Agenda

Council Meeting | Thursday, June 19, 2025 | 9:00 AM | Council Chambers

Page

A. CALL TO ORDER

B. ADOPTION OF AGENDA

C. ADOPTION OF MINUTES

3 - 7 1. **County Council Meeting Minutes**
Council Meeting - 05 Jun 2025 - Minutes

D. DELEGATIONS

8 - 22 1. **10:30 a.m. - Highway 3 Twinning Development Association**
Highway 3 Twinning Development Association Presentation

E. DEPARTMENT REPORTS

E.1. DEVELOPMENT & INFRASTRUCTURE

23 - 813 E.1.1. **Bylaw 25-018 - Re-designate Plan 1113171 Block 1 Lot 5 in the NW 10-9-21-W4 from Urban Fringe to Rural General Industrial - First Reading**
Bylaw 25-018 - Re-designate Plan 1113171 Block 1 Lot 5 in the NW 10-9-21-W4 from Urban Fringe to Rural General Industrial- First Reading

E.2. CORPORATE SERVICES

814 - 816 E.2.1. **Tax Penalty Waiver Request - Roll #19420400**
Tax Penalty Waiver Request - Roll #19420400

E.3. OPERATIONS

E.3.1. **Lethbridge Regional Waste Services Commission Appointment**

F. CORRESPONDENCE

817 1. **Fresh Start Recovery - Thank You**
Fresh Start Recovery - Thank you

818 - 819 2. **Community Foundation**
Community Foundation

G. COUNTY COUNCIL AND COMMITTEE UPDATES

820 - 823 1. **Lethbridge County Council Attendance Update - May 2025**
Lethbridge County Council Attendance Update - May 2025

H. NEW BUSINESS

I. CLOSED SESSION

824 - 825 1. **Request for Participation (FOIP Section 21 - Disclosure harmful to intergovernmental relations)**
Request for Participation

826 - 841 2. **Proposed Regional Economic Development Initiative (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party, Section 25 - Disclosure Harmful to Economic and Other Interests of a Public Body)**
Proposed Regional Economic Development Initiative (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party, Section 25 - Disclosure Harmful to Economic and Other Interests of a Public Body)

3. **CAO Report - C. Beck (FOIP Sections 16, 17, 23 and 24)**

J. ADJOURN

Minutes

Council Meeting | Thursday, June 5, 2025 | 9:00 AM | Council Chambers

The Council Meeting of Lethbridge County was called to order on Thursday, June 5, 2025, at 9:00 AM, in the Council Chambers, with the following members present:

PRESENT:
Reeve Tory Campbell
Councillor Lorne Hickey
Councillor Mark Sayers
Councillor Kevin Slomp
Councillor Morris Zeinstra
Chief Administrative Officer Cole Beck
Director, Development & Infrastructure Devon Thiele
Director, Corporate Services Hailey Pinksen
Director, Operations Ryan Thomson
Manager, Planning & Development Hilary Janzen
Executive Assistant Candice Robison
Senior Planner Steve Harty
Municipal Intern, Planning Hannah Laberge

A. CALL TO ORDER

Reeve Tory Campbell called the meeting to order at 9:02 a.m.

Reeve Campbell read the following land acknowledgement:
In the true spirit of reconciliation, we acknowledge all those who call this land home now and for thousands of years in the past. May we respect each other and find understanding together and recognize the benefits that this land provides to all of us.

Reeve Campbell expressed gratitude to Hilary Janzen, Manager of Planning and Development, for her dedicated years of service and significant contributions to the County. He also extended his congratulations to her on her new role with the Town of Taber, wishing her continued success in her future endeavors.

B. ADOPTION OF AGENDA

The following items were added to the agenda:

H.4 - FCSS (*FOIP Section 21 - Disclosure harmful to business interests of a third party)*
H.5. - Disposal of Municipal Lands (*FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)*

166-2025	Councillor Sayers	MOVED that the June 5, 2025 Lethbridge County Council Meeting Agenda be adopted as amended.

CARRIED

C. ADOPTION OF MINUTES

C.1. *County Council Meeting Minutes*

167-2025	Councillor Hickey	MOVED that the May 15, 2025 Lethbridge County Council Minutes be adopted as presented.

CARRIED

D. SUBDIVISION APPLICATIONS

D.1. *Subdivision Application #2025-0-069 – Penner - Lot 1, Block 1, Plan 0210278 within NW1/4 27-11-20-W4M*

168-2025 Councillor Slomp MOVED that the Industrial subdivision of Lot 1, Block 1, Plan 0210278 within NW1/4 27-11-20-W4M (Certificate of Title No. 021 034 662), to subdivide a 10.24 and a 22.06 acre (4.143 & 8.929 ha) parcel from a previously subdivided title comprised of 91.98 acres (37.22 ha) for rural general industrial use; BE APPROVED subject to the following:

RESERVE:
The 10% reserve requirement, pursuant to Sections 666 and 667 of the Municipal Government Act, be provided as money in place of land on the 32.30-acres at the market value of $6,000.00 per acre with the actual acreage and amount (approx. $19,380.00) to be paid to Lethbridge County be determined at the final stage, for Municipal Reserve purposes.

CONDITIONS:
1. That, pursuant to Section 654(1)(d) of the Municipal Government Act, all outstanding property taxes shall be paid to Lethbridge County.
2. That, pursuant to Section 655(1)(b) of the Municipal Government Act, the applicant or owner or both enter into and comply with a Development Agreement with Lethbridge County which shall be registered concurrently with the final plan against the title(s) being created. This agreement may reference the terms and obligations of the service road to be developed.
3. That the applicant provides a final Plan of Survey as prepared by an Alberta Land Surveyor to illustrate the exact dimensions and parcel size of the proposed parcel as approved.
4. That the conditions of Alberta Transportation and Economic Corridors regarding access to Highway 25 and the service road be met prior to finalization, including that a 30.0 m service road be dedicated and constructed along the highway frontage of the two parcels. The final Plan of Survey shall include the dedication of the 30.0 m service road.
5. That the applicant has a professional soils analysis completed for the two parcels to demonstrate suitability of a private on-site septic treatment system on the land, with results to be as determined satisfactory to the Subdivision Authority. This may also be addressed through the terms of the Development Agreement with the County.
6. That any easement(s) as required by utility companies, or the municipality shall be established.

CARRIED

D.2. ***Subdivision Application #2025-0-077 – Houweling - Lot 1, Block 1, Plan 9913181 within SW1/4 33-10-21-W4M***

169-2025 Councillor Sayers MOVED that the Industrial subdivision of Lot 1, Block 1, Plan 9913181 within SW1/4 33-10-21-W4M (Certificate of Title No. 001 002 321), to subdivide a 4.31-acre (1.74 ha) parcel from a previously subdivided title of 81.62-acres (33.03 ha) for rural general industrial use; BE APPROVED subject to the following:

RESERVE:
The 10% reserve requirement, pursuant to Sections 666 and 667 of the Municipal Government Act, be provided as money in place of land on the 4.31-acres at the market value of $12,000.00 per acre with the actual acreage and amount (approx. $5,172.00) to be paid to Lethbridge County to be determined at the final stage, for Municipal Reserve purposes.

CONDITIONS:
1. That, pursuant to Section 654(1)(d) of the Municipal Government Act, all outstanding property taxes shall be paid to Lethbridge County.
2. That, pursuant to Section 655(1)(b) of the Municipal Government Act, the applicant or owner or both enter into and comply with a Development Agreement with Lethbridge County which shall be registered concurrently with the final plan against the title(s) being created.
3. That the applicant submits a final plan as prepared by an Alberta Land Surveyor that certifies the exact location and dimensions of the parcel being subdivided as approved.

4. That any easement(s) as required by utility companies, or the municipality shall be established.
5. That the applicant is responsible for meeting any conditions of Alberta Arts, Culture and Status of Women regarding provincial Historical Resources Act clearance or approval that may be required, prior to finalization.

CARRIED

E. DEPARTMENT REPORTS

E.1. DEVELOPMENT & INFRASTRUCTURE

E.1.1. *Bylaw 25-016 - Re-designate a portion of the NW 3-10-22-W4 from Rural Agriculture to Rural General Industrial - First Reading*

170-2025 Councillor Slomp MOVED that Bylaw 25-016 be read a first time.

CARRIED

E.2. OPERATIONS

E.2.1. *Culvert Replacement*

171-2025 Councillor Hickey MOVED that Council authorize an allocation of $95,000 from the Public Works Capital Project Reserve for the replacement of the deteriorated culvert at Range Road 21-4 through directional drilling, and for the completion of associated ditch remediation and slope stabilization works.

CARRIED

E.3. ADMINISTRATION

E.3.1. *Alberta Lamb Producers Conference & AGM Sponsorship*

172-2025 Councillor Sayers MOVED that Lethbridge County approve a $500 + GST sponsorship at the Coffee Sponsor level for the 2025 Alberta Lamb Producers AGM and Conference, scheduled for November 14–15, 2025, in Lethbridge.

CARRIED

F. CORRESPONDENCE

F.1. *Lethbridge Coaldale 4-H Beef Club/Warner Beef Club - Country Classic Show & Sale*

Council received correspondence from the Lethbridge Coaldale 4-H Beef Club and the Warner Beef Club regarding their first-ever joint event—the Country Classic Show and Sale, taking place on June 7, 2025, at Perlich Brothers Auction Market.

173-2025 Councillor Hickey MOVED that Council donates $300 to the Lethbridge Coaldale 4-H Beef Club/Warner Beef Club Country Classic Show & Sale to be funded from the Council Donations Reserve.

CARRIED

H. CLOSED SESSION

H.1. - Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)

H.2. - Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)

H.3. - CAO Report - C. Beck (FOIP Sections 16, 17, 23 and 24)

H.4. - FCSS (FOIP Section 21 - Disclosure harmful to business interests of a third party)

H.5. - Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)

174-2025 Councillor Zeinstra MOVED that the Lethbridge County Council Meeting move into Closed Session, pursuant to Section 197 of the Municipal Government Act, the time being 9:37 a.m. for the discussion on the following:

H.1. - Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)

H.2. - Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)

H.3. - CAO Report - C. Beck (FOIP Sections 16, 17, 23 and 24)

H.4. - FCSS (FOIP Section 16 - Disclosure harmful to business interests of a third party)

H.5. - Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)

Present during the Closed Session:
Lethbridge County Council
Chief Administrative Officer
Senior Management
Administrative Staff
CARRIED

175-2025 Councillor Zeinstra MOVED that the Lethbridge County Council Meeting move out of the closed session at 11:38 a.m

CARRIED

H.1. ***Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)***

176-2025 Councillor Slomp MOVED that County Council refuse the offer and direct administration to counteroffer for the assessed value or greater of the land.

CARRIED

H.2. ***Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)***

177-2025 Councillor Hickey MOVED that County Council rescind the sale of the lot and transfer the lands to the water users group.

CARRIED

H.5. ***H.5. - Disposal of Municipal Lands (FOIP Section 25 - Disclosure harmful to economic and other interests of a public body)***

178-2025 Councillor Sayers MOVED that County advertise the land in question for sale as per the Land Sale Policy.

CARRIED

I. ADJOURN

179-2025 Councillor Zeinstra MOVED that the Lethbridge County Council Meeting adjourn at 11:40 a.m.

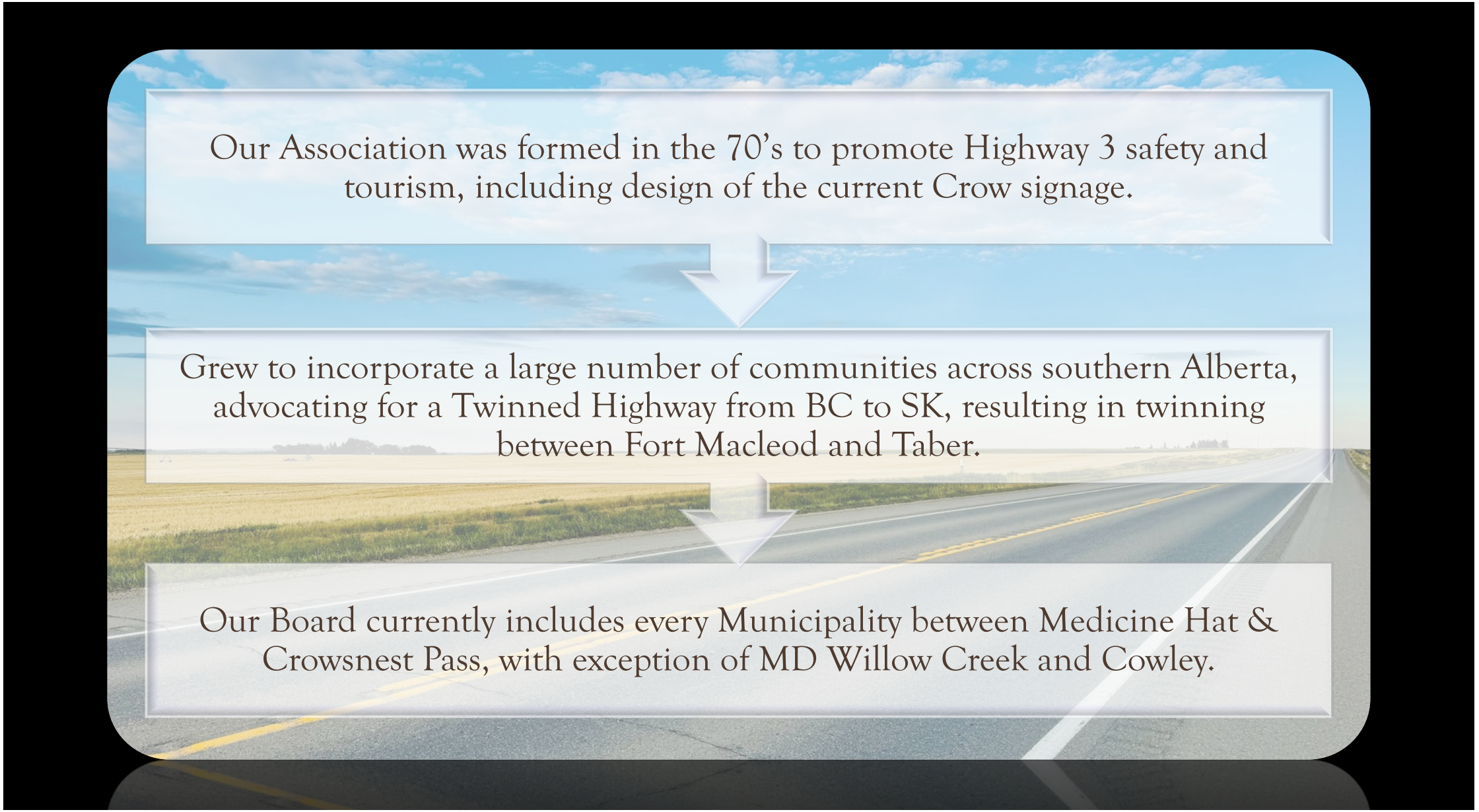
CARRIED

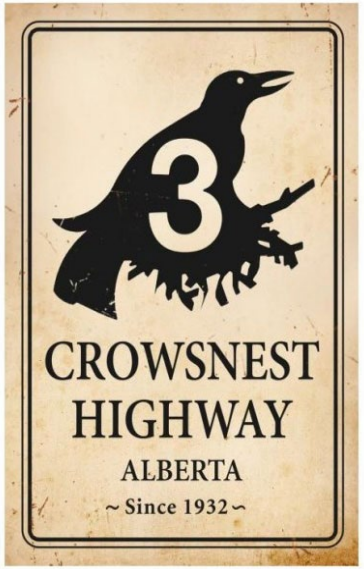
Reeve

CAO

Highway 3 Twinning Development Association

Looking Back


Our Association was formed in the 70's to promote Highway 3 safety and tourism, including design of the current Crow signage.
Grew to incorporate a large number of communities across southern Alberta, advocating for a Twinned Highway from BC to SK, resulting in twinning between Fort Macleod and Taber.
Our Board currently includes every Municipality between Medicine Hat & Crowsnest Pass, with exception of MD Willow Creek and Cowley.



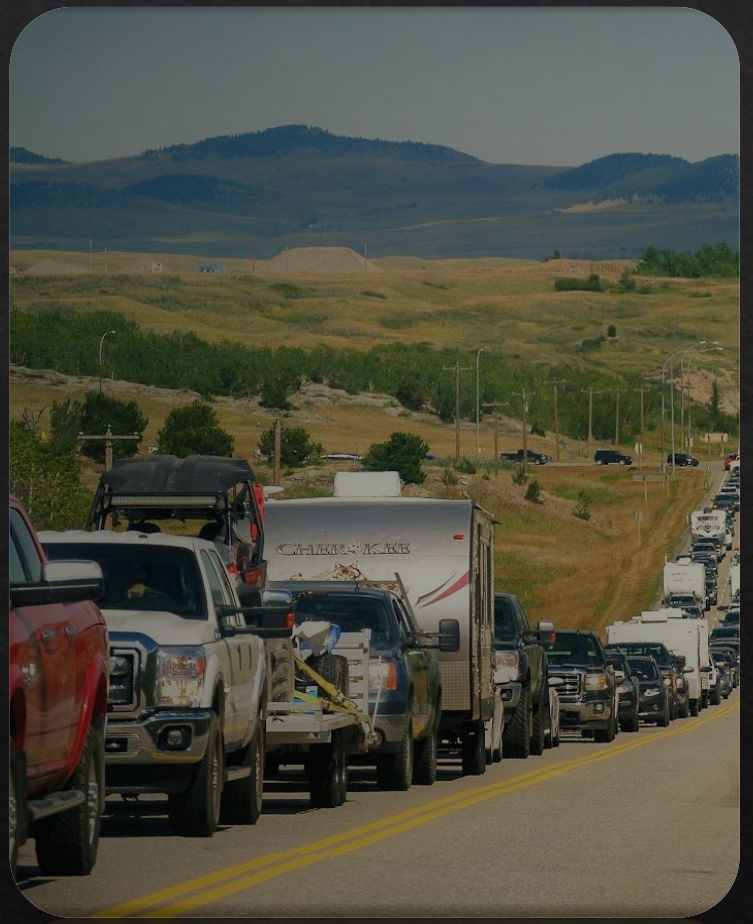


The H3TDA Logo was created in late 2019 and incorporated into use in the beginning of 2020.

Permission was granted from Alberta Transportation to use the crow in our logo as it was a great fit for the association. The Crowsnest “Crow” sign has been around since the 1930s.

Why Twin

- Import/Export through Southern Alberta and South-Eastern BC US Border crossings are among the *top 10 Busiest in Canada* and Hwy 3 is the Hwy 1 alternate supply-chain route to Vancouver ports.
- New or expanded investments have significantly increased trucking on Hwy 3 single lanes.
- Annual Traffic Counts maintained with Alberta Transportation show increased travel up to 4X since the 1960s.
- The 24 kms of passing lanes built in the early 2000s are not adequate and do not have the capacity to move the increasing numbers of vehicles, both transport and automobile, especially at the rate of economic growth.



Moving Forward



On November 25th, 2022, the Government of Alberta announced plans to complete the twinning of the remaining portions of Highway 3. Broken into eight phases with varying timings, the plan is to twin the remaining 215 kilometres of the Southern Alberta highway.



The official groundbreaking took place on May 31, 2024 at a work site east of Taber mark the beginning of the long-awaited Highway 3 twinning project.

Sections

46 kilometres

Twin Highway 3 between Taber and Burdett

10 kilometres

Highway 3X/Coleman Bypass

5 kilometres

East of Seven Persons to Medicine Hat

47 kilometres

Blairmore to east of Highway 6 at Pincher Creek

28 kilometres

East of Bow Island to east of Seven Persons

23 kilometres

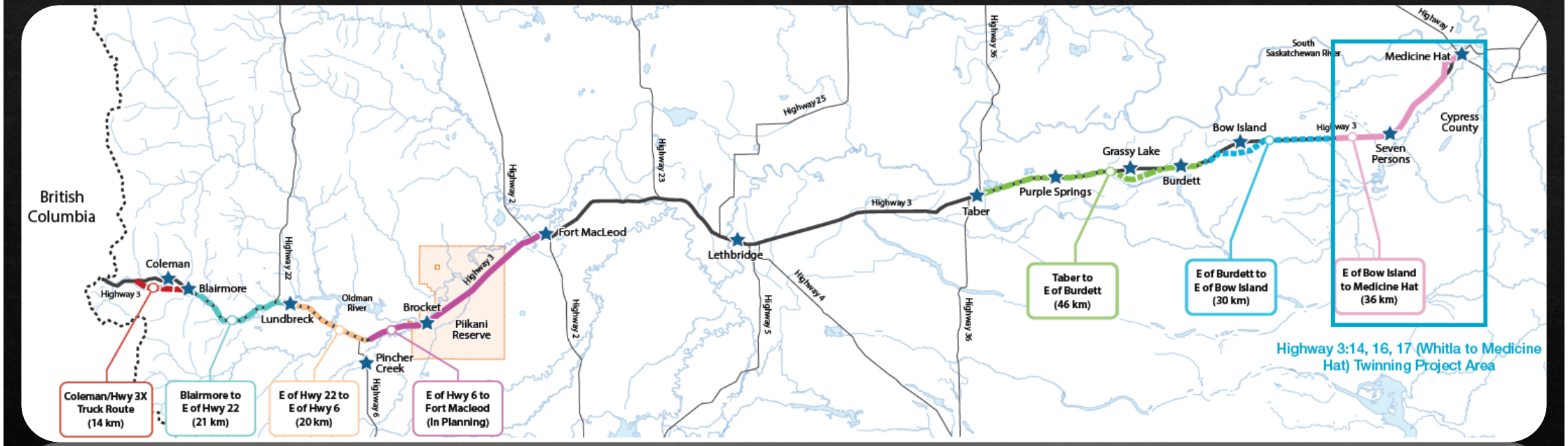
East of Burdett to east of Bow Island

38 kilometres

Pincher Creek to west of Fort Macleod

8 kilometres

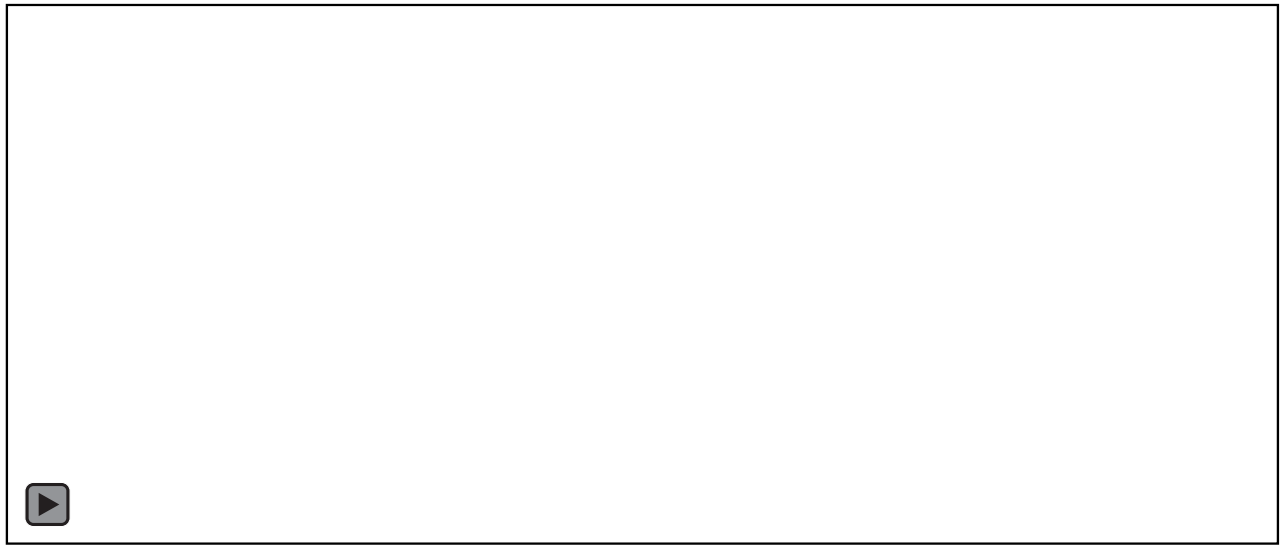
Alberta/B.C. border to Highway 3X


British Columbia
Coleman
Blairmore
Highway 3
Highway 22
Lundbreck
Oldman River
Brocket
Piikani Reserve
Pincher Creek
Highway 6
Highway 3
Fort MacLeod
Highway 2
Highway 23
Highway 25
Lethbridge
Highway 4
Highway 5
Highway 36
Taber
Highway 3
Purple Springs
Grassy Lake
Burdett
Bow Island
Highway 3
South Saskatchewan River
Medicine Hat
Highway 1
Seven Persons
Cypress County
Coleman/Hwy 3X Truck Route (14 km)
Blairmore to E of Hwy 22 (21 km)
E of Hwy 22 to E of Hwy 6 (20 km)
E of Hwy 6 to Fort Macleod (In Planning)
Taber to E of Burdett (46 km)
E of Burdett to E of Bow Island (30 km)
E of Bow Island to Medicine Hat (36 km)
Highway 3:14, 16, 17 (Whitla to Medicine Hat) Twinning Project Area

Members

The association is now proudly supported by:

- 13 Municipalities
- 20 Industry/Business Members
- 20 Member Organizations



Continued Support is Needed to Build Momentum


01
ADVOCACY
BEING THE VOICE OF THE PEOPLE, COMMUNITIES, AND INDUSTRY ALONG THE CORRIDOR
02
COMMUNICATION
BEING THE CONDUIT OF COMMUNICATION BETWEEN GOVERNMENT, COMMUNITY, AND INDUSTRY
03
BUY-IN
PROVIDING INDUSTRY PARTICIPATION FOR GREATER UNDERSTANDING OF ECONOMIC AND SAFETY IMPACTS THAT TWINNING WILL SOLVE
04
LOBBYING
WORKING WITH KEY DECISION MAKERS TO VOICE THE MESSAGE OF IMPACT ALONG THE CORRIDOR IN ORDER TO SECURE TWINNING COMMITTMENTS
05
ACTION
HIGHWAY 3 SHOVELS IN THE GROUND

Why Membership is Important

- OPPRORTUNITY - to shape and assist in driving the process
- COMMUNICATION - to share questions, concerns, and information that will assist in planning within communities and businesses
- STRENGTH – to have one a collaborative voice and consistent messaging with government
- LOBBYING/ADVOCATING – to maintain our presence and ensure the funding remains a priority and that that entire project is completed




TWIN3.CA
HIGHWAY 3 TWINNING DEVELOPMENT
TWIN3
SIGN THE PETITION AT
ADVOCACY
COMMUNICAT
BUY-IN
LOBBYING















AGENDA ITEM REPORT

Title:	Bylaw 25-018 - Re-designate Plan 1113171 Block 1 Lot 5 in the NW 10-9-21-W4 from Urban Fringe to Rural General Industrial - First Reading
Meeting:	Council Meeting - 19 Jun 2025
Department:	Development & Infrastructure
Report Author:	Hilary Janzen

APPROVAL(S):

Devon Thiele, Director, Development & Infrastructure	Approved - 12 Jun 2025
Cole Beck, Chief Administrative Officer	Approved - 12 Jun 2025

STRATEGIC ALIGNMENT:

Governance	Relationships	Region	Prosperity
☐	☒	☒	☐

EXECUTIVE SUMMARY:

An application has been made to re-designate Plan 1113171 Block 1 Lot 5 in the NW 10-9-21-W4 from Urban Fringe to Rural General Industrial. The applicant wishes to re-designate the lands to allow for future subdivision and industrial development.

RECOMMENDATION:

That Bylaw 25-018 be read a first time.

REASON(S) FOR RECOMMENDATION(S):

First reading of Bylaw 25-018 will allow County Administration to set the date for the Public Hearing and send out the notices for the proposed bylaw.

PREVIOUS COUNCIL DIRECTION / POLICY:

- The Municipal Development Plan policy 4.13 states that landowners/developers may apply to Lethbridge County to initiate a re-designation process for parcels of land in support of development proposals that may not conform to the existing land use
- County Council approved the Bylaw 23-008 being the Chinook Industrial Park Area Structure Plan on May 4, 2023.

BACKGROUND INFORMATION:

An application has been made to re-designate e-designate Plan 1113171 Block 1 Lot 5 in the NW 10-9-21-W4 from Urban Fringe to Rural General Industrial. The applicant wishes to re-designate the lands to allow for future subdivision and industrial development.

The application has been circulated to all County Departments and external agencies for review and their comments as well as any planning/strategic planning considerations will be presented at the public hearing. It is anticipated that the public hearing will be held in August 2025.

ALTERNATIVES / PROS / CONS:

County Council may refuse first reading of the Bylaw. Refusing the bylaw would be contrary to legal advice which as been that first reading of the bylaw shall be given as the applicant and the public have the right to attend and speak at a public hearing which is set upon first reading of the bylaw. The public hearing process allows County Council the opportunity to hear all positions (in favour and opposed) on the bylaw and make an informed decision. If first reading of the bylaw is not given the applicant could appeal that decision to the Alberta Court of Appeal.

FINANCIAL IMPACT:

If the bylaw was approved, any future development would be taxed at the County's commercial/industrial tax rate.

LEVEL OF PUBLIC PARTICIPATION:

☐ Inform ☐ Consult ☒ Involve ☐ Collaborate ☐ Empower

ATTACHMENTS:

Bylaw 25-018 - Application Form
25_018_UF_to_RGI Rezoning Map
Rocky Mountain Equipment- Land Use Redesignation_April 24 reduced size
Bylaw 25-018- Rocky Mountain Equipment - Amendment to LUB

Lethbridge County
#100, 905 - 4th Ave S
Lethbridge, AB T1J 4E4
403-328-5525

FORM C: APPLICATION FOR A LAND USE BYLAW AMENDMENT

Pursuant to Land Use Bylaw No. 24-007

OFFICE USE		
Date of Application: April 24, 2025	Assigned Bylaw	No. Bylaw 25-018
Date Deemed Complete: May 12, 2025	Application & Processing Fee:	$1500.00
☒ Redesignation ☐ Text Amendment	Certificate of Title Submitted:	☒ Yes ☐ No Title transfer not completed upon submission

A refusal is **not** appealable and a subsequent application for amendment involving the same lot and/or the same or similar use may not be made for at least 18 months after the date of refusal. [Refer to Part 1, Sections 54 to 56 of bylaw.]

IMPORTANT NOTE: Although the Development Officer is in a position to advise on the principle or details of any proposals, such advice must not be taken in any way as official consent.

APPLICANT INFORMATION

Name of Applicant: Jason Carter - Rocky Mountiain Equipment

Mailing Address: 3345 8th St SE
Calgary AB, T2G 3A4

Postal Code:

Phone: 403-894-6055

Phone (alternate):

Fax:

Is the applicant the owner of the property? ☑ Yes ☐ No

IF "NO" please complete box below

Name of Owner:

Mailing Address:

Postal Code:

Phone:

Applicant's interest in the property:
- ☐ Agent
- ☐ Contractor
- ☐ Tenant
- ☐ Other

PROPERTY INFORMATION

Municipal Address:

Legal Description: Lot(s) 5 Block 1 Plan 1113171

OR Quarter NW/SW Section 10 Township 19 Range 21

LETHBRIDGE COUNTY

Lethbridge County
#100, 905 - 4th Ave S
Lethbridge, AB T1J 4E4
403-328-5525

FORM C: APPLICATION FOR A LAND USE BYLAW AMENDMENT

Pursuant to Land Use Bylaw No. 24-007

AMENDMENT INFORMATION

What is the proposed amendment? ☐ Text Amendment ☑ Land Use Redesignation

IF TEXT AMENDMENT:

For text amendments, attach a description including:

- The section to be amended;
- The change(s) to the text; and
- Reasons for the change(s).

IF LAND USE REDESIGNATION:

Current Land Use Designation (zoning): Lethbrige Urban Fringe, LUF District

Proposed Land Use Designation (zoning) (if applicable): RGI District - Rural General Industrial

SITE DESCRIPTION:

Describe the **lot/parcel dimensions** Approx 800m x 400m and **lot area/parcel acreage** 84
Indicate the information on a scaled PLOT or SITE PLAN: (0-4 acres at 1" = 20'; 5-9 acres at 1"= 100'; 10 acres or more at 1"=200')

☑ **Site or Plot Plan Attached** ☐ **Conceptual Design Scheme or Area Structure Plan Attached**

OTHER INFORMATION:

Section 55 of the *Land Use Bylaw* regulates the information required to accompany an application for redesignation. Please **attach a descriptive narrative** detailing:

- The existing and proposed future land use(s) (i.e. details of the proposed development);
- If and how the proposed redesignation is consistent with applicable statutory plans;
- The compatibility of the proposal with surrounding uses and zoning;
- The development suitability or potential of the site, including identification of any constraints and/or hazard areas (e.g. easements, soil conditions, topography, drainage, etc.);
- Availability of facilities and services (sewage disposal, domestic water, gas, electricity, fire protection, schools, etc.) to serve the subject property while maintaining adequate levels of service to existing development; and
- Access and egress from the parcel and any potential impacts on public roads.

In addition to the descriptive narrative, an Area Structure Plan or Conceptual Design Scheme may be required in conjunction with this application where:

- redesignating land to another district;
- multiple parcels of land are involved;
- four or more lots could be created;
- several pieces of fragmented land are adjacent to the proposal;
- new internal public roads would be required;
- municipal services would need to be extended; or
- required by Council, or the Subdivision or Development Authority if applicable.

LETHBRIDGE COUNTY

Lethbridge County
#100, 905 - 4th Ave S
Lethbridge, AB T1J 4E4
403-328-5525

FORM C: APPLICATION FOR A LAND USE BYLAW AMENDMENT

Pursuant to Land Use Bylaw No. 24-007

The applicant may also be required to provide other professional reports, such as a:

- geotechnical report; and/or
- soils analysis; and/or
- evaluation of surface drainage or a detailed storm water management plan;
- and any other information described in Part 1, section 55(2) or as deemed necessary to make an informed evaluation of the suitability of the site in relation to the proposed use;

if deemed necessary.

SITE PLAN

Plans and drawings, in sufficient detail to enable adequate consideration of the application, must be submitted in **duplicate** with this application, together with a plan sufficient to identify the land. It is desirable that the plans and drawings should be on a scale appropriate to the development. However, unless otherwise stipulated, it is not necessary for plans and drawings to be professionally prepared. Council may request additional information.

DECLARATION OF APPLICANT/AGENT

The information given on this form is full and complete and is, to the best of my knowledge, a true statement of the facts in relation to the application. I also consent to an authorized person designated by the municipality to enter upon the subject land and buildings for the purpose of an inspection during the processing of this application. *I/We have read and understand the terms noted below and hereby certify that the registered owner of the land is aware of, and in agreement with this application.*

Jason Carter

APPLICANT

REGISTERED OWNER (if not the same as applicant)

April 17 2025

DATE

IMPORTANT: This information may also be shared with appropriate government/ other agencies and may also be kept on file by the agencies. This information may also be used by and for any or all municipal programs and services. Information provided in this application may be considered at a public meeting. The application and related file content will become available to the public and are subject to the provisions of the Freedom of Information and Protection of Privacy Act (FOIP). If you have any questions about the collection of this information, please contact Lethbridge County.

TERMS

1. Subject to the provisions of the Land Use Bylaw No. 24-007 of Lethbridge County, the term "development" includes any change in the use, or intensity of use, of buildings or land.
2. Pursuant to the Municipal Development Plan, an area structure plan or conceptual design scheme may be required by Council before a decision is made.
3. A refusal is not appealable and a subsequent application for redesignation (reclassification) involving the same or similar lot and/or for the same or similar use may not be made for at least 18 months after the date of a refusal.
4. An approved redesignation (reclassification) shall be finalized by amending the land use bylaw map in accordance with section 692 of the Municipal Government Act, Revised Statutes of Alberta 2000, Chapter M-26.

Note: Information provided or generated in this application may be considered at a public meeting.



Bylaw 25-018: Urban Fringe (UF) to Rural General Industrial (RGI)

Plan 1113171; Block 1; Lot: 5; (NW-10-9-21-W4M) Approx 83.69 Acres Located in Lethbridge County, AB

N

Bylaw 25-018 - Urban Fringe to Rural General Industrial

LETHBRIDGE COUNTY

Rocky Mountain Equipment (RME)

Land Use Redesignation Application

FINAL REPORT

April 2025

ISL Engineering and Land Services Ltd. is an award-winning full-service consulting firm dedicated to working with all levels of government and the private sector to deliver planning and design solutions for transportation, water, and land projects.

At ISL, your identity is part of our identity. Diversity, Equity, and Inclusion (DEI) speaks to our core values and provides space for our teams to bring their authentic selves to work. ISL believes DEI creates the best outcomes for our clients while sustaining a happy and thriving work environment that allows for career development opportunities for all staff. ISL is committed to a focused effort on continuous improvement and development of a respectful and safe workplace.

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Rocky Mountain Equipment (RME) Land Use Redesignation Application

SUPPORTING INFORMATION FOR LETHBRIDGE COUNTY SITE

1.0 INTRODUCTION

The proposed RME Development site as shown on **Figure 1: Location Plan** is located within W½ 10-09-21 W4M in Lethbridge County (the County). The site is bounded by 43 Street N and the City of Lethbridge (the City) boundary to the west, Township Road (TR) 92 to the north, the St. Mary River Irrigation District (SMRID) Canal to the east and newly developed industrial park to the south (Frontier Industrial Park). The study area is relatively flat agricultural land with a gradual slope to the east.

The proposed RME Development comprises approximately 84 acres. A 20-acre site, noted as RME Parcel, will be developed at the north end of the parcel to include a building and associated traffic/staging areas for a RME dealership while the remaining area will be reserved for future development. The site will also include a stormwater pond to collect site drainage per the Stormwater Management Plan.



Figure 1: Location Plan

2.0 SITE CONTEXT

The land is relatively flat with a natural drainage pattern flowing towards the southeast portion of the Plan Area. There is an existing break in topography located centrally within the Plan area where the natural drainage begins to flow in the northeast direction.

The proximity to the Rave Industrial Park to the south and the Lethbridge Industrial Park to the west provides a perfect location for continued industrial growth with direct access to 43rd Street. The SMRID Canal provides separation between existing agricultural uses and cattle feeding areas east of the development.

A buried Telus Fibre Optics line currently bisects the parcel diagonally and relocation of the line will provide an efficient storm pond design and allow for future development parcels to be unencumbered by the utility easement.

A conceptual site plan is provided on **Figure 2: Proposed Site Development Concept** to illustrate how the site has been designed to accommodate the larger parcel required for the RME operations as well smaller parcels for future development.

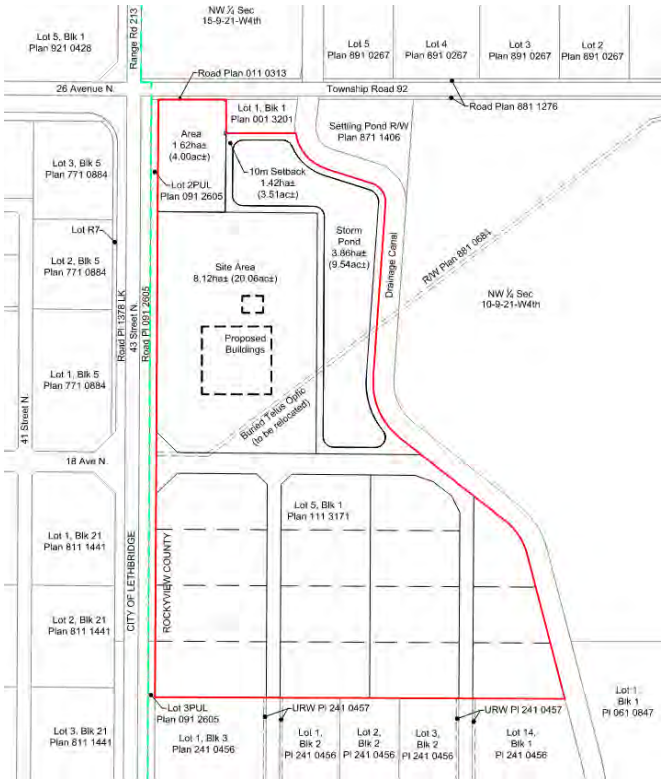


Figure 2: Site Development Concept

3.0 POLICY CONTEXT

The proposed Land Use Redesignation application is consistent with the following relevant regulations, statutory plans, and local bylaws:

3.1 City Of Lethbridge and Lethbridge County Inter- Municipal Development Plan (IMDP) (City of Lethbridge Bylaw No. 6015 & Lethbridge County Bylaw No. 1478, October 2016)

The RME lands fall within the City of Lethbridge and Lethbridge County IDP area, adjacent to primarily industrial uses in the City of Lethbridge.

The subject site is in **Policy Area 4, Sub-Area 1** as shown on **Map 4** of the IDP. The County has identified this area as a County Development Node and has an interest in expanding north of the existing RAVE development. The City would like to see the area managed in terms of appropriate land uses, access, and connectivity to city services and utilities.

IDP policies include:

- Flexibility in roadway alignment and parcel sizes,
- Visual screening and buffering on both sides of 43 Street, and
- Alignment with intersections on the west side of 43 Street.

3.2 Municipal Development Plan (MDP) (Bylaw No. 22-001)

The overall goal of the MDP is to acknowledge and support the important agricultural aspects of Lethbridge County, while facilitating new opportunities for economic and community growth for the municipality in a sound, well-planned and sustainable manner.

The RME site is located within an area identified as Potential Business Park Area (Growth) on **Map 5 Main Industrial / Business Park Areas.** IDP Policies include:

- Planning for a strategy of growth in the industrial/commercial sector to help provide the County a more balanced, diversified, and healthier tax base,
- Providing a positive environment for industrial/commercial development,
- Provide siting and locational criteria that are defined but flexible,
- Providing for a wide range of industrial and commercial types of development,
- Providing infrastructure in a sustainable, efficient, cost-effective, and environmentally sound manner to provide adequate service and maintain public health and safety.

3.3 Chinook Industrial Park Area Structure Plan (ASP) (Bylaw No. 23-008)

The Chinook Industrial Park ASP was prepared consistent with policies established in the MDP and the City Of Lethbridge and Lethbridge County IDP.

The RME Development comprises approximately 84 acres in Phase 3 of the Chinook Industrial Park ASP and is identified on the **ASP Land Use Plan** as Flex Industrial and Stormwater Management Facilities. The intent of the Flex Industrial Area is to provide flexible options for multiple forms of industrial related uses in a variety of forms depending on market conditions and landowner requirements. Flex Industrial is not a land use district, and this area is intended

to accommodate either Business Light Industrial (BLI) and/or Rural General Industrial (RGI) zoning.

The RME Parcel is larger than anticipated in the ASP in order to accommodate the operational requirements for the site. The remaining areas are consistent with the sizes originally anticipated in Phase 3. Policies within the ASP provide sufficient flexibility to adjust the sizes of the parcels without requiring an amendment to the ASP.

The road network is generally as shown on the **ASP Land Use Plan**, with minor modifications to reflect desired parcel sizes and operational requirements for the RME dealership.

Municipal reserve be provided by cash-in-lieu. Costs will be confirmed with the Town Assessor.

3.4 Land Use Bylaw (Bylaw No. 24-007)

The subject parcel is currently used for agricultural purposes and is designated **Lethbridge Urban Fringe, LUF District.**

A land use bylaw amendment to redesignate the site to **Rural General Industrial (RGI) District** is required to accommodate the RME dealership and other general industrial uses, as well as the stormwater facility.

The proposed redesignation is shown on **Figure 3: Proposed Land Use Bylaw Amendment.**

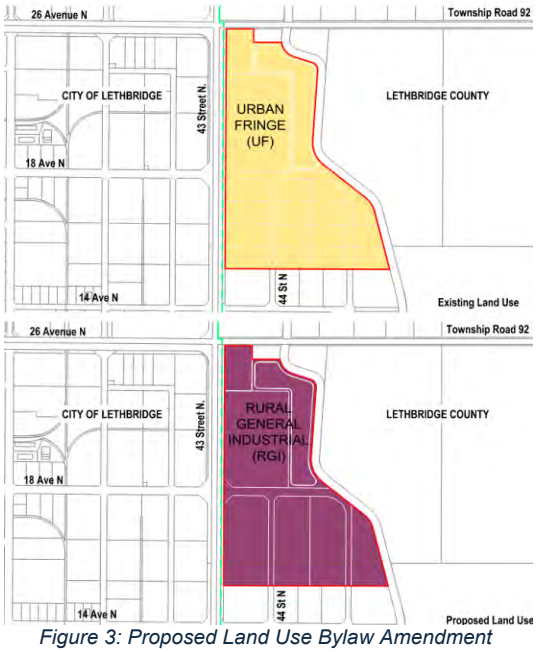


Figure 3: Proposed Land Use Bylaw Amendment

4.0 TECHNICAL REPORTS

4.1 Phase 1 Environmental Site Assessment

A Phase I Site Assessment (ESA) was conducted by Tetra Tech as part of the overall Chinook Industrial Park ASP. Another Phase 1 ESA was conducted by R SQUARED ENVIRONMENTAL INC. in May 2024, specifically for the RME Development.

Both ESAs found no significant environmental concerns identified during the studies which included a review of relevant historical research, interviews, and a site inspection. There are no recommendations for further environmental investigations on the overall Chinook Industrial Park and RME Development at this time.

4.2 Geotechnical Investigation

A geotechnical evaluation was completed by Tetra Tech as part of the overall Chinook Industrial Park ASP. A site specific geotechnical field investigation for the RME Development was conducted by P. Machibroda Engineering Ltd. between August 27 and 29, 2024.

Based on the soil test results, recommendations were prepared for site preparation, excavations and dewatering, limit states resistance factors and serviceability, deep foundations, grade-supported concrete slabs, soil retaining walls, foundation drainage, foundation concrete, site classification for seismic site response, traffic structures, and stormwater ponds.

4.3 Stormwater Management Plan (SWMP)

A SWMP was prepared by Stantec Consulting Ltd. for the Chinook Industrial Park ASP in February 2023. This document provides the design basis for the overall stormwater management plan, including analysis details, summaries of the hydraulic modeling performed, and retention required.

4.4 Traffic Analysis

A Traffic Impact Assessment (TIA) was undertaken by Stantec for the Chinook Industrial Park ASP. Traffic data was collected along with an estimate of trip generated from the proposed development to determine impacts to the adjacent roadways and identify improvements to maintain level of service. The proposed development appears to have no detrimental effect on the operations at 43 Street N.

Chinook Industrial Park will have access to 43 Street N with two new intersections at 14 Avenue N and 18 Avenue N. Signalization at the new access points and upgrades to 43 Street N will be required to maintain acceptable operations. Improvements will be shared between the City of Lethbridge and Lethbridge County. Allocation of final costs will be determined during subdivision.

The proposed road network for the RME Development generally complies with what is shown on the **ASP Land Use Plan**, with minor modifications to reflect desired parcel sizes and operational requirements for the RME Parcel/dealership.

5.0 MUNICIPAL SERVICES

5.1 Water

Each new lot within the RME Development can have a new water service by connecting to a watermain located in the adjacent roadways. Each connection point to the City and County system shall have a meter chamber and premise/isolation backflow protection.

The watermain will extend the existing watermains currently servicing Frontier Industrial Park which connects to the City of Lethbridge Water System, located on 43rd Street. The RME Development will extend the watermain further north to connect to the Lethbridge County Water System located on TR 92. A provision to allow a watermain loop between the City and the County Water System is contingent upon reaching a conveyance agreement between the City and County.

All water mains are to be a minimum of 250 mm in diameter. A demand of 5 m^3/ha/day was assumed, and fire flows has been assumed at 9,000 L/min.

The use of non-potable water by future development is not anticipated.

5.2 Fire Protection

The proposed primary source for fire protection in the RME Development will be through the new watermains described under Section 5. Hydrants along the roadways will be space at intervals meeting the jurisdiction providing fire protection service at the time of construction which is currently the Town of Coaldale.

5.3 Wastewater

The current City sanitary infrastructure is not capable of accommodating the flows from the RME Development. The RME Development will need to be serviced through septic fields or pump-out tanks. As such, parcels will need to be a minimum of 0.81 ha (2.0 acres) in size, and high consumption water users producing large quantities of sewage effluent cannot be accommodated under this servicing strategy. Detailed evaluations, designs, and regulatory approvals for onsite systems will be prepared by others during development permitting. No provision will be made in public roads for a municipal gravity system, nor any connection to municipal treatment facilities.

5.4 Stormwater

All future stormwater designs and construction shall meet the requirements of Lethbridge County, the Province of Alberta and SMRID. An agreement must be established between the County and SMRID and two major requirements must be met (listed below) before a pumped discharge of stormwater into the Canal can be considered.

1. Stormwater must be sampled and meet SMRID water quality requirements.
2. Available conveyance capacity within the Canal must be confirmed prior to operation for storm events.

Based on these requirements, a new storm pond will be required to accommodate the RME Development. The new pond will need to operate as a “zero-release” facility storing an entire

1:100 year rainfall event until permission is granted by SMRID. Based on initial discussions with SMRID, discharge to the Canal is usually provided twice a year and during major storm events.

The RME parcel is intended to drain directly to the new pond. The other parcels and new roadway will be restricted to a 40 L/s/ha and 90 L/s/ha release rates respectively, to reduce the size of the underground storm infrastructure that conveys stormwater towards the new pond.

5.5 Shallow Utilities

The shallow utilities for the RME Development will include natural gas, electrical power, and telecommunications services. Natural gas distribution will be provided by ATCO Gas, electrical power services will be provided by Fortis and telecommunications services, including phone and internet, will be provided by local service providers such as Telus and Satellite Service providers. As part of the subdivision of the RME Development, coordination with third party shallow utilities companies will be completed to extend mains along a new utility easement (located adjacent to the road). Parcel owners will need to contact third party shallow utilities companies directly to pull new services off the mains to service their site.

Additionally, the RME Development will require relocation of an existing Telus Fibre utility which cuts across the parcel. Pending coordination with TELUS, the Fibre utility is planned to be relocated within a 2.4 m wide easement along the north side of the new roadway south of the RME Parcel, an extension of 18 Avenue N. A custom 22 m Industrial Collector Road is proposed for this roadway (refer to *Figure 4.0 Custom 22.0m Industrial Collector Road*).

6.0 TRANSPORTATION

The road network is generally as shown on the ASP Land Use Plan, with minor modifications to reflect desired parcel sizes and operational requirements for the RME Parce/dealership.

New roadways are to be a standard 20m R/W Industrial Collector Road with 10m pavement width (two 5 m wide driving lanes), no provision for on street parking, no sidewalks and all intersections to accommodate WB20 truck turning movements. All roadways will be paved and meet Lethbridge County standards.

Access for the RME Parcel will come from the 18 Avenue N extension. The largest equipment accessing the RME Parcel is close to 20’ wide. To ensure the equipment can drive along the new roadway freely, a 12m wide pavement is proposed (two 6 m driving lane) expanding the road right of way from 20 m to 22 m. Refer to **Figure 4.0 Custom 22.0m Industrial Collector Road.**

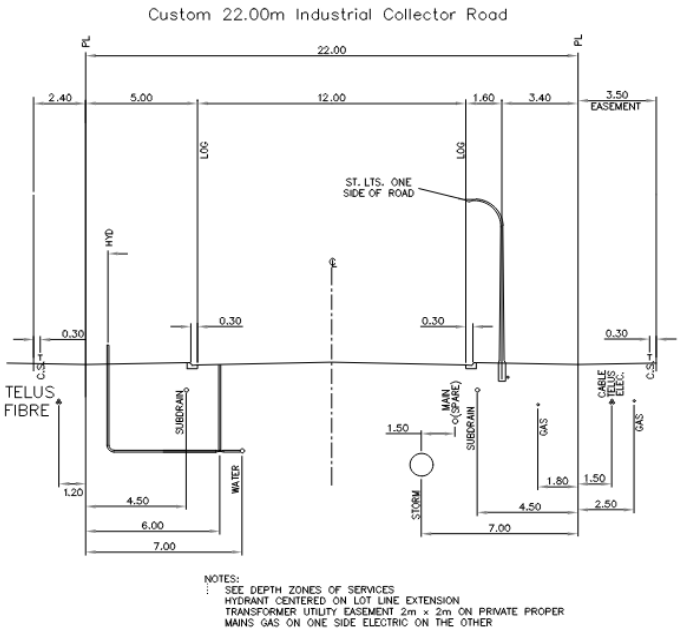


Figure 4: Custom 22.0m Industrial Collector Road

7.0 CONCLUSION

The proposed land use bylaw amendment is consistent with the County's guiding policy documents and inter-municipal initiatives with the City of Lethbridge.

Approval of the redesignation will allow compatible development to be in place by the end of 2027.

APPENDICES



Project Boundary

ISL

0 300 600 m
1:15,000

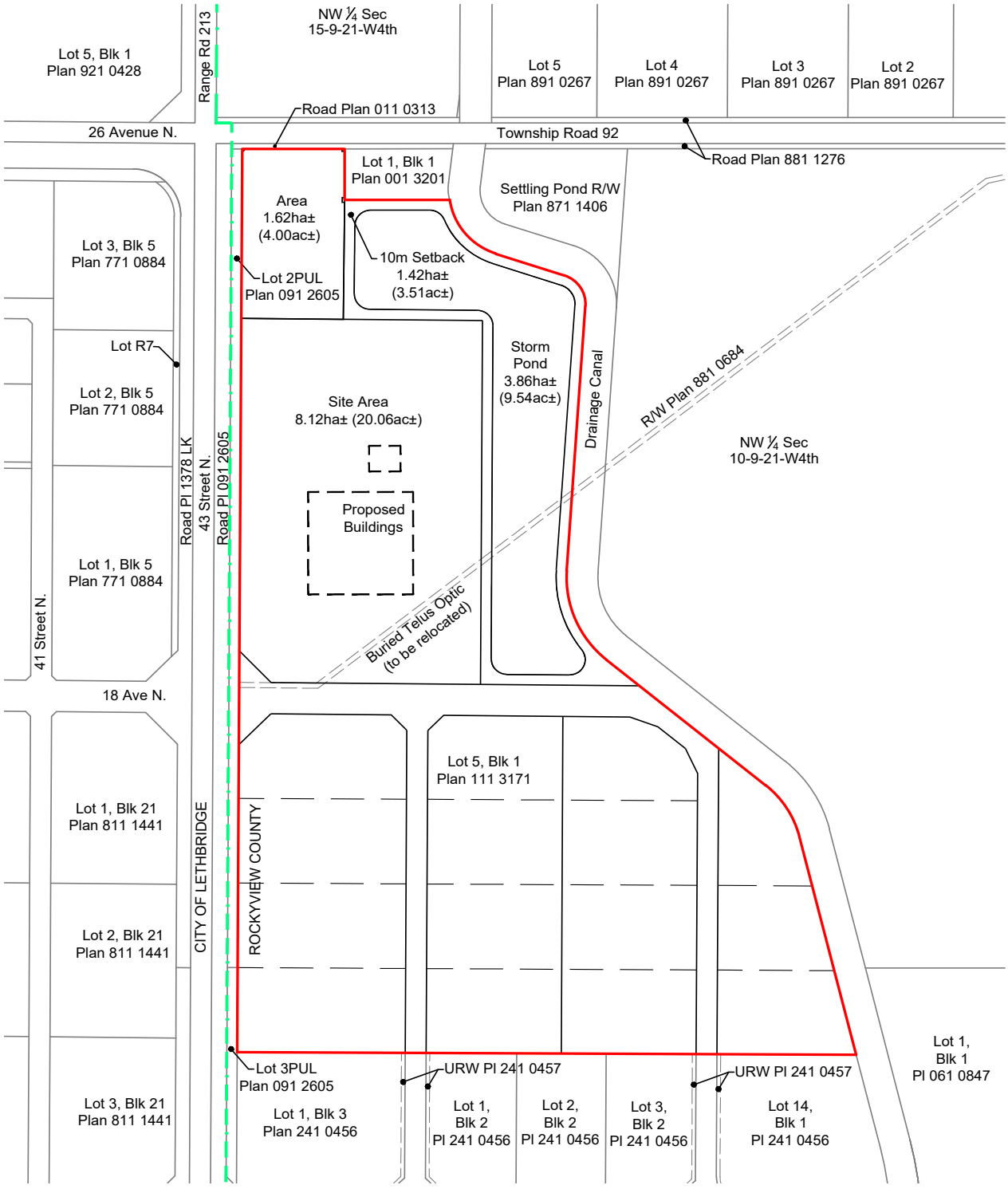
Integrated Expertise, Locally Delivered

N

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Rocky Mountain Equipment
Lethbridge County
Figure 1
Location Plan

April 2025



Property Boundary
City/County Boundary

0 100 200 m
1:5000

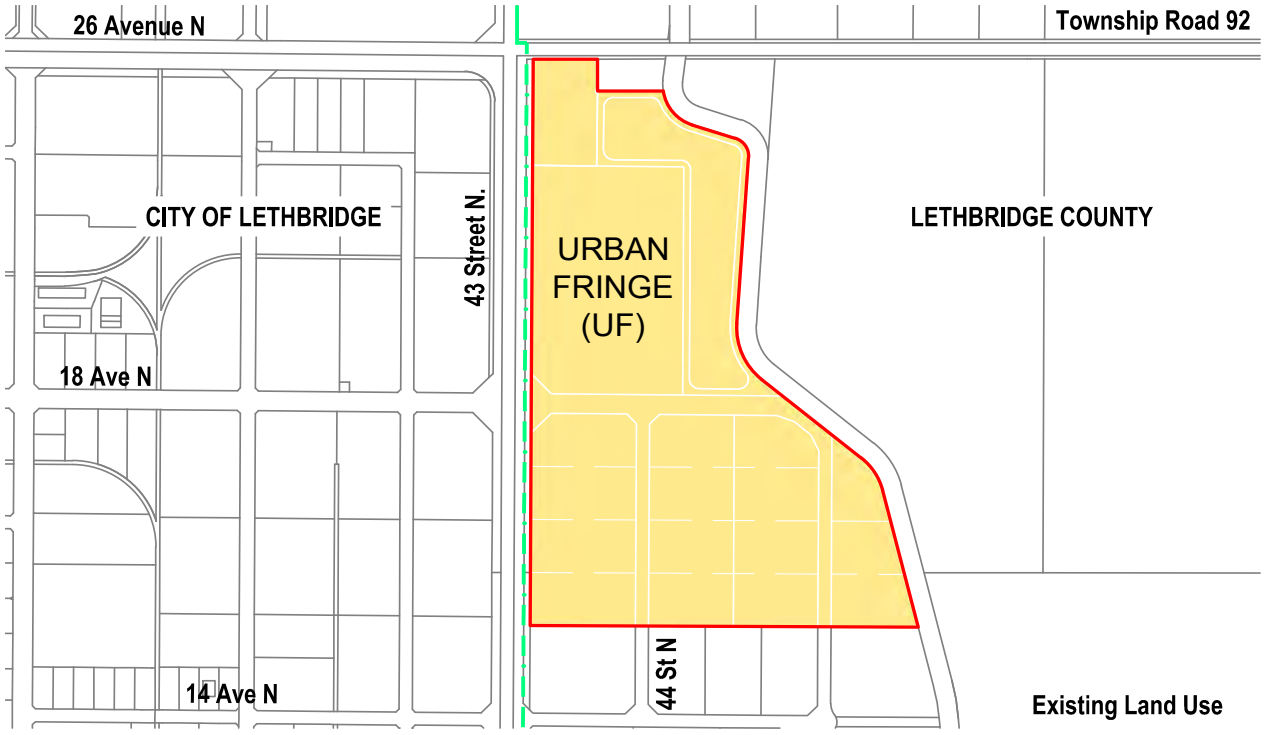
Integrated Expertise, Locally Delivered

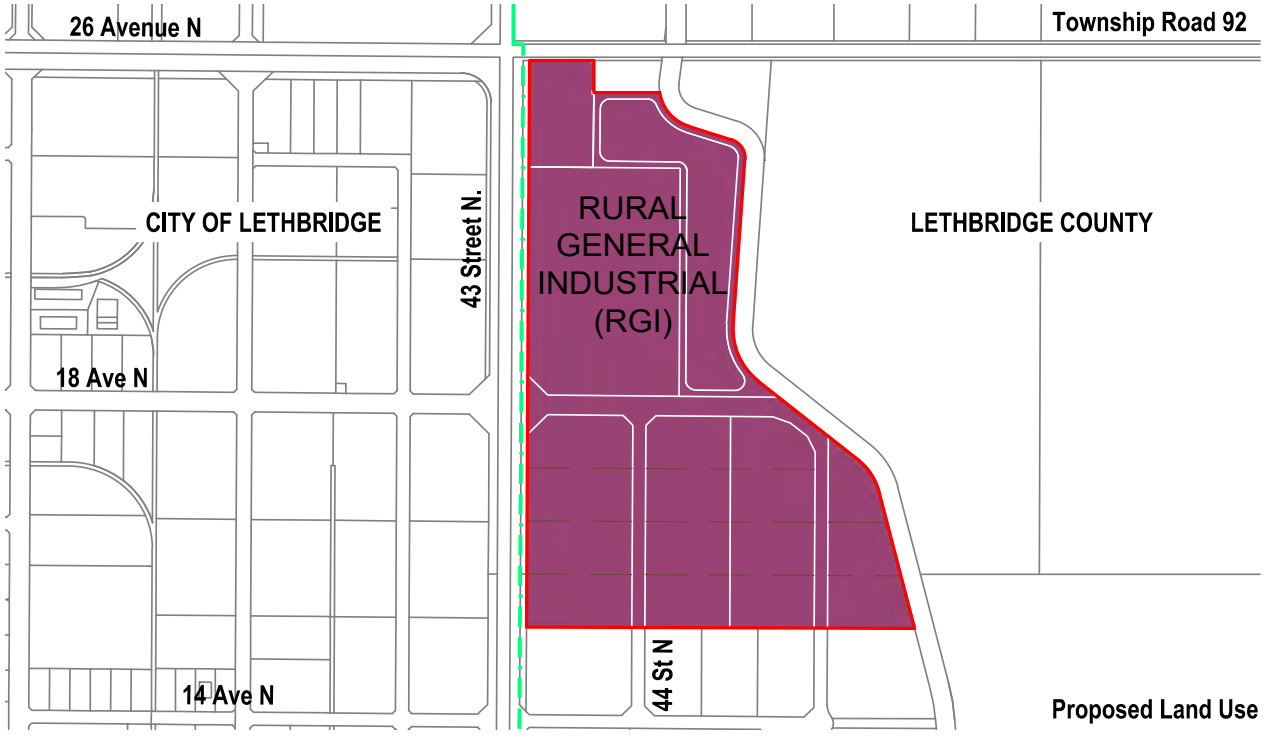
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Rocky Mountain Equipment
Lethbridge County
Figure 2
Proposed Site Development Concept

April 2025

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ISL

Property Boundary
City/County Boundary

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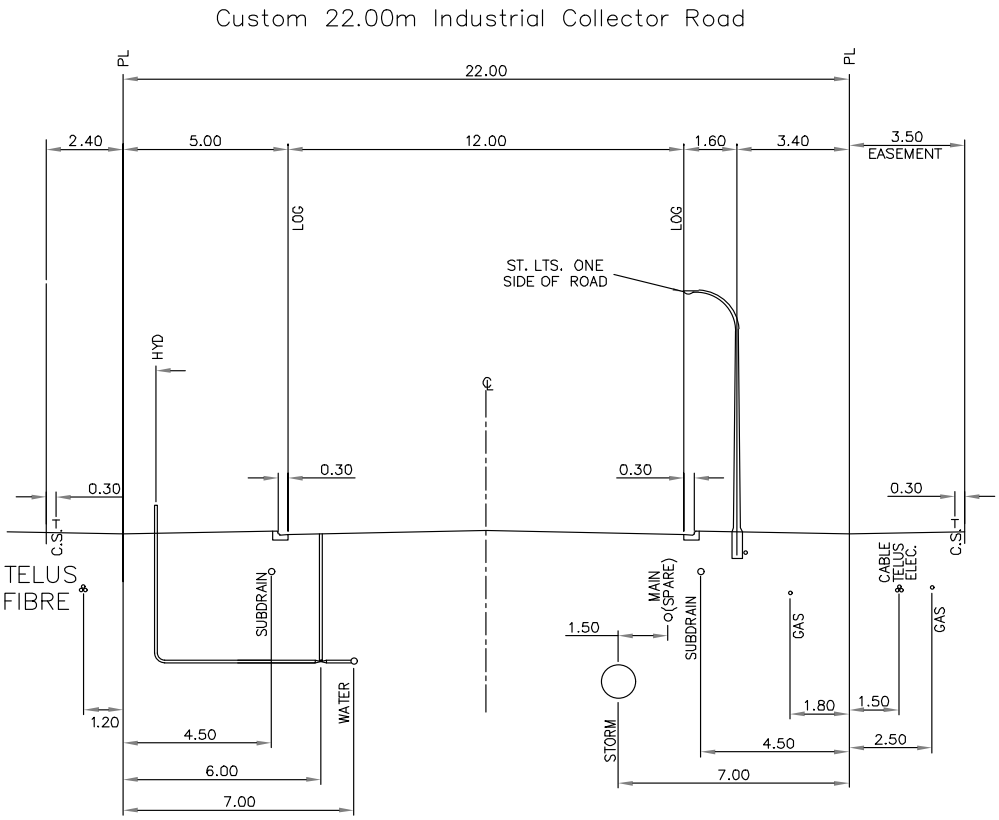
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Rocky Mountain Equipment
Lethbridge County
Figure 3
Proposed Land Use Bylaw Amendment

April 2025

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NOTES:
1. SEE DEPTH ZONES OF SERVICES
2. HYDRANT CENTERED ON LOT LINE EXTENSION
3. TRANSFORMER UTILITY EASEMENT 2m x 2m ON PRIVATE PROPER
4. MAINS GAS ON ONE SIDE ELECTRIC ON THE OTHER

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0039 801 056	1113171;1;5	241 188 150

LEGAL DESCRIPTION

PLAN 1113171
BLOCK 1
LOT 5
CONTAINING 59.56 HECTARES(147.18 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES	(ACRES)	MORE OR LESS
SUBDIVISION	2410456	25.61	63.28	

EXCEPTING THEREOUT ALL MINES AND MINERALS

ATS REFERENCE: 4;21;9;10;W
ESTATE: FEE SIMPLE

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 241 053 431 +12

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
241 188 150	20/07/2024	TRANSFER OF LAND	$5,085,000	$5,085,000

OWNERS

PRAIRIEVIEW SEED POTATOES LTD.
OF 2817 SOUTHRIDGE ROAD S
LETHBRIDGE
ALBERTA T1K 7W5

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
1485KX	.	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE ST. MARY RIVER IRRIGATION DISTRICT

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
1049KD .	05/02/1968	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "PORTION DESCRIBED"
881 219 612	01/12/1988	UTILITY RIGHT OF WAY GRANTEE - ALBERTA GOVERNMENT TELEPHONES. AS TO PORTION OR PLAN:8810684 "TAKES PRIORITY OF CAVEAT 871131928 REGISTERED 27/07/1987"
991 249 227	30/08/1999	IRRIGATION DISTRICT RESOLUTION PART OF AN IRRIGABLE UNIT " AFFECTS PART OF THIS TITLE "
241 053 435	21/02/2024	CAVEAT RE : DEFERRED RESERVE CAVEATOR - LETHBRIDGE COUNTY. C/O OLDMAN RIVER REGIONAL SERVICES COMMISSION 3105 - 16TH AVENUE NORTH LETHBRIDGE ALBERTA T1H5E8

TOTAL INSTRUMENTS: 005

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 22 DAY OF APRIL, 2025 AT 10:32 A.M.

ORDER NUMBER: 53478274

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

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APPENDIX A

Traffic Impact Assessment

Chinook Industrial Park Area Structure Plan

February 2, 2023

Prepared for:

Sumus

Prepared by:

Stantec Consulting Ltd.
Unit 230, 704 4 Avenue South
Lethbridge AB T1J 0N8



TRAFFIC IMPACT ASSESSMENT

This document entitled Traffic Impact Assessment was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Sumus (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by: Angela Forsyth, P.Eng.

Reviewed by: Japji Chahal-Virk, P.Eng.

Corporate Authorization



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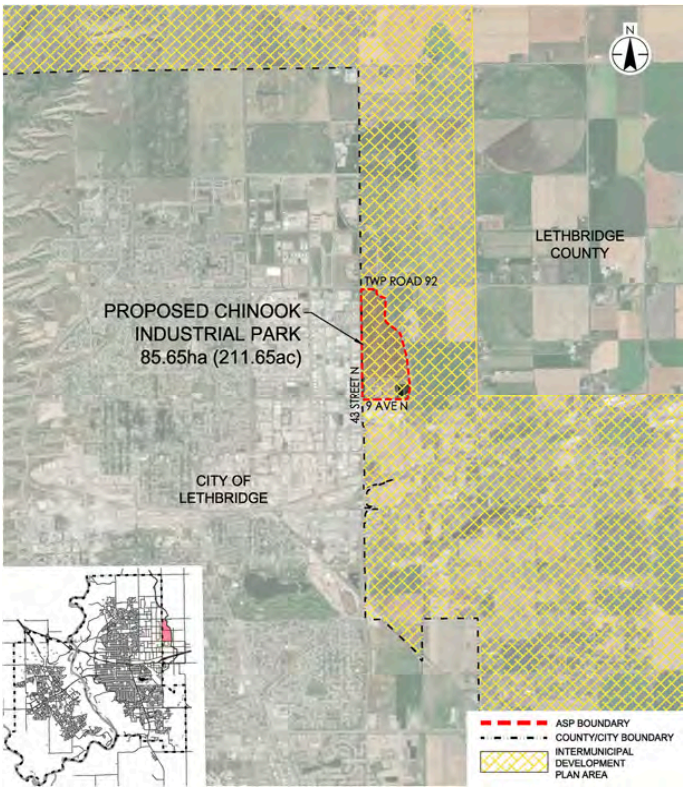
Appendix A – Synchro Reports
Appendix B – Existing TIA

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Sumus to complete a Traffic Impact Assessment (TIA) as part of the Chinook Industrial Park Area Structure Plan (ASP). This is an updated ASP to reflect the reconfigured land uses and access points in the area. Previously, there was an internal roadway network connecting the 9 Avenue N access point to the 14 Avenue N and 18 Avenue N access points via a north-south local roadway. This roadway has since been discontinued, leaving the two access points for the proposed remaining development. The current 9 Avenue N access remains to service the existing developed portion of the ASP area.

The development is located in Lethbridge County adjacent to the City of Lethbridge boundary. It is bounded by 43 Street N to the west, 9 Avenue N to the south, the SMRID canal to the east, and Township Road 92 to the north. Figure 1 illustrates the location of the site.

Figure 1: Site Location



1.1 OBJECTIVES

The objectives of this TIA are as follows:

- Collect the traffic data from the existing traffic impact assessment.
- Estimate the magnitude and characteristics of the peak hour traffic generated by the proposed development.
- Evaluate the impacts of vehicular traffic generated by the proposed development on the adjacent intersections on 43 Street N.
- Identify proposed roadway and intersection geometry for the planned new intersections.
- Identify and recommend appropriate traffic operation and/or infrastructure improvements necessary to accommodate the anticipated traffic.

1.2 STUDY AREA

The study area includes the following intersections:

- 43 Street N and 18 Avenue N
- 43 Street N and 14 Avenue N

The study area is illustrated in Figure 2.

Figure 2: Study Intersections



2.0 EXISTING INFRASTRUCTURE

2.1 ROAD NETWORK

43 Street N is a two-lane urban and rural cross-section along the east limits of the City of Lethbridge. From Highway 3 to north of 9 Avenue N, the roadway is an urban 4-lane cross section with signalized intersections. Just north of 9 Avenue N, the road transitions from the 4-lane urban to a 2-lane rural cross section, and continues as such to the City of Lethbridge limits at 62 Avenue N.

14 Avenue N and 18 Avenue N are both urban industrial collector roads connecting the Churchill Industrial Park to the arterial road network. Both intersections with 43 Street N are three-leg unsignalized, rural type intersections, intersecting at 90 degrees. There is a stop condition on the minor approach in both locations. 43 Street N is posted at 60 kilometres per hour, and all other roadways are 50 kilometres per hour.

2.2 EXISTING GEOMETRY

43 Street N at the project location has two 3.75-metre-wide lanes with a 2.25 metre shoulder on each side. There are no horizontal curves, and the grade is relatively flat.

The three-leg intersection of 43 Street with 14 Avenue is at 90 degrees with little to no vertical curvature. Sight lines are excellent at this intersection. The cross section is transitioned from urban to rural at the edge of shoulder of 43 Street, where the curb terminates, and the shoulder is introduced. Two-centered curves are used on both radii.

Similarly, the three-leg intersection of 43 Street with 18 Avenue is at 90 degrees with little to no vertical curvature. Sight lines are excellent at this intersection. The cross section is transitioned from urban to rural at the edge of shoulder of 43 Street, where the curb terminates, and the shoulder is introduced. Two-centered curves are used on both radii.

2.3 LAND USE

The existing land is currently greenfield and zoned as Lethbridge Urban Fringe (LUF) by Lethbridge County. To the west, parcels are zoned as General Industrial (I-G) by the City of Lethbridge and the area is largely developed.

2.4 BACKGROUND TRAFFIC VOLUMES AND INTERSECTION ANALYSIS

The original TIA entitled ***A Traffic Impact Assessment (TIA) Report*** was completed in October 2018 by EASL Transportation Consultants Inc. This report was used for the background volumes for all scenarios,

and analysis performed is still valid for the purposes of this TIA. The previous TIA and relevant background analysis can be found in Appendix A.

3.0 PROPOSED DEVELOPMENT

3.1 TRIP GENERATION

Proposed land uses for the ASP area are a mixture of Business Light Industrial (BLI) and Rural General Industrial (RGI). The proposed land use areas are outlined in Figure 3. Table 1 summarizes the development proposal for the ASP area.

Figure 3: Proposed Land Uses

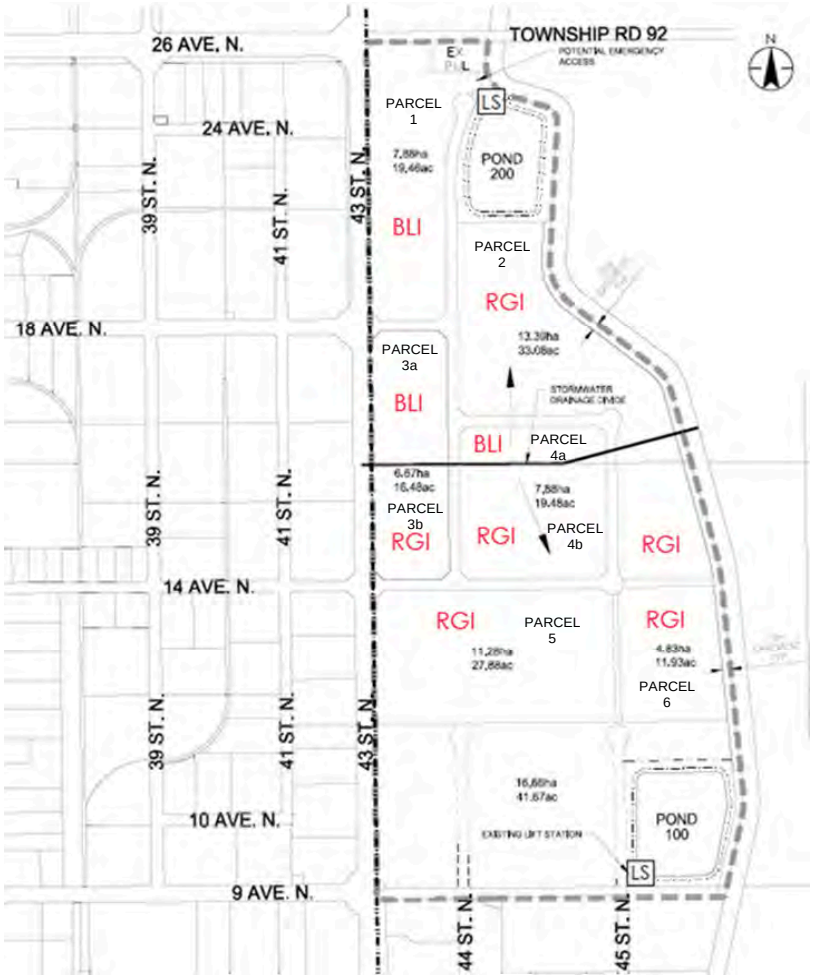


Table 1: Construction Site Traffic Projections

Parcel	Use	Gross Area
1	Business Light Industrial	19.46 ac
2	Rural General Industrial	33.08 ac
3a	Business Light Industrial	8.86 ac
3b	Rural General Industrial	7.62 ac
4a	Business Light Industrial	4.79 ac
4b	Rural General Industrial	14.69 ac
5	Rural General Industrial	27.88 ac
6	Rural General Industrial	11.93 ac

To estimate the peak hour traffic generated by the proposed development, the trip generation rates from Table 4 were applied. This includes a factor of 8,200 square feet of developed gross floor building area (GFA) per acre for the proposed development, as utilized in the pervious TIA (EASL Transportation Consultants Inc, 2018). The trip generation rates were taken from ITE's Trip Generation Web-based App, 11th Edition. Table 2 summarizes the site traffic generated by the proposed development for the weekday AM and PM peak hours.

Table 2: Site Generated Traffic Volumes

Parcel	Land Use	Area	ITE 11 Ed		Intensity	Weekday						Weekday					
						AM			PM			AM			PM		
			Land Use Code			Trip Rate	In %	Out %	Trip Rate	In %	Out %	Total Trips (vph)	In	Out	Total Trips (vph)	In	Out
1	BLI	19.46 ac	110	Light Industrial	159.572 x1000 sqft	0.74	88%	12%	0.65	14%	86%	118	104	14	104	15	89
2	RGI	33.08 ac	130	Industrial Park	271.256 x1000 sqft	0.34	81%	19%	0.34	22%	78%	92	75	18	92	20	72
3a	BLI	8.86 ac	110	Light Industrial	72.652 x1000 sqft	0.74	88%	12%	0.65	14%	86%	54	47	6	47	7	41
3b	RGI	7.62 ac	130	Industrial Park	62.484 x1000 sqft	0.34	81%	19%	0.34	22%	78%	21	17	4	21	5	17
4a	BLI	4.79 ac	110	Light Industrial	39.278 x1000 sqft	0.74	88%	12%	0.65	14%	86%	29	26	3	26	4	22
4b	RGI	14.69 ac	130	Industrial Park	120.458 x1000 sqft	0.34	81%	19%	0.34	22%	78%	41	33	8	41	9	32
5	RGI	27.88 ac	130	Industrial Park	228.616 x1000 sqft	0.34	81%	19%	0.34	22%	78%	78	63	15	78	17	61
6	RGI	11.93 ac	130	Industrial Park	97.826 x1000 sqft	0.34	81%	19%	0.34	22%	78%	33	27	6	33	7	26
											Total	**466**	**392**	**75**	**442**	**83**	**359**

3.1.1 Trip Distribution and Assignment

Estimated traffic volumes were distributed similarly to the previous TIA (EASL Transportation Consultants Inc, 2018). Percentage of vehicles arriving from and departing to the north, south and west were maintained for consistency in this analysis. There will be no change to the other intersections along 43 Street N corridor since there is no significant net volume change.

Traffic generated by the proposed development was assigned to the roadway network based on the trip distributions used in the previous TIA. The following trip distribution pattern was applied:

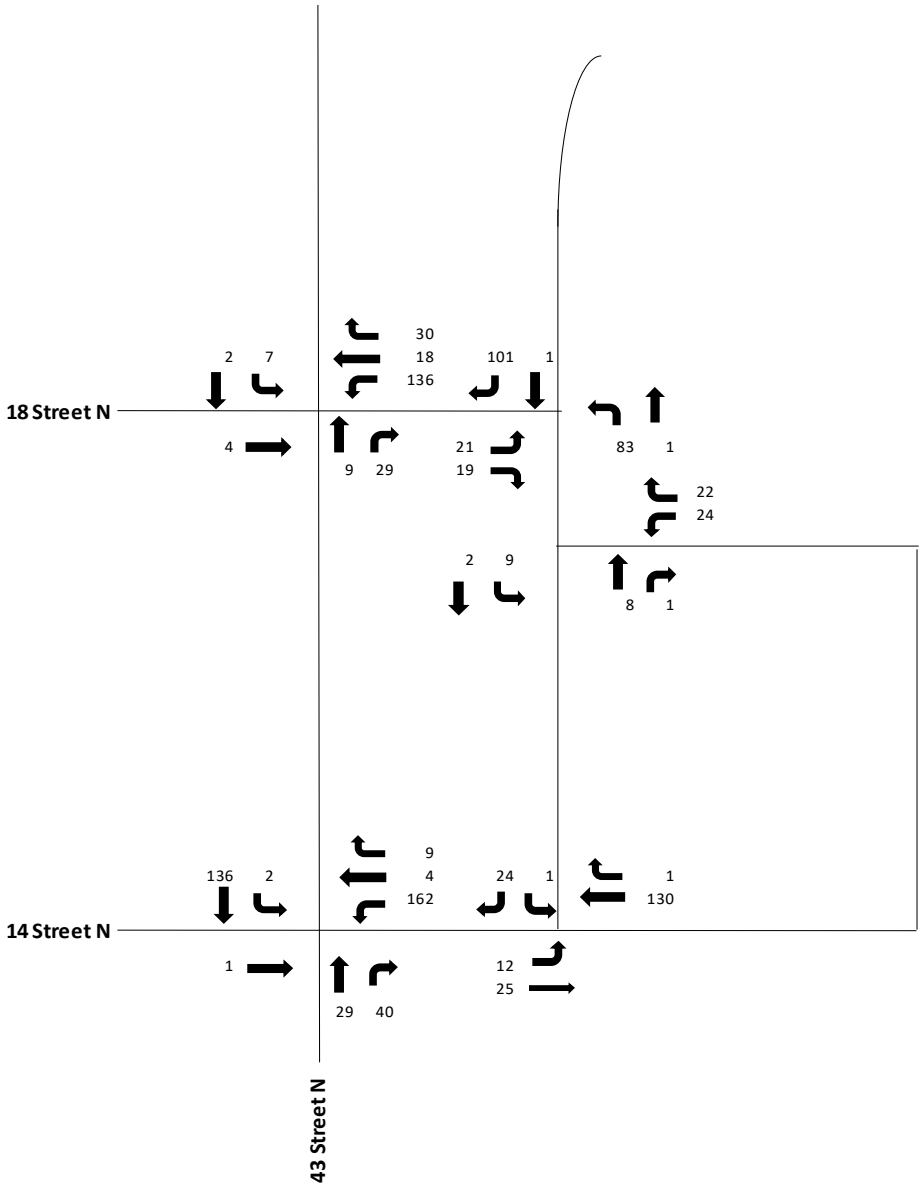
- To / from the north on 43 Street N: 11%
- To / from the south on 43 Street N: 83%
- To / from the west on 14 Avenue N: 1%
- To / from the west on 18 Avenue N: 5%

Peak hour development traffic volumes are shown in Figures 4 and 5, for the AM peak hour and PM peak hour, respectively.

Figure 4: AM Peak Hour Development Traffic



Figure 5: PM Peak Hour Development Traffic



4.0 2037 HORIZON ANAYLSIS

4.1 OPERATING CONDITIONS

The intersection analysis in this TIA was undertaken using the Synchro 11 software package, supporting the Highway Capacity Manual 6th Edition (HCM 6th).

The methodology considers the intersection geometry, traffic volumes, posted speed limit, and intersection control for unsignalized intersections. For signalized intersections, the intersection geometry, traffic volumes, posted speed limit, traffic signal phasing/timing plan and pedestrian volumes are all considered.

The average delay for each lane group, as well as the overall intersection; is calculated and computed into a level-of-service (LOS) category. The level-of-service criteria is tabulated below in Table 3 for both unsignalized and signalized intersections.

Table 3: Level of Service Criteria

Level of Service	Average Control Delay (seconds per vehicle)		Comment
	Signalized Intersection	Unsignalized Intersection	
A	10.0 or less	10.0 or less	Very good operation
B	10.1 to 20.0	10.1 to 15.0	Good operation
C	20.1 to 35.0	15.1 to 25.0	Acceptable operation
D	35.1 to 55.0	25.1 to 35.0	Congestion
E	55.1 to 80.0	35.1 to 50.0	Significant congestion
F	More than 80.0	More than 50.0	Unacceptable operation

The volume-to-capacity (v/c) ratio was also considered in the analyses. The v/c ratio represents the percentage of capacity the traffic volumes are consuming. If the v/c ratio is above 1.0, then the movement or intersection has exceeded capacity.

4.2 TRAFFIC VOLUMES

To obtain the total post development 2037 traffic volumes, the 2037 background volumes from the previous TIA (EASL Transportation Consultants Inc, 2018) were extracted from the report. The site



generated traffic volumes were added to the 2037 background volumes to obtain the total post-development 2037 traffic volumes. Figure 6 and Figure 7 show the 2037 projected total peak hour traffic volumes in the AM peak hour and PM peak hour, respectively.

Figure 6: Projected Total 2037 AM Peak Hour Traffic Volumes

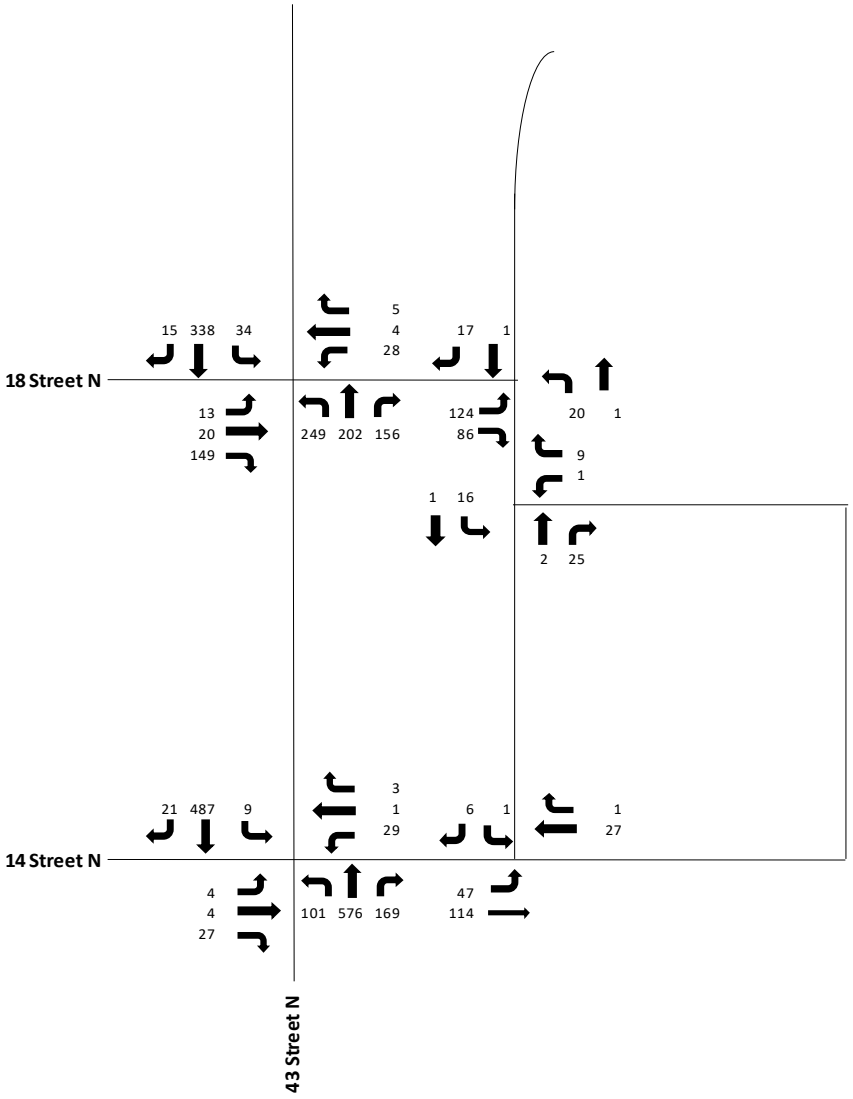
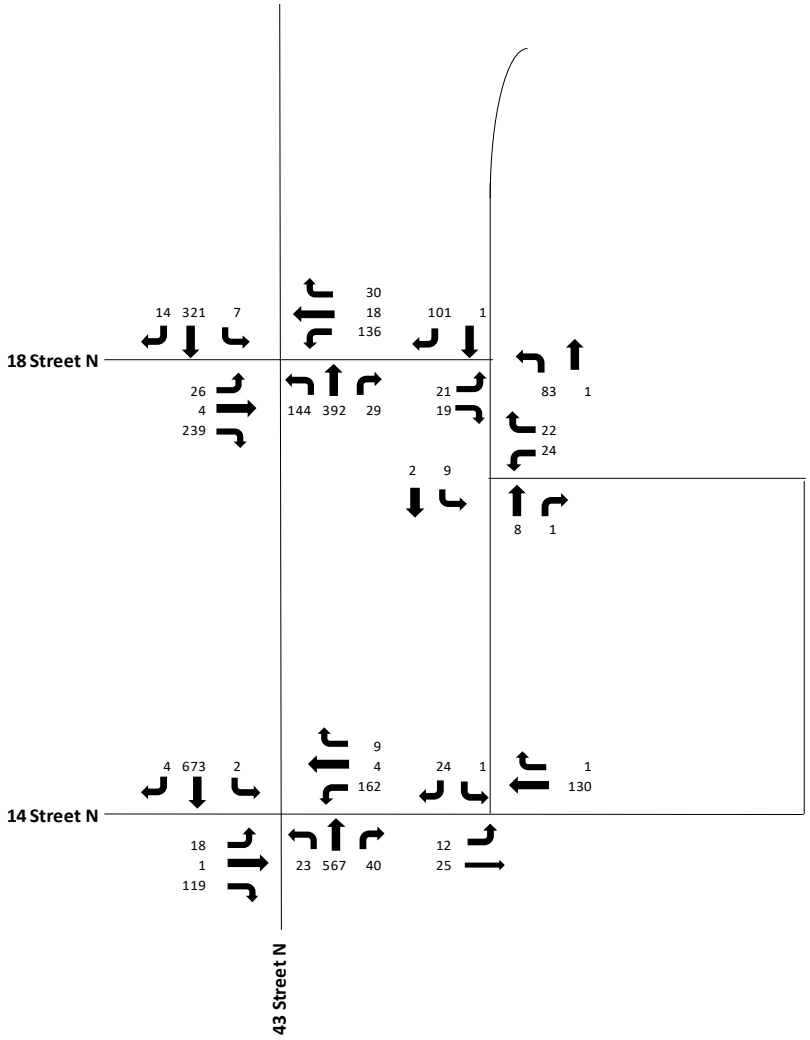


Figure 7: Projected Total 2037 PM Peak Hour Traffic Volumes



4.3 INTERSECTION CAPACITY ANALYSIS

The projected traffic volumes were applied to roadway network, and the intersections were reviewed for both the AM and PM peak hours, based on proposed geometrics, lane conditions and traffic control measures. Traffic signals were added to the intersections of 43 Street N with 18 Street N and 14 Street N based on the analysis of the existing TIA (EASL Transportation Consultants Inc, 2018).

The results of the Synchro analysis are summarized in Table 4 and Table 5 for the AM and PM peak hours, respectively.

Table 4: Analysis Results for 2037 AM Peak Hour Total Traffic Conditions

Intersection	Intersection Control	Measure	Eastbound			Westbound			Northbound			Southbound			Level of Service
			Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
43 Street N / 18 Avenue N	Traffic Signals	Volumes (vph)	13	20	149	28	4	5	249	202	156	34	338	15	B
		Level of Service		B			D			C			A		
		V/C Ratio by Movement		0.59			0.33			0.89			0.42		
		95th Percentile Queue (m)		23.6			14.6			166.1			39.7		
43 Street N / 14 Avenue N	Traffic Signals	Volumes (vph)	4	4	27	29	1	3	101	576	169	9	487	21	B
		Level of Service		B			C			B			A		
		V/C Ratio by Movement		0.21			0.27			0.84			0.44		
		95th Percentile Queue (m)		9.7			9.6			210.7			42.3		
Internal Intersection 1	Stop Controlled	Volumes (vph)	124		86				20	1			1	17	A
		Level of Service		A						A			A		
		V/C Ratio by Movement		0.25						0.01			0.01		
		95th Percentile Queue (m)		7.4						0.3			0		
Internal Intersection 2	Stop Controlled	Volumes (vph)				1		9		2	25	16	1		A
		Level of Service					A			A			A		
		V/C Ratio by Movement					0.01			0.02			0.01		
		95th Percentile Queue (m)					0.2			0			0.3		
Internal Intersection 3	Stop Controlled	Volumes (vph)	47	114			27	1				1		6	A
		Level of Service		A			A						A		
		V/C Ratio by Movement		0.03			0.02						0.01		
		95th Percentile Queue (m)		0.8			0						0.2		

Table 5: Analysis Results for 2037 PM Peak Hour Total Traffic Conditions

Intersection	Intersection Control	Measure	Eastbound			Westbound			Northbound			Southbound			Level of Service
			Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
43 Street N / 18 Avenue N	Traffic Signals	Volumes (vph)	26	4	239	136	18	30	144	392	29	7	321	14	C
		Level of Service		A			D			C			A		
		V/C Ratio by Movement		0.52			0.85			0.92			0.46		
		95th Percentile Queue (m)		19.3			56.8			121.7			38.7		
43 Street N / 14 Avenue N	Traffic Signals	Volumes (vph)	18	1	119	162	4	9	23	567	40	2	673	4	B
		Level of Service		A			C			B			B		
		V/C Ratio by Movement		0.32			0.64			0.73			0.76		
		95th Percentile Queue (m)		12.1			41.1			121.7			133.3		
Internal Intersection 1	Stop Controlled	Volumes (vph)	21		19				83	1			1	101	A
		Level of Service		A						A			A		
		V/C Ratio by Movement		0.06						0.07			0.07		
		95th Percentile Queue (m)		1.4						1.6			0		
Internal Intersection 2	Stop Controlled	Volumes (vph)				24		22		8	1	9	2		A
		Level of Service					A			A			A		
		V/C Ratio by Movement					0.05			0.01			0.01		
		95th Percentile Queue (m)					1.3			0			0.1		
Internal Intersection 3	Stop Controlled	Volumes (vph)	12	25			130	1				1		24	A
		Level of Service		A			A						A		
		V/C Ratio by Movement		0.01			0.09						0.03		
		95th Percentile Queue (m)		0.2			0						0.8		

From the analysis, it appears that the intersection will operate acceptably through the 2037 post-development conditions. Level of service is maintained at LOS D or better for any given movement, v/c

ratios are for the most part well below 1.0. Scenarios approaching 1.0 include northbound movements at 43 Street N and 18 Avenue N in the AM and PM peak hours, as well as the westbound movement at that intersection in the PM peak hour. 95th percentiles queue lengths are lengthy for some movements, with the highest being 210 meters for the northbound movement at 43 Street N and 14 Avenue N.. All queue lengths are able to be contained in the respective blocks, with no queues extending to the adjacent intersection.

To reduce queue lengths, a northbound left turn lane was introduced at both 14 Avenue N and 18 Avenue N. These turn lanes were effective in reducing the longer queue lengths by more than 50% in some cases. The results of this Synchro analysis are summarized in Table 6 and Table 7 for the AM and PM peak hours, respectively.

Table 6: Analysis Results for 2037 AM Peak Hour Total Traffic Conditions (Adjusted Geometry)

Intersection	Intersection Control	Measure	Eastbound			Westbound			Northbound			Southbound			Level of Service
			Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
43 Street N / 18 Avenue N	Traffic Signals	Volumes (vph)	13	20	149	28	4	5	249	202	156	34	338	15	A
		Level of Service	A			B			B	A		A			
		V/C Ratio by Movement	0.46			0.15			0.6	0.46		0.52			
		95th Percentile Queue (m)	15.9			9			33.1	26.2		37.6			
43 Street N / 14 Avenue N	Traffic Signals	Volumes (vph)	4	4	27	29	1	3	101	576	169	9	487	21	A
		Level of Service	B			C			A	A		A			
		V/C Ratio by Movement	0.14			0.16			0.19	0.67		0.46			
		95th Percentile Queue (m)	8.7			9.1			8.2	88.6		42.1			

Table 7:Analysis Results for 2037 PM Peak Hour Total Traffic Conditions (Adjusted Geometry)

Intersection	Intersection Control	Measure	Eastbound			Westbound			Northbound			Southbound			Level of Service
			Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
43 Street N / 18 Avenue N	Traffic Signals	Volumes (vph)	26	4	239	136	18	30	144	392	29	7	321	14	B
		Level of Service	A			C			B	B		B			
		V/C Ratio by Movement	0.51			0.69			0.41	0.64		0.53			
		95th Percentile Queue (m)	13.8			35.5			21.5	55.1		42			
43 Street N / 14 Avenue N	Traffic Signals	Volumes (vph)	18	1	119	162	4	9	23	567	40	2	673	4	B
		Level of Service	A			C			A	B		B			
		V/C Ratio by Movement	0.32			0.64			0.07	0.68		0.76			
		95th Percentile Queue (m)	12.1			41.1			4.2	110.9		133.3			

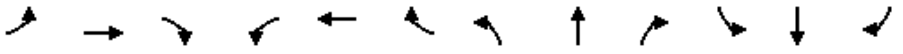
5.0 CONCLUSION

The proposed changes in the development's roadway network appear to have no detrimental effect on the operations at the 43 Street N access points. The recommendations from the previous TIA (EASL Transportation Consultants Inc, 2018) still allow both intersections to operate acceptably. Therefore, this analysis indicates that:

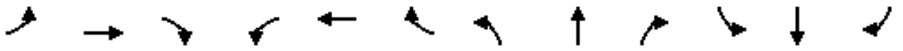
- The two access points at 14 Street N and 18 Street N continue to operate acceptably under the new internal roadway network.
- The two access points at 14 Street N and 18 Street N will require signalization to maintain acceptable operations.
- Both intersections should be monitored periodically for traffic operations. If traffic operations deteriorate, consideration should be given to installing a northbound left turn lane at one or both intersections.
- Internal roadways should operate as two-lane cross sections with a stop-condition on the "T" approach.
- Other recommendations from the previous TIA (EASL Transportation Consultants Inc, 2018) should be preserved:
    - 43 Street N & 26 Avenue N, to mitigate the 2037 background condition:
        - Installation of a traffic signal.
    - 43 Street and Highway 3, to mitigate the 2037 background condition:
        - Installation of a second westbound left turn lane.
        - Installation of a second eastbound left turn lane.
        - Installation of a third westbound through lane.
        - Installation of a third eastbound through lane.
        - Optimization of the traffic signal splits.

APPENDIX A

Synchro Reports



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	27	29	1	3	101	576	169	9	487	21
Future Volume (vph)	4	4	27	29	1	3	101	576	169	9	487	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.898			0.989			0.973			0.994	
Flt Protected		0.994			0.957			0.994			0.999	
Satd. Flow (prot)	0	1404	0	0	1489	0	0	1522	0	0	1562	0
Flt Permitted		0.953			0.720			0.868			0.985	
Satd. Flow (perm)	0	1346	0	0	1120	0	0	1329	0	0	1540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			3			33			6	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		131.7			164.3			548.3			495.0	
Travel Time (s)		9.5			11.8			32.9			29.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Adj. Flow (vph)	5	5	31	33	1	3	115	655	192	10	553	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	41	0	0	37	0	0	962	0	0	587	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		24.5	24.5		24.5	24.5	
Total Split (s)	22.5	22.5		22.5	22.5		67.5	67.5		67.5	67.5	
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		63.0	63.0		63.0	63.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.2			10.2			71.9			71.9	
Actuated g/C Ratio		0.12			0.12			0.86			0.86	
v/c Ratio		0.21			0.27			0.84			0.44	
Control Delay		18.5			34.0			15.8			3.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.5			34.0			15.8			3.9	
LOS		B			C			B			A	
Approach Delay		18.5			34.0			15.8			3.9	
Approach LOS		B			C			B			A	
Queue Length 50th (m)		1.5			5.2			91.2			25.6	
Queue Length 95th (m)		9.7			m9.6			#210.7			42.3	
Internal Link Dist (m)		107.7			140.3			524.3			471.0	
Turn Bay Length (m)												
Base Capacity (vph)		314			244			1150			1328	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.13			0.15			0.84			0.44	

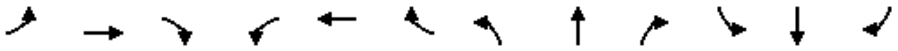
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 83.4			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 12.0		Intersection LOS: B	
Intersection Capacity Utilization 99.8%		ICU Level of Service F	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: 43 St N & 14 Ave N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	20	149	28	4	5	249	202	156	34	338	15
Future Volume (vph)	13	20	149	28	4	5	249	202	156	34	338	15
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.890			0.981			0.965			0.995	
Flt Protected		0.996			0.964			0.980			0.996	
Satd. Flow (prot)	0	1395	0	0	1488	0	0	1488	0	0	1559	0
Flt Permitted		0.977			0.541			0.688			0.917	
Satd. Flow (perm)	0	1368	0	0	835	0	0	1045	0	0	1435	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		169			6			46			5	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		143.5			159.4			495.0			516.3	
Travel Time (s)		10.3			11.5			29.7			31.0	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Adj. Flow (vph)	15	23	169	32	5	6	283	230	177	39	384	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	207	0	0	43	0	0	690	0	0	440	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		24.5	24.5		24.5	24.5	
Total Split (s)	22.6	22.6		22.6	22.6		67.4	67.4		67.4	67.4	
Total Split (%)	25.1%	25.1%		25.1%	25.1%		74.9%	74.9%		74.9%	74.9%	
Maximum Green (s)	18.1	18.1		18.1	18.1		62.9	62.9		62.9	62.9	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.6			11.6			55.2			55.2	
Actuated g/C Ratio		0.15			0.15			0.73			0.73	
v/c Ratio		0.59			0.33			0.89			0.42	
Control Delay		16.5			35.7			25.1			5.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.5			35.7			25.1			5.5	
LOS		B			D			C			A	
Approach Delay		16.5			35.7			25.1			5.5	
Approach LOS		B			D			C			A	
Queue Length 50th (m)		5.4			5.4			50.5			17.2	
Queue Length 95th (m)		23.6			14.6			#166.1			39.7	
Internal Link Dist (m)		119.5			135.4			471.0			492.3	
Turn Bay Length (m)												
Base Capacity (vph)		462			208			869			1184	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.45			0.21			0.79			0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 76			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 83.2%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 3: 43 St N & 18 Ave N



Intersection	
Int Delay, s/veh	9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	124	86	20	1	1	17
Future Vol, veh/h	124	86	20	1	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	141	98	23	1	1	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	58	11	20	0	-	0
Stage 1	11	-	-	-	-	-
Stage 2	47	-	-	-	-	-
Critical Hdwy	6.5	6.3	4.2	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	2.29	-	-	-
Pot Cap-1 Maneuver	929	1047	1546	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	915	1047	1546	-	-	-
Mov Cap-2 Maneuver	915	-	-	-	-	-
Stage 1	976	-	-	-	-	-
Stage 2	955	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1546	-	965	-	-
HCM Lane V/C Ratio	0.015	-	0.247	-	-
HCM Control Delay (s)	7.4	0	10	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	1	-	-

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	9	2	25	16	1
Future Vol, veh/h	1	9	2	25	16	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	1	10	2	28	18	1

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	53	16	0	0	30	0
Stage 1	16	-	-	-	-	-
Stage 2	37	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.2	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	936	1040	-	-	1533	-
Stage 1	986	-	-	-	-	-
Stage 2	965	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	925	1040	-	-	1533	-
Mov Cap-2 Maneuver	925	-	-	-	-	-
Stage 1	986	-	-	-	-	-
Stage 2	953	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.5	0	6.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1027	1533	-
HCM Lane V/C Ratio	-	-	0.011	0.012	-
HCM Control Delay (s)	-	-	8.5	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.1

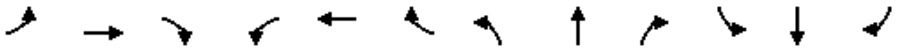
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	47	114	27	1	1	6
Future Vol, veh/h	47	114	27	1	1	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	53	130	31	1	1	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	32	0	-	0	268	32
Stage 1	-	-	-	-	32	-
Stage 2	-	-	-	-	236	-
Critical Hdwy	4.2	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.29	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	1530	-	-	-	704	1019
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	785	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1530	-	-	-	678	1019
Mov Cap-2 Maneuver	-	-	-	-	678	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	785	-

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1530	-	-	-	951
HCM Lane V/C Ratio	0.035	-	-	-	0.008
HCM Control Delay (s)	7.4	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	1	119	162	4	9	23	567	40	2	673	4
Future Volume (vph)	18	1	119	162	4	9	23	567	40	2	673	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.883			0.993			0.992			0.999	
Flt Protected		0.994			0.956			0.998				
Satd. Flow (prot)	0	1381	0	0	1493	0	0	1558	0	0	1572	0
Flt Permitted		0.949			0.672			0.965			0.999	
Satd. Flow (perm)	0	1318	0	0	1050	0	0	1506	0	0	1570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		135			5			9			1	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		131.7			164.3			548.3			495.0	
Travel Time (s)		9.5			11.8			32.9			29.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Adj. Flow (vph)	20	1	135	184	5	10	26	644	45	2	765	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	0	199	0	0	715	0	0	772	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		24.5	24.5		24.5	24.5	
Total Split (s)	22.5	22.5		22.5	22.5		37.5	37.5		37.5	37.5	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		62.5%	62.5%		62.5%	62.5%	
Maximum Green (s)	18.0	18.0		18.0	18.0		33.0	33.0		33.0	33.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		15.2			15.2			33.4			33.4	
Actuated g/C Ratio		0.29			0.29			0.65			0.65	
v/c Ratio		0.32			0.64			0.73			0.76	
Control Delay		7.0			29.0			17.0			18.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.0			29.0			17.0			18.3	
LOS		A			C			B			B	
Approach Delay		7.0			29.0			17.0			18.3	
Approach LOS		A			C			B			B	
Queue Length 50th (m)		1.6			18.1			54.7			62.0	
Queue Length 95th (m)		12.1			#41.1			#121.7			#133.3	
Internal Link Dist (m)		107.7			140.3			524.3			471.0	
Turn Bay Length (m)												
Base Capacity (vph)		579			397			1004			1044	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.27			0.50			0.71			0.74	

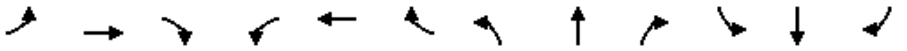
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 51.6			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 78.6%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 6: 43 St N & 14 Ave N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	4	239	136	18	30	144	392	29	7	321	14
Future Volume (vph)	26	4	239	136	18	30	144	392	29	7	321	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.880			0.978			0.993			0.994	
Flt Protected		0.995			0.964			0.987			0.999	
Satd. Flow (prot)	0	1378	0	0	1483	0	0	1542	0	0	1562	0
Flt Permitted		0.956			0.512			0.812			0.989	
Satd. Flow (perm)	0	1324	0	0	788	0	0	1269	0	0	1547	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		272			15			7			6	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		143.5			159.4			495.0			516.3	
Travel Time (s)		10.3			11.5			29.7			31.0	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Adj. Flow (vph)	30	5	272	155	20	34	164	445	33	8	365	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	307	0	0	209	0	0	642	0	0	389	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		24.5	24.5		24.5	24.5	
Total Split (s)	23.0	23.0		23.0	23.0		42.0	42.0		42.0	42.0	
Total Split (%)	35.4%	35.4%		35.4%	35.4%		64.6%	64.6%		64.6%	64.6%	
Maximum Green (s)	18.5	18.5		18.5	18.5		37.5	37.5		37.5	37.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		18.2			18.2			33.4			33.4	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.52			0.85			0.92			0.46	
Control Delay		7.7			53.9			33.3			9.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.7			53.9			33.3			9.9	
LOS		A			D			C			A	
Approach Delay		7.7			53.9			33.3			9.9	
Approach LOS		A			D			C			A	
Queue Length 50th (m)		3.1			22.3			58.2			23.1	
Queue Length 95th (m)		19.3			#56.8			#121.7			38.7	
Internal Link Dist (m)		119.5			135.4			471.0			492.3	
Turn Bay Length (m)												
Base Capacity (vph)		597			254			798			973	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.51			0.82			0.80			0.40	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 60.7			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 25.1		Intersection LOS: C	
Intersection Capacity Utilization 96.7%		ICU Level of Service F	
Analysis Period (min) 15			

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

Splits and Phases: 3: 43 St N & 18 Ave N



Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	19	83	1	1	101
Future Vol, veh/h	21	19	83	1	1	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	24	22	94	1	1	115

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	248	59	116	0	-	0
Stage 1	59	-	-	-	-	-
Stage 2	189	-	-	-	-	-
Critical Hdwy	6.5	6.3	4.2	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	2.29	-	-	-
Pot Cap-1 Maneuver	723	985	1424	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	824	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	675	985	1424	-	-	-
Mov Cap-2 Maneuver	675	-	-	-	-	-
Stage 1	882	-	-	-	-	-
Stage 2	824	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	7.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1424	-	794	-	-
HCM Lane V/C Ratio	0.066	-	0.057	-	-
HCM Control Delay (s)	7.7	0	9.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Intersection	
Int Delay, s/veh	7.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	22	8	1	9	2
Future Vol, veh/h	24	22	8	1	9	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	27	25	9	1	10	2

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	32	10	0	0	10	0
Stage 1	10	-	-	-	-	-
Stage 2	22	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.2	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	962	1048	-	-	1559	-
Stage 1	993	-	-	-	-	-
Stage 2	980	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	956	1048	-	-	1559	-
Mov Cap-2 Maneuver	956	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	974	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	998	1559	-
HCM Lane V/C Ratio	-	-	0.052	0.007	-
HCM Control Delay (s)	-	-	8.8	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

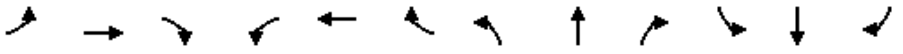
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	25	130	1	1	24
Future Vol, veh/h	12	25	130	1	1	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	14	28	148	1	1	27

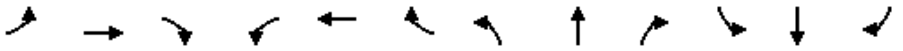
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	149	0	-	0	205	149
Stage 1	-	-	-	-	149	-
Stage 2	-	-	-	-	56	-
Critical Hdwy	4.2	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.29	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	1385	-	-	-	766	877
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	947	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1385	-	-	-	758	877
Mov Cap-2 Maneuver	-	-	-	-	758	-
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	947	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1385	-	-	-	872
HCM Lane V/C Ratio	0.01	-	-	-	0.033
HCM Control Delay (s)	7.6	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	27	29	1	3	101	576	169	9	487	21
Future Volume (vph)	4	4	27	29	1	3	101	576	169	9	487	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.898			0.989			0.966			0.994	
Flt Protected		0.994			0.957		0.950				0.999	
Satd. Flow (prot)	0	1404	0	0	1489	0	1495	1520	0	0	1562	0
Flt Permitted		0.950			0.742		0.473				0.988	
Satd. Flow (perm)	0	1342	0	0	1154	0	744	1520	0	0	1545	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			3			39			6	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		131.7			164.3			548.3			495.0	
Travel Time (s)		9.5			11.8			32.9			29.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Adj. Flow (vph)	5	5	31	33	1	3	115	655	192	10	553	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	41	0	0	37	0	115	847	0	0	587	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		24.5	24.5		24.5	24.5	
Total Split (s)	22.5	22.5		22.5	22.5		57.5	57.5		57.5	57.5	
Total Split (%)	28.1%	28.1%		28.1%	28.1%		71.9%	71.9%		71.9%	71.9%	
Maximum Green (s)	18.0	18.0		18.0	18.0		53.0	53.0		53.0	53.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.7			10.7		45.8	45.8			45.8	
Actuated g/C Ratio		0.19			0.19		0.83	0.83			0.83	
v/c Ratio		0.14			0.16		0.19	0.67			0.46	
Control Delay		14.8			26.5		3.8	8.2			4.9	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		14.8			26.5		3.8	8.2			4.9	
LOS		B			C		A	A			A	
Approach Delay		14.8			26.5			7.7			4.9	
Approach LOS		B			C			A			A	
Queue Length 50th (m)		1.0			3.4		3.7	49.1			25.6	
Queue Length 95th (m)		8.7			m9.1		8.2	88.6			42.1	
Internal Link Dist (m)		107.7			140.3			524.3			471.0	
Turn Bay Length (m)							50.0					
Base Capacity (vph)		485			401		657	1347			1365	
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		0.08			0.09		0.18	0.63			0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 55.5			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 7.3		Intersection LOS: A	
Intersection Capacity Utilization 88.4%		ICU Level of Service E	
Analysis Period (min) 15			

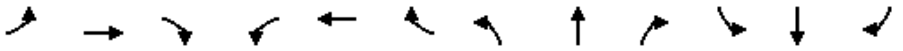
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: 43 St N & 14 Ave N





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	20	149	28	4	5	249	202	156	34	338	15
Future Volume (vph)	13	20	149	28	4	5	249	202	156	34	338	15
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.890			0.981			0.935			0.995	
Flt Protected		0.996			0.964		0.950				0.996	
Satd. Flow (prot)	0	1395	0	0	1488	0	1495	1471	0	0	1559	0
Flt Permitted		0.979			0.806		0.527				0.947	
Satd. Flow (perm)	0	1371	0	0	1244	0	829	1471	0	0	1482	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		169			6			103			5	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		143.5			159.4			495.0			516.3	
Travel Time (s)		10.3			11.5			29.7			31.0	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Adj. Flow (vph)	15	23	169	32	5	6	283	230	177	39	384	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	207	0	0	43	0	283	407	0	0	440	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	



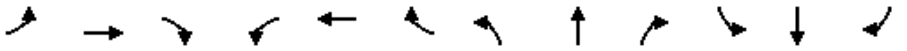
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		24.5	24.5		24.5	24.5	
Total Split (s)	22.5	22.5		22.5	22.5		37.5	37.5		37.5	37.5	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		62.5%	62.5%		62.5%	62.5%	
Maximum Green (s)	18.0	18.0		18.0	18.0		33.0	33.0		33.0	33.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.7			10.7		26.0	26.0			26.0	
Actuated g/C Ratio		0.23			0.23		0.57	0.57			0.57	
v/c Ratio		0.46			0.15		0.60	0.46			0.52	
Control Delay		8.7			14.7		13.3	6.3			8.9	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		8.7			14.7		13.3	6.3			8.9	
LOS		A			B		B	A			A	
Approach Delay		8.7			14.7			9.2			8.9	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		1.9			1.9		11.8	10.6			17.0	
Queue Length 95th (m)		15.9			9.0		33.1	26.2			37.6	
Internal Link Dist (m)		119.5			135.4			471.0			492.3	
Turn Bay Length (m)							50.0					
Base Capacity (vph)		649			501		607	1106			1087	
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		0.32			0.09		0.47	0.37			0.40	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 45.9			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 68.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: 43 St N & 18 Ave N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	1	119	162	4	9	23	567	40	2	673	4
Future Volume (vph)	18	1	119	162	4	9	23	567	40	2	673	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.883			0.993			0.990			0.999	
Flt Protected		0.994			0.956		0.950					
Satd. Flow (prot)	0	1381	0	0	1493	0	1495	1558	0	0	1572	0
Flt Permitted		0.949			0.672		0.352				0.999	
Satd. Flow (perm)	0	1318	0	0	1050	0	554	1558	0	0	1570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		135			5			9			1	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		131.7			164.3			548.3			495.0	
Travel Time (s)		9.5			11.8			32.9			29.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Adj. Flow (vph)	20	1	135	184	5	10	26	644	45	2	765	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	0	199	0	26	689	0	0	772	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		24.5	24.5		24.5	24.5	
Total Split (s)	22.5	22.5		22.5	22.5		37.5	37.5		37.5	37.5	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		62.5%	62.5%		62.5%	62.5%	
Maximum Green (s)	18.0	18.0		18.0	18.0		33.0	33.0		33.0	33.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		15.2			15.2		33.4	33.4			33.4	
Actuated g/C Ratio		0.29			0.29		0.65	0.65			0.65	
v/c Ratio		0.32			0.64		0.07	0.68			0.76	
Control Delay		7.0			29.0		7.0	14.8			18.3	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		7.0			29.0		7.0	14.8			18.3	
LOS		A			C		A	B			B	
Approach Delay		7.0			29.0			14.5			18.3	
Approach LOS		A			C			B			B	
Queue Length 50th (m)		1.6			18.1		1.1	49.5			62.0	
Queue Length 95th (m)		12.1			#41.1		4.2	#110.9			#133.3	
Internal Link Dist (m)		107.7			140.3			524.3			471.0	
Turn Bay Length (m)							50.0					
Base Capacity (vph)		579			397		368	1038			1044	
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		0.27			0.50		0.07	0.66			0.74	

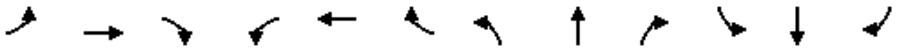
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 51.6			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 17.0		Intersection LOS: B	
Intersection Capacity Utilization 65.2%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 6: 43 St N & 14 Ave N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	4	239	136	18	30	144	392	29	7	321	14
Future Volume (vph)	26	4	239	136	18	30	144	392	29	7	321	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.880			0.978			0.990			0.994	
Flt Protected		0.995			0.964		0.950				0.999	
Satd. Flow (prot)	0	1378	0	0	1483	0	1495	1558	0	0	1562	0
Flt Permitted		0.955			0.583		0.534				0.990	
Satd. Flow (perm)	0	1322	0	0	897	0	840	1558	0	0	1548	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		272			22			10			6	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		143.5			159.4			495.0			516.3	
Travel Time (s)		10.3			11.5			29.7			31.0	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Adj. Flow (vph)	30	5	272	155	20	34	164	445	33	8	365	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	307	0	0	209	0	164	478	0	0	389	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	

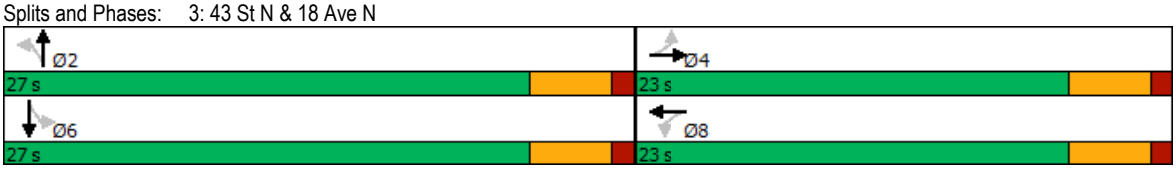


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		24.5	24.5		24.5	24.5	
Total Split (s)	23.0	23.0		23.0	23.0		27.0	27.0		27.0	27.0	
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%		54.0%	54.0%	
Maximum Green (s)	18.5	18.5		18.5	18.5		22.5	22.5		22.5	22.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.2			14.2		21.1	21.1			21.1	
Actuated g/C Ratio		0.32			0.32		0.48	0.48			0.48	
v/c Ratio		0.51			0.69		0.41	0.64			0.53	
Control Delay		6.0			25.9		12.8	14.6			12.2	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		6.0			25.9		12.8	14.6			12.2	
LOS		A			C		B	B			B	
Approach Delay		6.0			25.9			14.1			12.2	
Approach LOS		A			C			B			B	
Queue Length 50th (m)		1.8			11.5		7.4	24.4			18.5	
Queue Length 95th (m)		13.8			#35.5		21.5	55.1			42.0	
Internal Link Dist (m)		119.5			135.4			471.0			492.3	
Turn Bay Length (m)							50.0					
Base Capacity (vph)		714			390		430	803			796	
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		0.43			0.54		0.38	0.60			0.49	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 44.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 13.6		Intersection LOS: B	
Intersection Capacity Utilization 88.0%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 3: 43 St N & 18 Ave N



APPENDIX B

Existing TIA

A Traffic Impact Assessment (TIA) Report

For

CHINOOK INDUSTRIAL PARK AREA STRUCTURE PLAN DEVELOPMENT

Lethbridge, Alberta

Prepared for

Hasegawa Consulting Professional Engineers

November 3, 2017
1st Revision: April 9, 2018
2nd Revision: September 6, 2018
3rd Revision: October 10, 2018



EASL Transportation Consultants, Inc.
Delivering Engineering and Planning Solutions
840 6 Avenue SW, Suite 300
Calgary, Alberta, T2P 3E5
Tel: 403.930.1928 I Fax: 403.265.3783
info@easltransportation.ca
www.easltransportation.ca

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1.0 INTRODUCTION

1.1 General

Hasegawa Consulting Professional Engineers retained EASL Transportation Consultants, Inc. to undertake a traffic impact assessment (TIA) in support of the proposed Chinook Industrial Park Development to be located within Quarter Sections SW 1/4-10-9-21-4 and NW 1/4-10-9-21-4 in Lethbridge County, Alberta. This traffic impact assessment is being prepared to assess potential transportation impacts of the proposed development and to satisfy Lethbridge County's and City of Lethbridge's requirements for such a study as a result of the proposed development. **Figure 1a** presents a site map that shows the general location of the proposed development, and **Figure 1b** presents a local context aerial map. The proposed development is defined by the following boundaries:

- 43 Street N to the west;
- Greenfield to the east;
- Township Road 92 to the north; and
- 9 Avenue N to the south.

1.2 Existing Land Use

The southern portion of project area located at the northeastern corner of 43 Street / 9 Avenue N intersection is occupied by the currently operating Southland International Truck Facility. The remaining portion of the land to the north is a Greenfield unoccupied area.

1.3 Proposed Development Plan

The proposed Chinook Industrial Park Development site will consist of the following:

1. **Phase 1:** will be located within the existing Southland International Truck Facility and will include 18.56 acres of General Light Industrial land use and 18.62 acres of Business Park land use. Phase 1 will be completed after 2 years from today.
2. **Phases 2 to 5:** will be located within the Greenfield area north of the existing Southland International Truck Facility and will consist of 95.17 acres of General Light Industrial land use and 40.66 acres of Business Park land use. Phase 2 will be completed within 5 years from today.

The proposed project development site plan and internal roadway plan are included in **Appendix A** of this report.

1.4 Purpose of Study

The primary purposes of this traffic impact assessment study are:

- To evaluate the traffic operations and levels of service (LOS) at the following intersections:

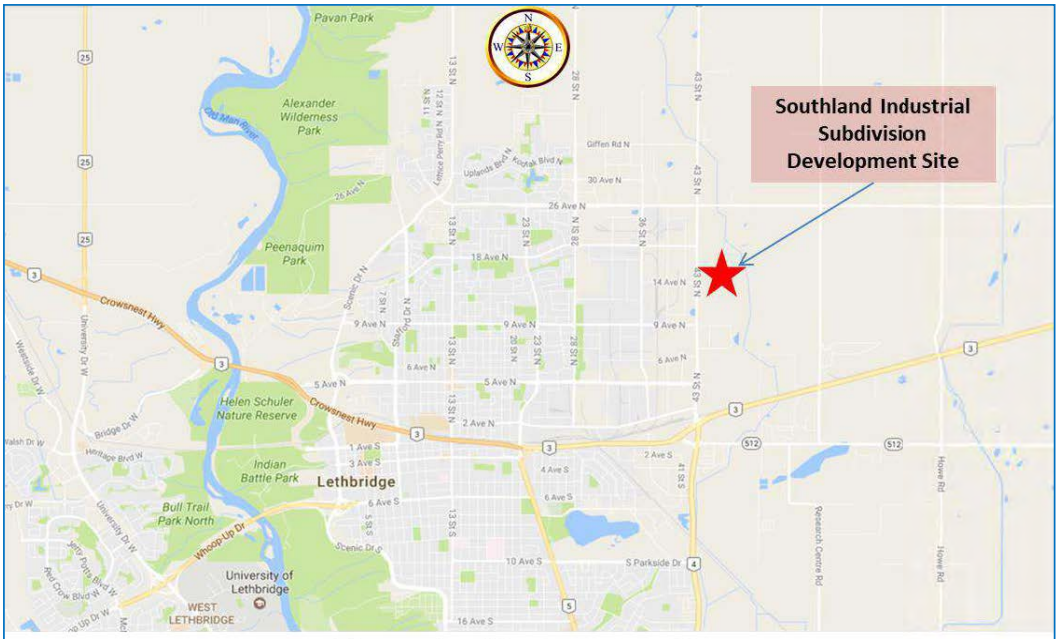


Figure 1a: Site Location Map

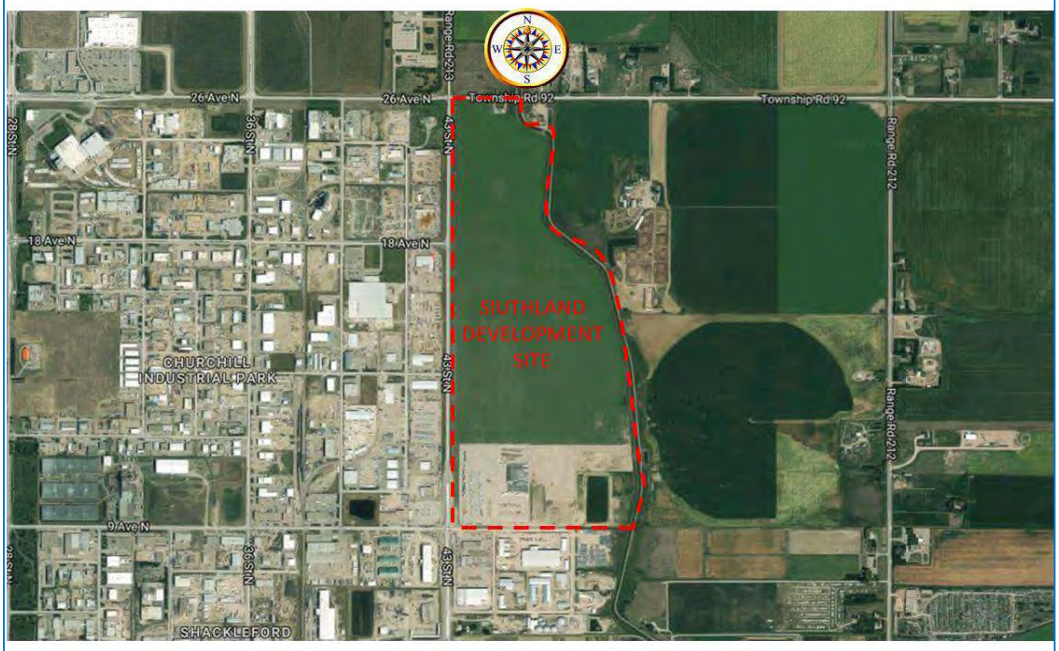


Figure 1b: Local Context Aerial Map

- 43 Street North and 26 Avenue North intersection (Unsignalized);
- 43 Street North and 18 Avenue North intersection (Unsignalized);
- 43 Street North and 14 Avenue North intersection (Unsignalized);
- 43 Street North and 9 Avenue North intersection (Signalized);
- 43 Street North and 5 Avenue North intersection (Signalized); and
- Highway 3 / Crowsnest Highway and 43 Street North intersection (signalized).

- To evaluate any potential project traffic impacts of the proposed development to the surrounding roadway network, and to determine if the roadways, site access and traffic circulations in the project vicinities would be suitable for the intended development and the amount of development traffic volumes anticipated.
- To identify suitable intersection control and geometric configurations that would be required to properly service the proposed development including conducting a signal warrant analyses for any of the study unsignalized intersections, as needed.
- Also, to identify any needed short-term and long-term roadway improvements in the areas to enable acceptable traffic operations that would satisfy both the Lethbridge County and the City of Lethbridge requirements.

1.5 Methodologies

This traffic impact assessment utilizes the following evaluation methodologies:

- Data collection including but not limited to existing roadway and intersection geometric characteristic, pavement markings, traffic control types, and intersection turning movement traffic counts.
- The forecast of background peak hour traffic volumes without the site traffic for the 2, 5 and 20-year horizons (2019, 2022 and 2037).
- Trip generation estimate for the proposed development based on appropriate ***Trip Generation*** land use categories and corresponding trip generation rates by the Institute of Transportation Engineers (ITE).
- Distribution of the site generated trips to/from the development site based on population, land uses, roadway network, and existing traffic patterns in the project vicinities.
- Assignment of the project trips to the adjacent roadways based on the proposed project site plan and the estimated roadway trip distribution characteristics.
- Existing, background, and future traffic capacity analysis for the study area intersections and roadways to identify possible capacity constraints and to assess overall traffic impacts of the proposed development, which is based on the ***latest Highway Capacity Manual (HCM)*** methodologies by the Transportation Research Board, the US National Academies of Sciences, Engineering and Medicine.

2.0 EXISTING CONDITIONS

2.1 Area Road Network

The existing transportation system within the vicinity of the proposed project site consists of the following roadways:

43 Street North is within the City of Lethbridge limits and represent the borderline between the City of Lethbridge and Lethbridge County. 43 Street N is a paved arterial two-lane two-way roadway north of 9 Avenue N and a divided 4-lane roadway with two lanes per direction south of 9 Avenue N. 43 Street North is classified as a dangerous goods route with a posted speed limit of 70 km/h. Based on the City of Lethbridge 2016 Traffic Flow Map, the daily traffic volumes on 43 Street N in the vicinity of 9 Avenue N is 8,300 vehicles per day and north of 26 Avenue N is 800 vehicles per day.

26 Avenue North / Township Road 92: 26 Avenue N, to the west of 43 Street N is within the City of Lethbridge limits and is a two-lane two-way paved roadway with a posted speed limit of 60km/h. The existing daily traffic volume on 26 Avenue North is 4,800 vehicles per day based on the City of Lethbridge 2016 Traffic Flow Map. This road's name changes to Township Road 92 to the east of 43 Street N and becomes under the jurisdiction of Lethbridge County.

18 Avenue North is within the City of Lethbridge limits and is a two-lane two-way paved industrial collector road with a posted speed limit of 50km/h. The existing daily traffic volume on 18 Avenue N is 3.900 vehicles per day based on the City of Lethbridge 2016 Traffic Flow Map.

14 Avenue North is within the City of Lethbridge limits and is a two-lane two-way paved roadway paved industrial collector road with a posted speed limit of 50km/h. The existing daily traffic volumes on 14 Avenue North is 1,200 vehicles per day based on the City of Lethbridge 2016 Traffic Flow Map.

9 Avenue North west of 43 Street N is within the City of Lethbridge limits and is a paved two-lane two-way industrial collector roadway with allowed parallel parking on both sides of the road. However, 9 Avenue N east of 43 Street N is within the Lethbridge County limits and is a two-lane two-way gravel roadway. The posted speed limit is 50km/h. Access to the existing Southland International Truck Facility as well as the Phase 1 of the proposed development will be off 9 Avenue N at 44 Street North. The existing daily traffic volume on 9 Avenue N west of 43 Street N is 4,400 vehicles per day based on the City of Lethbridge 2016 Traffic Flow Map.

5 Avenue North is within the City of Lethbridge limits and is a paved four lane divided roadway with a posted speed limit of 60km/h. The existing daily traffic volume on 5 Avenue N just west of 43 Street N is 4,200 vehicles per day based on the City of Lethbridge 2016 Traffic Flow Map.

Highway 3 (Crowsnest Highway) is a provincial paved and divided four lane highway with a posted speed limit of 80 Km/h in the vicinity of 43 Street. The existing daily traffic volume on

Highway 3 west of 43 Street N is 25,100 vehicles per day based on the City of Lethbridge 2016 Traffic Flow Map.

2.2 Existing Intersection Conditions

All study area intersections are located along 43 Street North with the northern three intersections at 26 Avenue N, 18 Avenue N, and 14 Avenue N currently unsignalized and controlled by stop signs on the east/west intersecting roads. The remaining three study intersections located at 9 Avenue N, 5 Avenue N, and Highway 3 (Crowsnest Hwy) are signalized intersections. **Figure 2a** has been prepared to present the lane configurations, the channelized movements and the control types at each of the study area intersections.

2.3 Existing Traffic Volumes and Conditions

A field reconnaissance of the site and its surroundings was conducted to establish a database of the existing conditions. The peak period for the proposed Chinook Industrial Park Development would typically occur during the weekday morning and the late afternoon periods.

Turning movement traffic count data were collected by Hasegawa Engineering on March 14, 2017 and March 16, 2017 from 7:00 AM to 9:00 AM, and from 4:00 PM to 6:00 PM at the following four study intersections:

- 43 Street North and 18 Avenue North intersection
- 43 Street North and 14 Avenue North intersection
- 43 Street North and 9 Avenue North intersection
- 43 Street North and 5 Avenue North intersection

The City of Lethbridge's 2016 traffic counts were obtained for the intersection of:

- 43 Street North and 26 Avenue North

Also, Alberta Transportation's 2016 traffic count data has been utilized to represent the existing traffic volumes for the intersection of:

- Highway 3/Crowsnest Highway and 43 Street

Analysis of the 15-minute turning movement traffic count data at study intersections indicated that the AM peak hour of traffic occurs between 7:15 AM and 8:15 AM; and the PM peak hour of traffic occurs between 4:15 PM and 5:15 PM. The existing AM and PM peak-hour traffic volumes for all study intersections are illustrated on **Figure 2b**. Details of the collected traffic count data as well as the City of Lethbridge and Alberta Transportation 2016 traffic count data are contained in **Appendix B**.

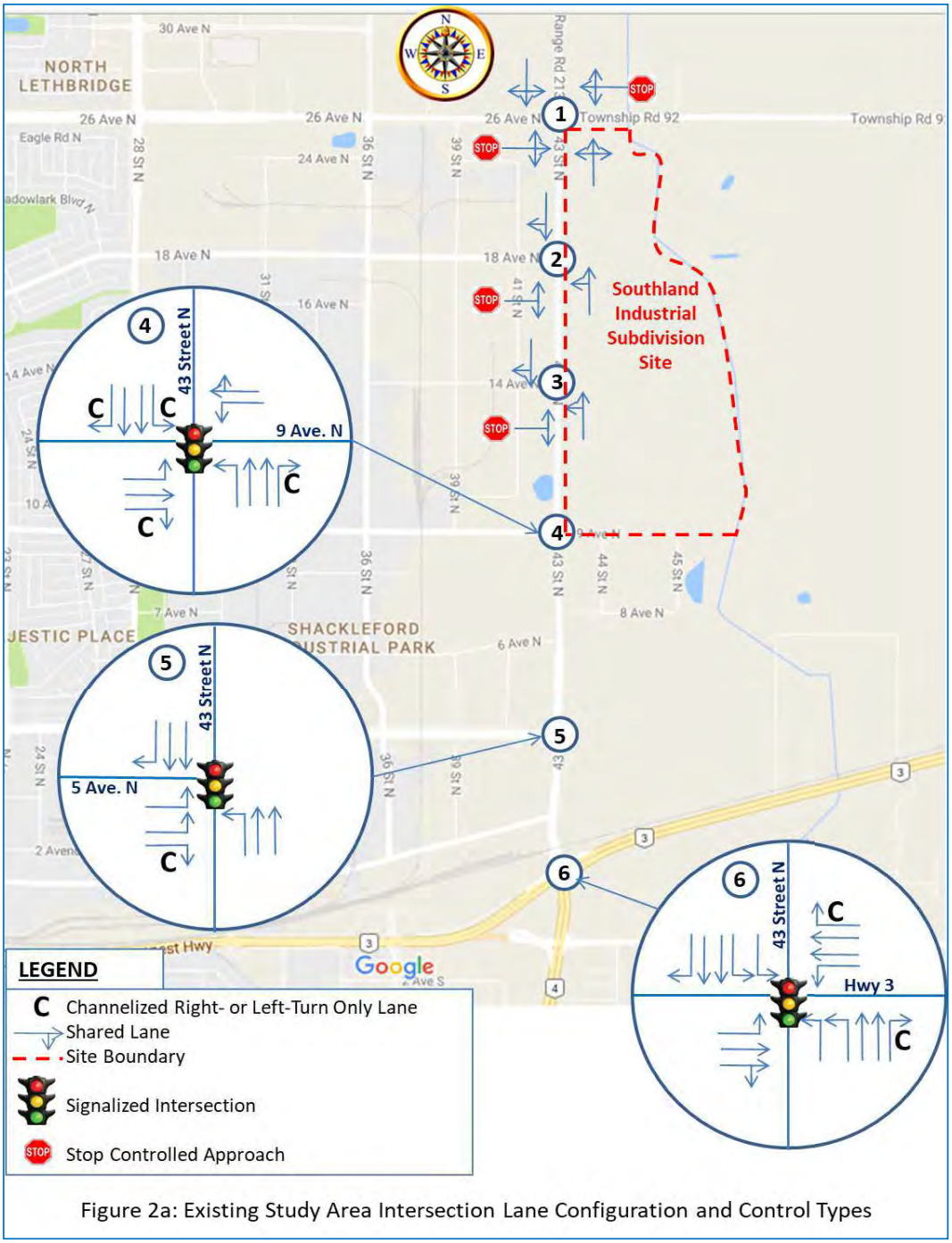


Figure 2a: Existing Study Area Intersection Lane Configuration and Control Types

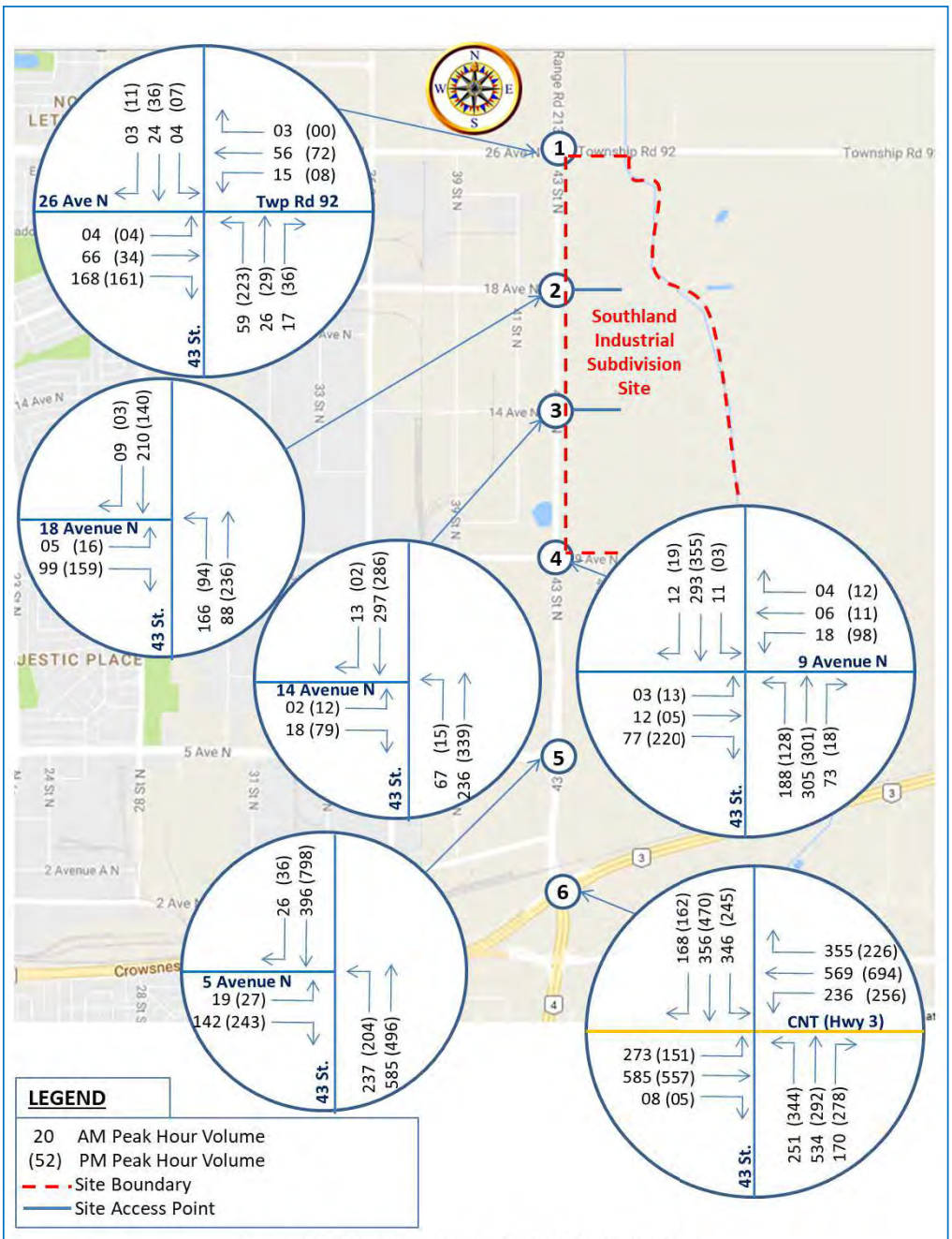


Figure 2b: Existing 2017 Peak Hour Traffic Volumes

2.4 Existing Heavy Vehicle Composition

The turning movement traffic count completed for the study intersections as well as the traffic count data obtained from the City of Lethbridge / Alberta Transportation were analyzed and the heavy vehicle percentages were determined at all study intersections. The AM peak hour and the PM peak hour heavy vehicle compositions were determined and are presented in Table 1. Note that heavy vehicle traffic volume considered included trucks, multi-axle vehicles, city buses and school buses.

Table 1: Adjacent Highway Heavy Vehicle Composition (in %)

Intersection Name	Peak Hour Period	2016 / 2017 Traffic Count Data			
		EB	WB	NB	SB
43 Street North and 26 Avenue	**AM and PM**	4%	4%	7%	16%
43 Street North and 18 Avenue North	**AM**	12%	-	10%	3%
	PM	9%	-	9%	8%
43 Street North and 14 Avenue North	**AM**	55%	-	10%	6%
	PM	3%	-	9%	10%
43 Street North and 9 Avenue North	**AM**	3%	36%	9%	9%
	PM	6%	2%	13%	7%
43 Street North and 5 Avenue North	**AM**	12%	-	6%	16%
	PM	7%	-	12%	6%
Highway 3 / Crowsnest Highway 43 Street North	**AM**	10.7%	8.7%	9.7%	14.8%
	PM	9.5%	6.3%	6.7%	11.2%

Based on the above results, the capacity analysis for study intersections utilized the observed heavy vehicle percentages as noted in Table 1. However, for new approaches, a heavy vehicle percentage of **10%** was utilized in the capacity analysis software for that approach as per the City of Lethbridge TIA standards.

2.5 Planned Roadway Improvements

City of Lethbridge has been contacted in order to find out if there are any plans for any roadway improvements within the study area in the near future. The City of Lethbridge development planning staff indicated that 43 Street N, north of 9 Avenue will be upgraded to 4-lane roadway in the future. However, the City of Lethbridge further confirmed that 43 Street N north of 9 Ave N is not anticipated to be twinned by 2037, which is the future horizon design year for this TIA. Therefore, existing layout will be considered in the analysis and needed improvements will be recommended. Additionally, the ***2006 Functional Planning Study completed by Stantec***[(1)] for Highways 3 & 4 in Lethbridge area proposes / recommends new alignments for these highways that would provide external links allowing external traffic to by-pass the City and hence reducing Crowsnest Highway traffic within Lethbridge.

(1) http://www.transportation.alberta.ca/projects/assets/Area_8_South/Hwy%203%20Lethbridge/Executive_Summary.pdf

3.0 PROJECTED TRAFFIC VOLUMES

3.1 Trip Generation for Background Developments

Background traffic takes into account additional traffic on the roadway systems that will be generated by approved developments in the area that may be completed by the time of the site build-out. The current project is projected to be built-out in the near term. Based on EASL Transportation Consultants' discussion with the City of Lethbridge, there is one approved development, Cavendish Farms within the vicinity of the project site that must be considered. The AM and PM peak hour traffic volumes generated by this background development and would impact the current study area intersections were obtained from the City of Lethbridge and are presented on **Figure 3**. A copy of the original City of Lethbridge's traffic volumes generated by Cavendish Farms is contained in **Appendix B**.

3.2 Historical Traffic Growth Rate

To account for inherited growth in traffic and the traffic generated by other unknown developments that may occur at the build-out of the proposed project, a traffic growth factor was applied to the existing traffic volumes to forecast the future traffic conditions. A 2.5% annual growth rate was used to estimate traffic growth for the 2-year, 5-year and 20-year horizons. This 2.5% growth rate was applied to the 2017 existing traffic volumes to derive the 2019, 2022, and 2037 background growth traffic volumes to be used to estimate the total background traffic volumes. Note that the 2.5% annual growth rate is in accordance with the City of Lethbridge / Lethbridge County acceptable medium to long range growth standards. The background growth traffic volumes for the years 2019, 2022, and 2037 are illustrated on **Figures 4, 5,** and **6**, respectively.

3.3 Background Traffic

The Cavendish Farms Background traffic volumes presented on Figure 3 were added to the traffic growth due to unknown developments (Figures 4, 5 and 6) then added to the existing 2017 peak hour traffic volumes shown on Figure 2, creating the 2019, 2022 and 2037 background traffic scenario (without site volumes) as illustrated on **Figures 7, 8 and 9.**

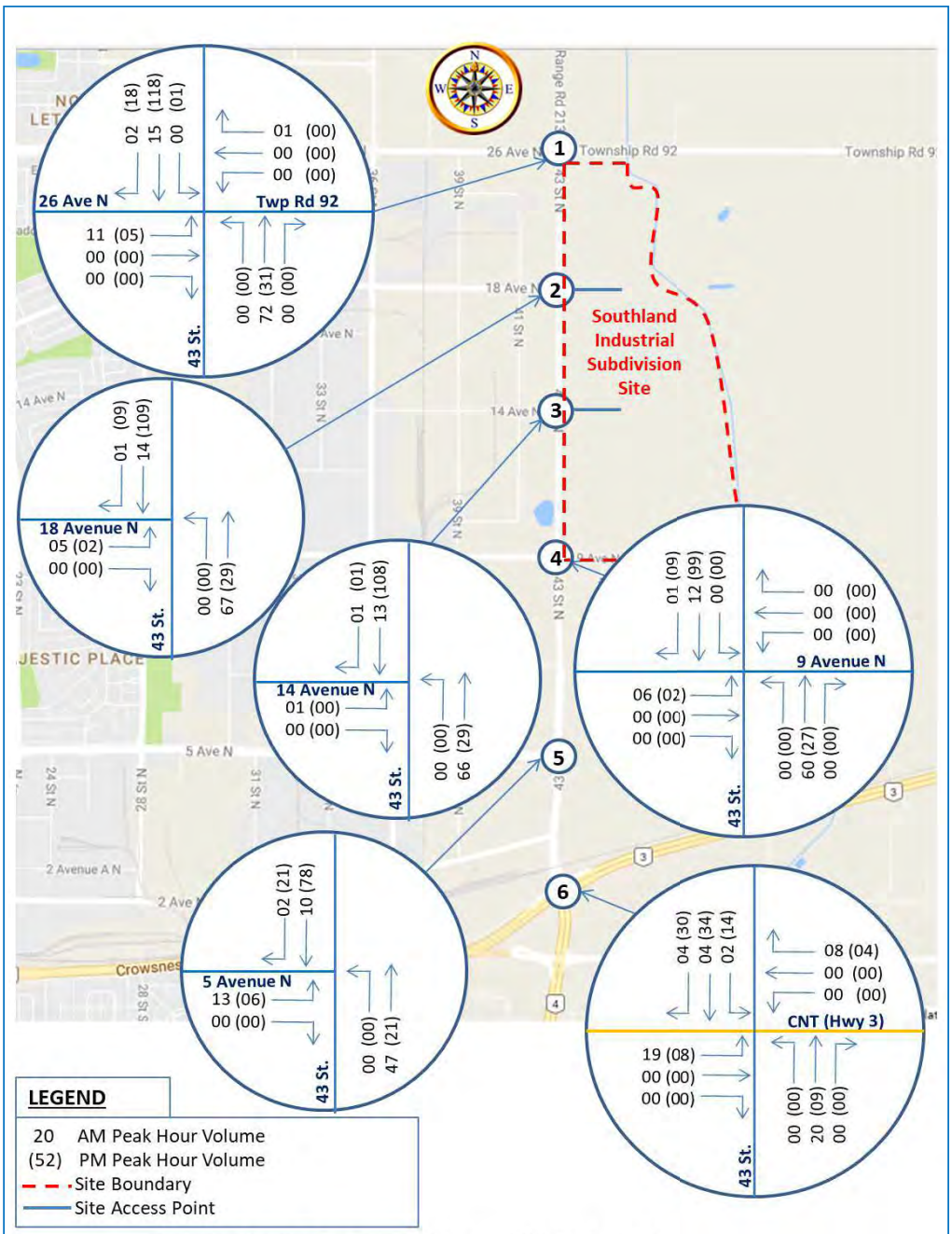


Figure 3: Known Background (Cavendish) Peak Hour Traffic Volumes

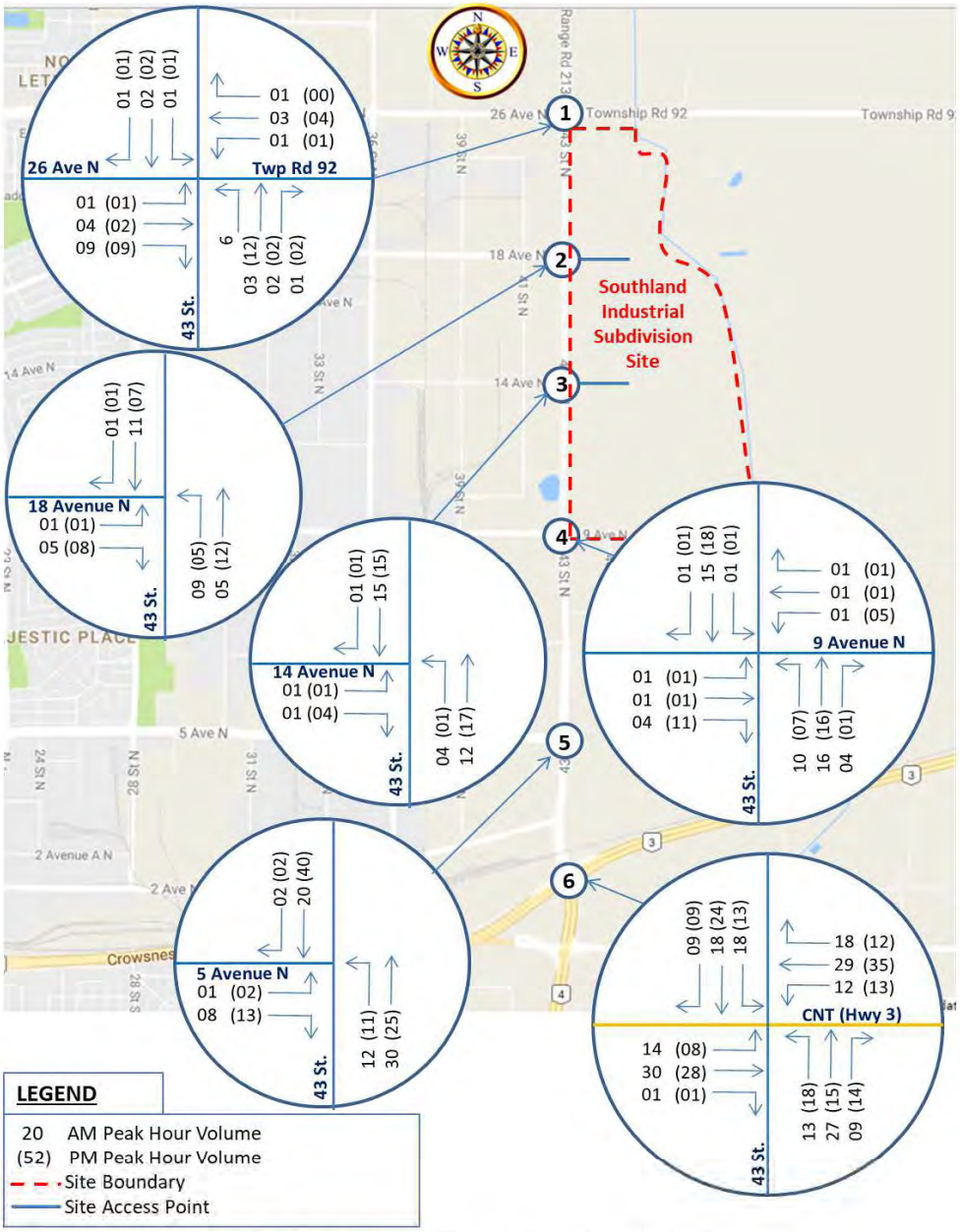


Figure 4: Background 2019 Growth Peak Hour Traffic Volumes
(2.5% Growth Rate Applied for 2 Years on Existing)

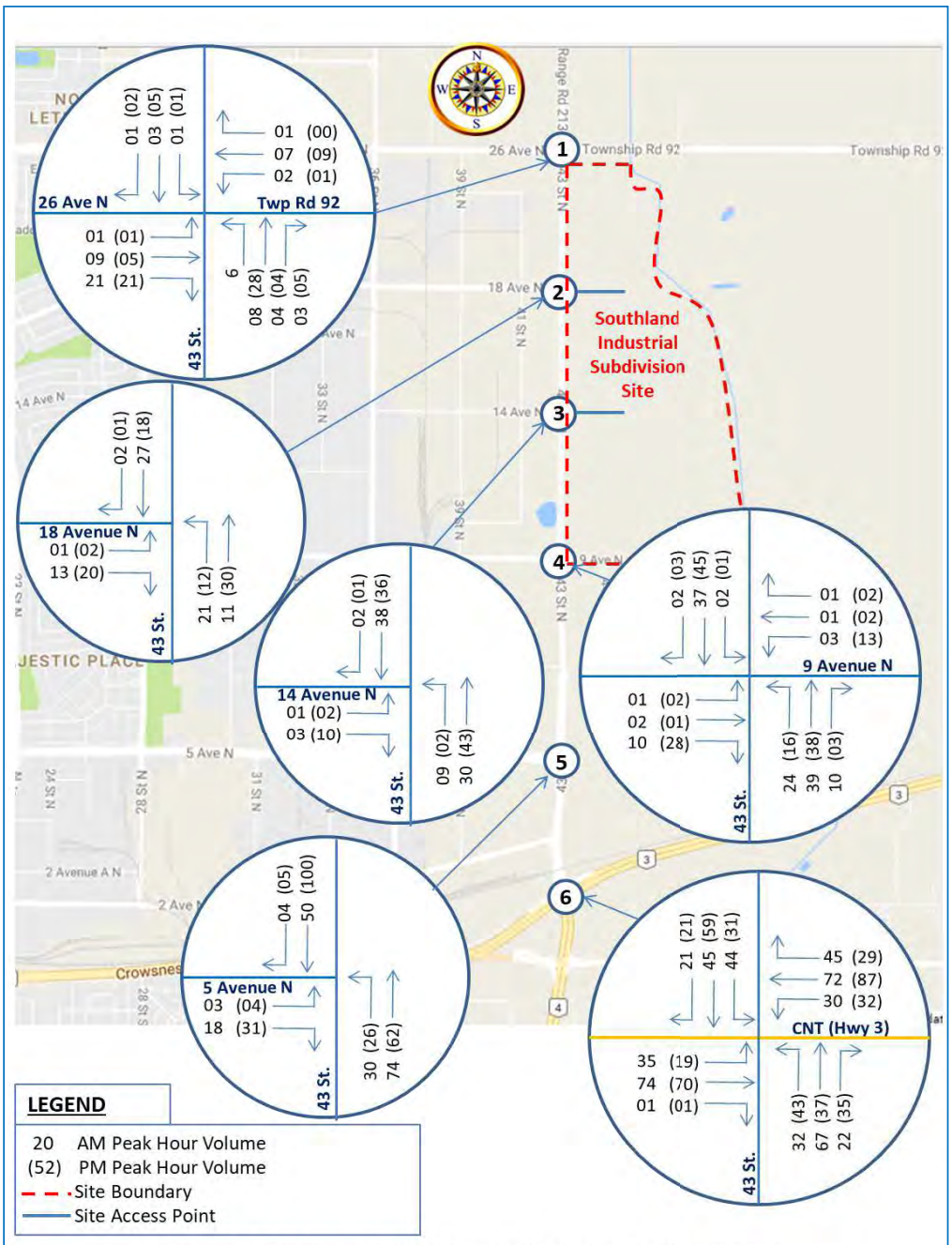


Figure 5: Background 2022 Growth Peak Hour Traffic Volumes
(2.5% Growth Rate Applied for 5 Years on Existing)

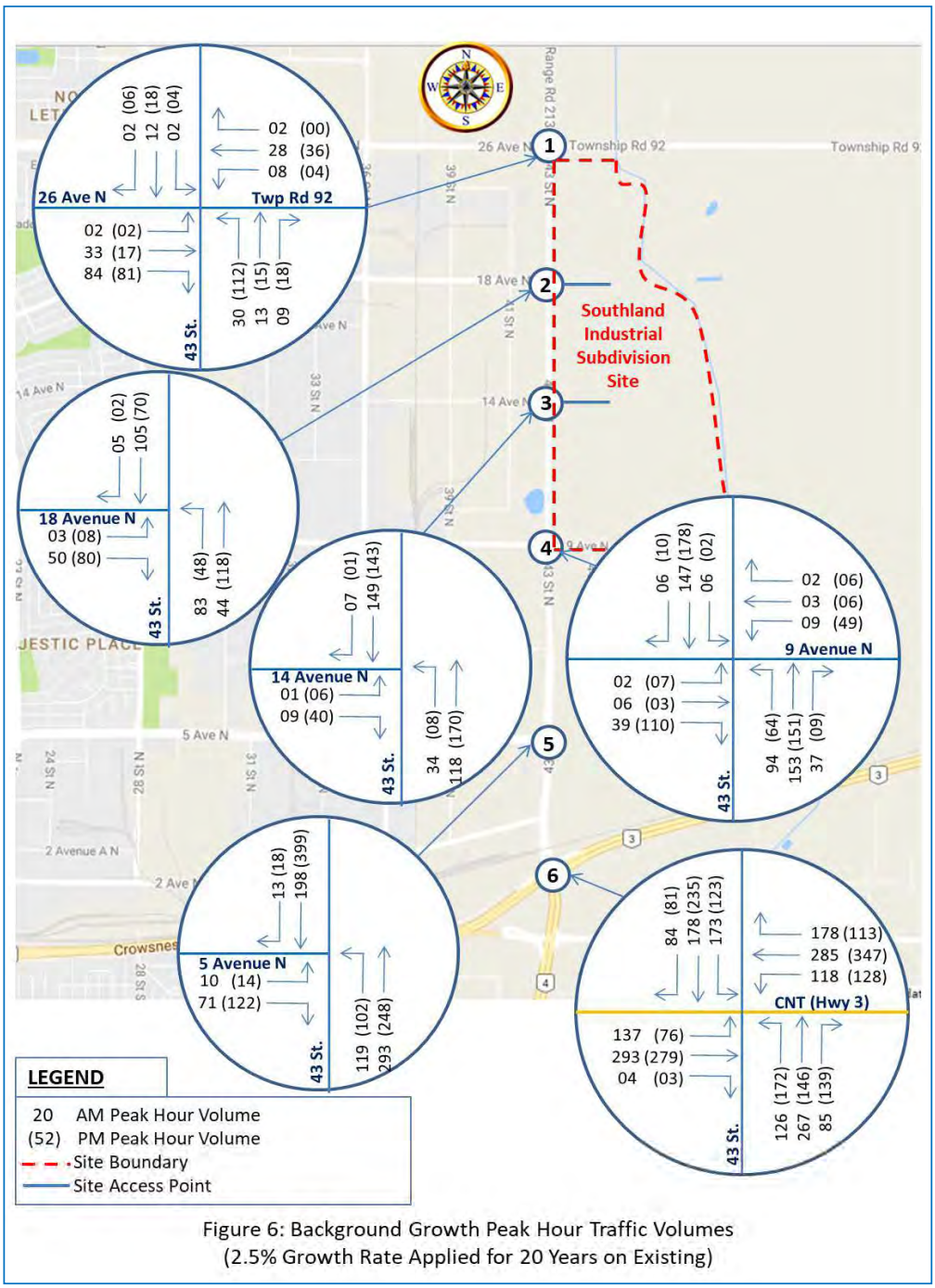


Figure 6: Background Growth Peak Hour Traffic Volumes
(2.5% Growth Rate Applied for 20 Years on Existing)

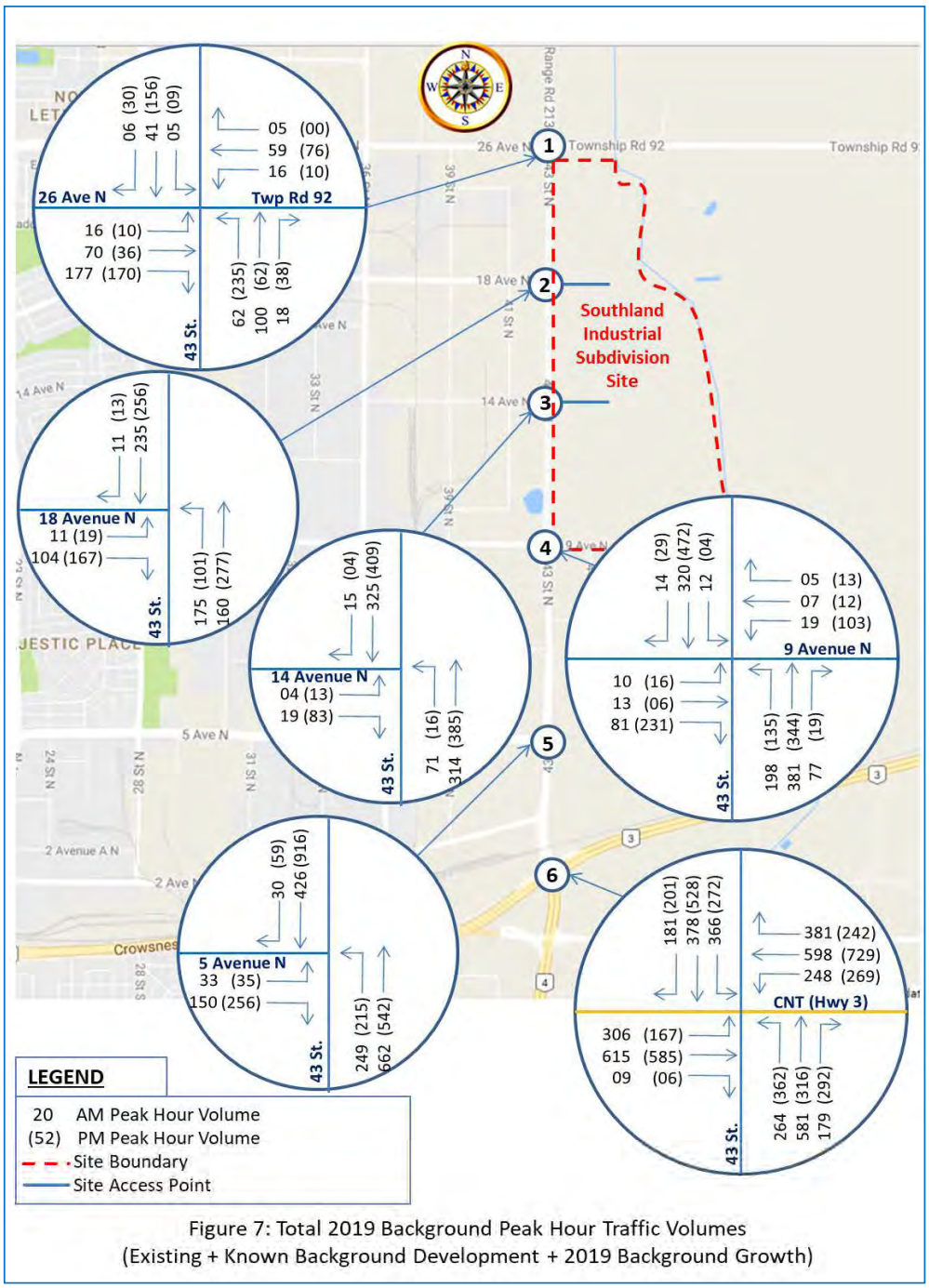


Figure 7: Total 2019 Background Peak Hour Traffic Volumes
(Existing + Known Background Development + 2019 Background Growth)

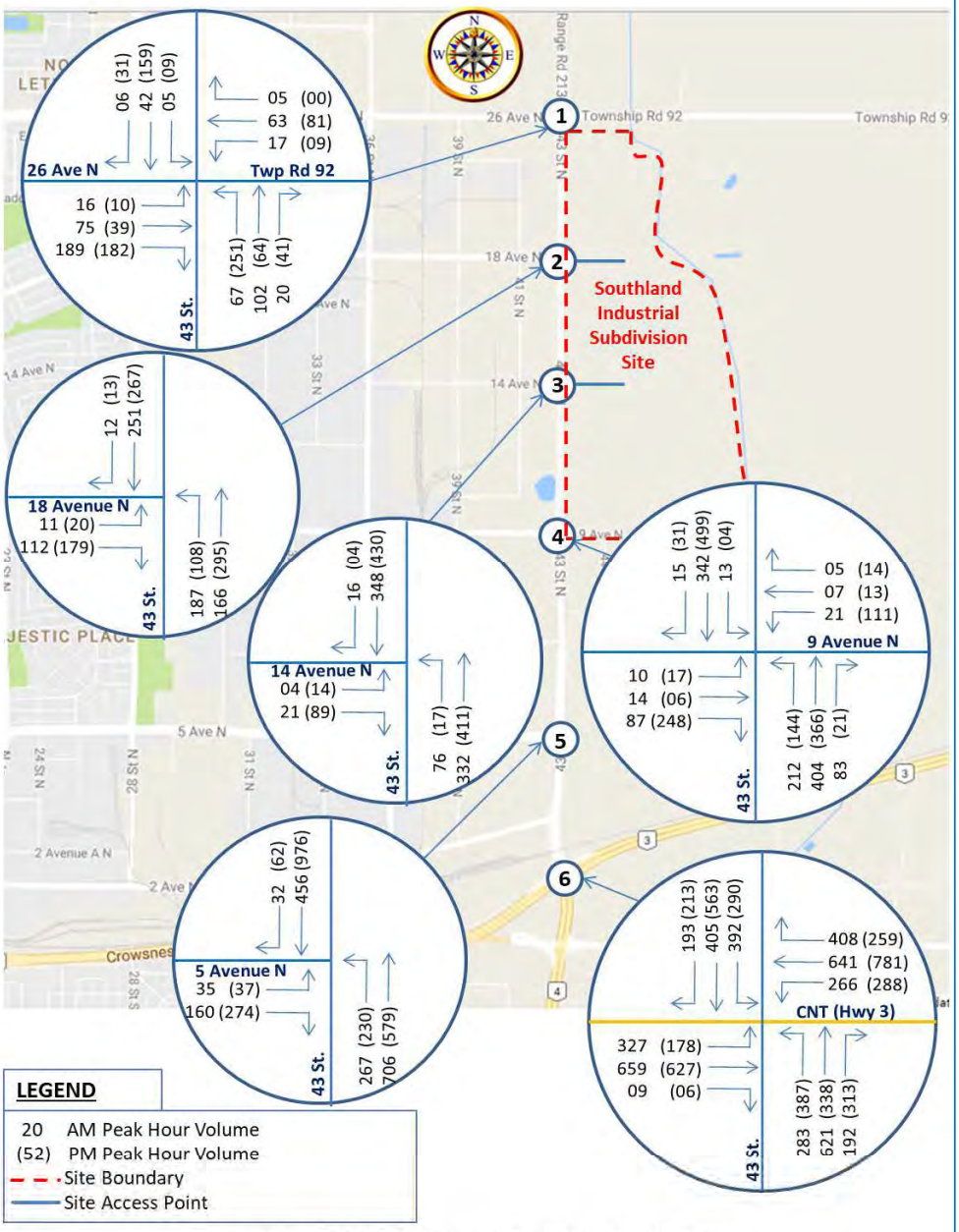


Figure 8: Total 2022 Background Peak Hour Traffic Volumes
(Existing + Known Background Development + 2022 Background Growth)

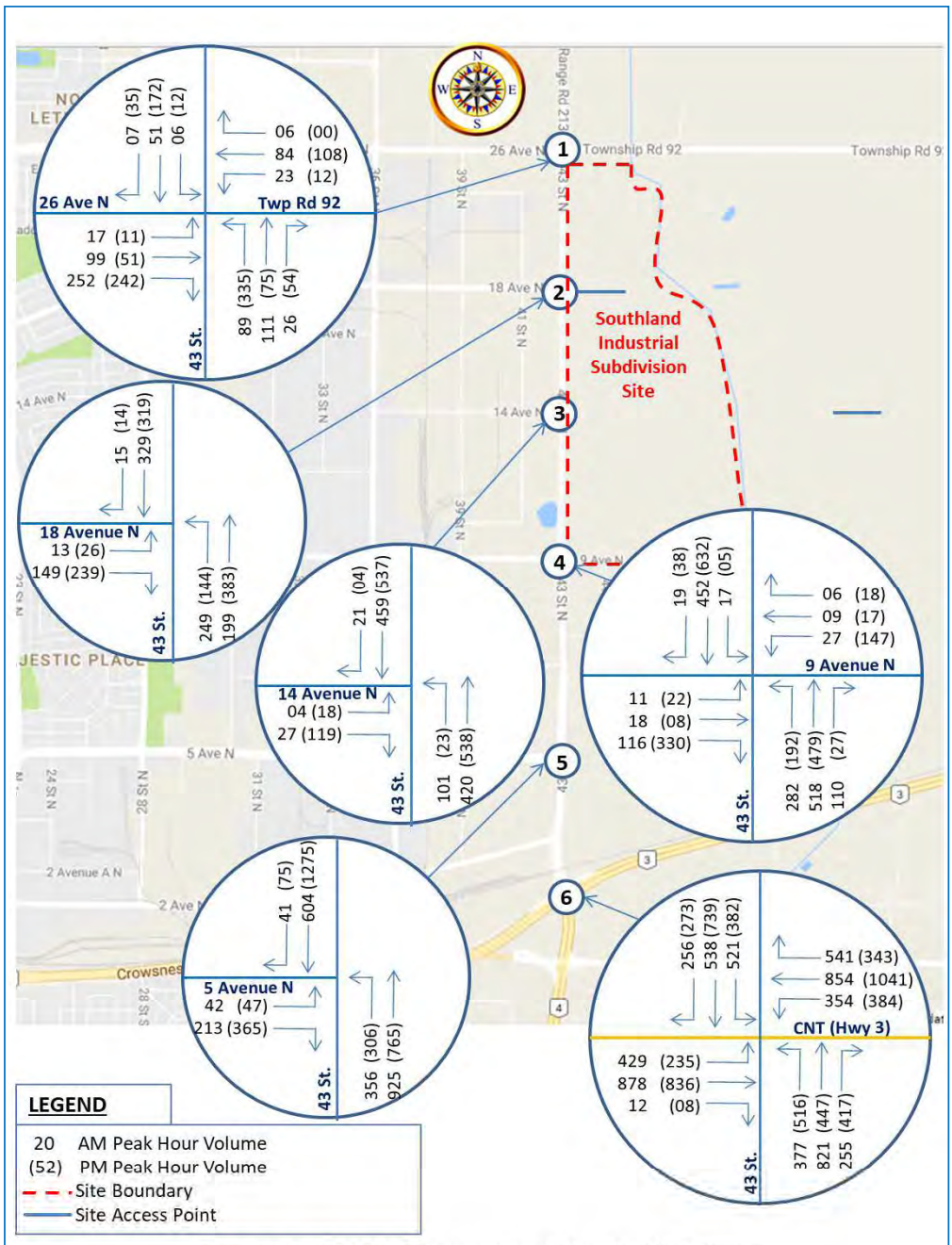


Figure 9: Total 2037 Background Peak Hour Traffic Volumes
(Existing + Known Background Development + 2037 Background Growth)

3.4 Site Generated Trips

To estimate the number of vehicle trips expected to be generated by a particular development, trip generation rates are applied based on the proposed land uses and intensity. The number of trips that would be generated by the proposed development was estimated based on the rates published in ***Trip Generation, 10th Edition*** by the Institute of Transportation Engineers (ITE). The trip generation rates along with the proposed land uses and the corresponding ITE land use codes are presented in **Table 2**. The projected Chinook Industrial Park development peak-hours and daily site-generated traffic volumes are presented in **Table 3**.

It should be noted that the proposed site development plan provides land use areas in acres and the ITE 10th Edition Trip Generation manual uses the gross floor area (GFA) as the independent variable. Based on reviewing several near-by, Lethbridge area existing industrial parks, building area ratios to the total acreage area ranged from 6,114 SF per acre to 11,155 SF per acre. We are selecting 8,200 SF per Acre for the proposed development as this is the average planned building areas. All proposed land use areas within each of the planned phases were converted to GFA based on this rate and are presented in the 4th column of **Table 3**.

Table 2: Trip Generation Rates (ITE Trip Generation Manual 10th Edition)

Land Use	ITE Code	Unit	AM Peak Hour			PM Peak Hour			Daily Trips
			in	out	total	in	out	total	
General Light Industrial	110	KSF	88%	12%	0.70	13%	87%	0.63	4.96
Business Park	770	KSF	61%	39%	0.40	46%	54%	0.42	12.44

Table 3: Projected Site-Generated Peak-Hour and Daily Traffic Volumes

Land Use		ITE Code	Intensity (KSF)	AM Peak Hour			PM Peak Hour			Daily Trips
				in	out	total	in	out	total	
Phase 1	G. Light Industrial	110	152.2	94	13	107	12	84	96	755
	Business Park	770	152.7	38	24	62	30	35	65	1,900
	Phase 1 Total			**132**	**37**	**169**	**42**	**119**	**161**	**2,655**
Phases 2 to 5	G. Light Industrial	110	780.4	481	66	547	64	428	492	3,871
	Business Park	770	333.4	82	52	134	65	76	141	4,148
	Phases 2 to 5 Total			563	118	681	129	504	633	8,019
Full Development Total Trips				**695**	**155**	**850**	**171**	**623**	**794**	**10,674**

3.4.1 Pass-by Trips

Pass-by trips are not new trips, but they are the trips that are attracted from the traffic passing the site on adjacent roadways. While pass-by trips are new trips at the access points to the site, they are not new trips on the adjacent roadway systems

3.4.2 Internal Trips

An internal trip is a trip that has both its origin and destination within a multi-use development area under investigation, which should be deducted from the total number of trips departing and entering the study site. The appropriate internal trip reduction rates are based on the characteristics of the mixed land uses. The proposed development has a potential for some internal trips but to be conservative in the analysis no internal trips were considered for this development.

3.5 Trip Distribution

The directions from which vehicles will approach and depart a site is a function of several variables, including the population and employment distribution within the development's area of influence, the operational characteristics of the road system, and the ease with which drivers can travel over various sections of the roadway network without encountering congestion. The directional distribution of new project trips by the Chinook Industrial Park development was estimated based on the consideration of all the pertinent factors above including existing traffic patterns. The resulting directional distributions are as follows:

- 22% of site generated trips will travel to and from the west on Highway 3;
- 21% of site generated trips will travel to and from the south on 43 Street S;
- 26% of site generated trips will travel to and from the east on Highway 3;
- 08% of site generated trips will travel to and from the west on 5 Avenue N;
- 06% of site generated trips will travel to and from the west on 9 Avenue N;
- 01% of site generated trips will travel to and from the west on 14 Avenue N;
- 05% of site generated trips will travel to and from the west on 18 Avenue N;
- 07% of site generated trips will travel to and from the west on 26 Avenue N;
- 01% of site generated trips will travel to and from the north on 43 Street N; and
- 03% of site generated trips will travel to and from the east on Township Road 92.

Site access distribution percentages were determined based on the above directional distributions coupled with the ability of traffic to perform the needed turns and in relation to the available site accesses during each development phase. The resulting final directions of approaches and site access traffic distributions for Phase 1 and Phase 2 are illustrated on **Figure 10a and Figure 10b,** respectively.

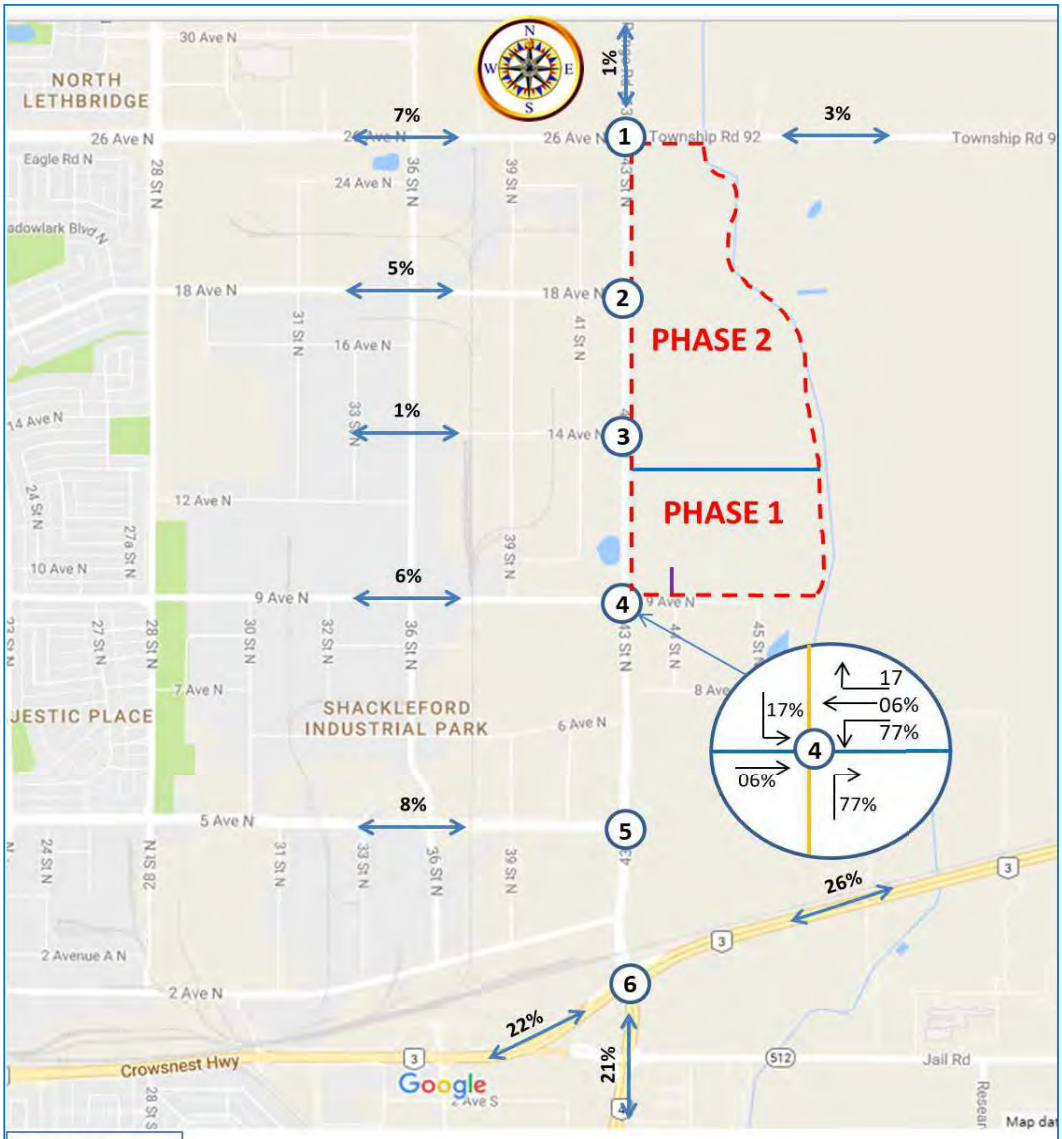


Figure 10a: Direction of Approach and Site Access Distribution
(Phase 1 of Development – Interim 2019)

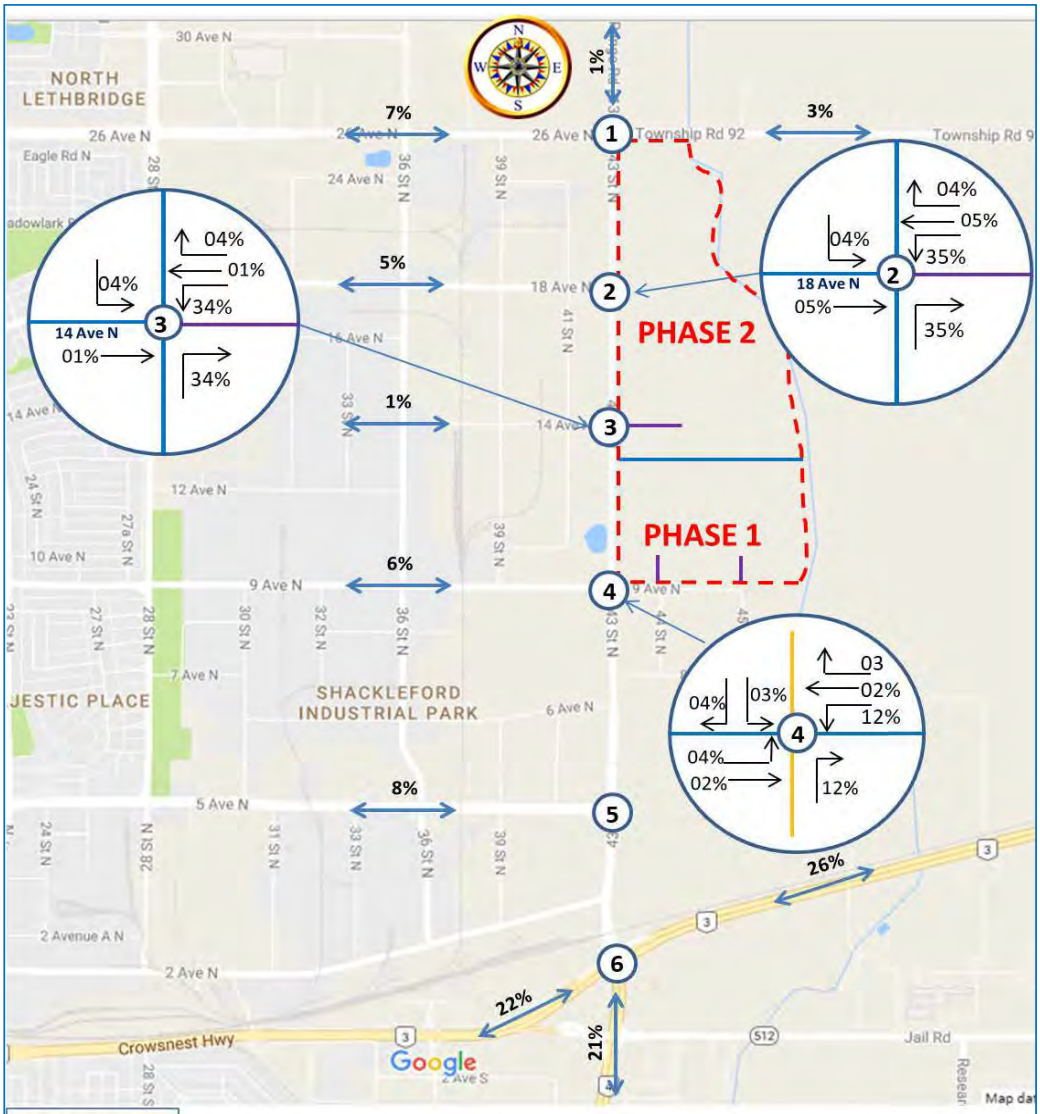


Figure 10b: Direction of Approach and Site Access Distribution
Phase 2: Full Development of Site(2022)

3.6 Trip Assignment

3.6.1 Project Built-Out (Opening Year – 2019) Volumes

The projected peak-hour traffic volumes for the Chinook Industrial Park Phase 1 of the development were assigned to the adjacent roadways based on the estimated directional distribution as shown on **Figure 10a**. The resulting site generated AM peak hour and PM peak hour trips are illustrated on **Figure 11.**

The project built-out year traffic volumes (opening year volumes) were prepared by adding the development's Phase 1 site-generated trips shown on Figure 11 to the Total 2019 Background traffic volumes shown on Figure 7. The resulting project built-out 2019 traffic volumes are presented on **Figure 13**.

3.6.2 Future Traffic Volumes

The projected full development (Phase 2) peak-hour traffic volumes for the Chinook Industrial Park were assigned to the adjacent roadways based on the estimated directional distribution as shown on **Figure 10b**. The resulting site generated AM peak hour and PM peak hour trips for the full development of the site are illustrated on **Figure 12.**

The development site-generated trips shown on **Figure 12** were then added to the 2022 and 2037 total background peak-hour traffic volumes shown on **Figure 8 and Figure 9** to arrive at the future 2022 and future 2037 peak-hour total traffic volumes, which are illustrated on **Figure 14 and Figure 15**.

3.6.3 Average Daily Traffic Volumes

The Future 2037 average daily traffic (ADT) volumes for the study area roadway links with the proposed Chinook Industrial Park traffic were estimated from the AM and PM peak hour volumes. As per the City of Lethbridge directions, the following formula was utilized to calculate the ADT volumes:

*ADT = (AM Peak Hour Volume + PM Peak Hour Volume) * 5.6*

The above formula was applied on the turning movement traffic volumes in order to estimate the roadway link ADT volumes. The resulting Future 2037 estimated ADT volumes are illustrated on **Figure 16**.

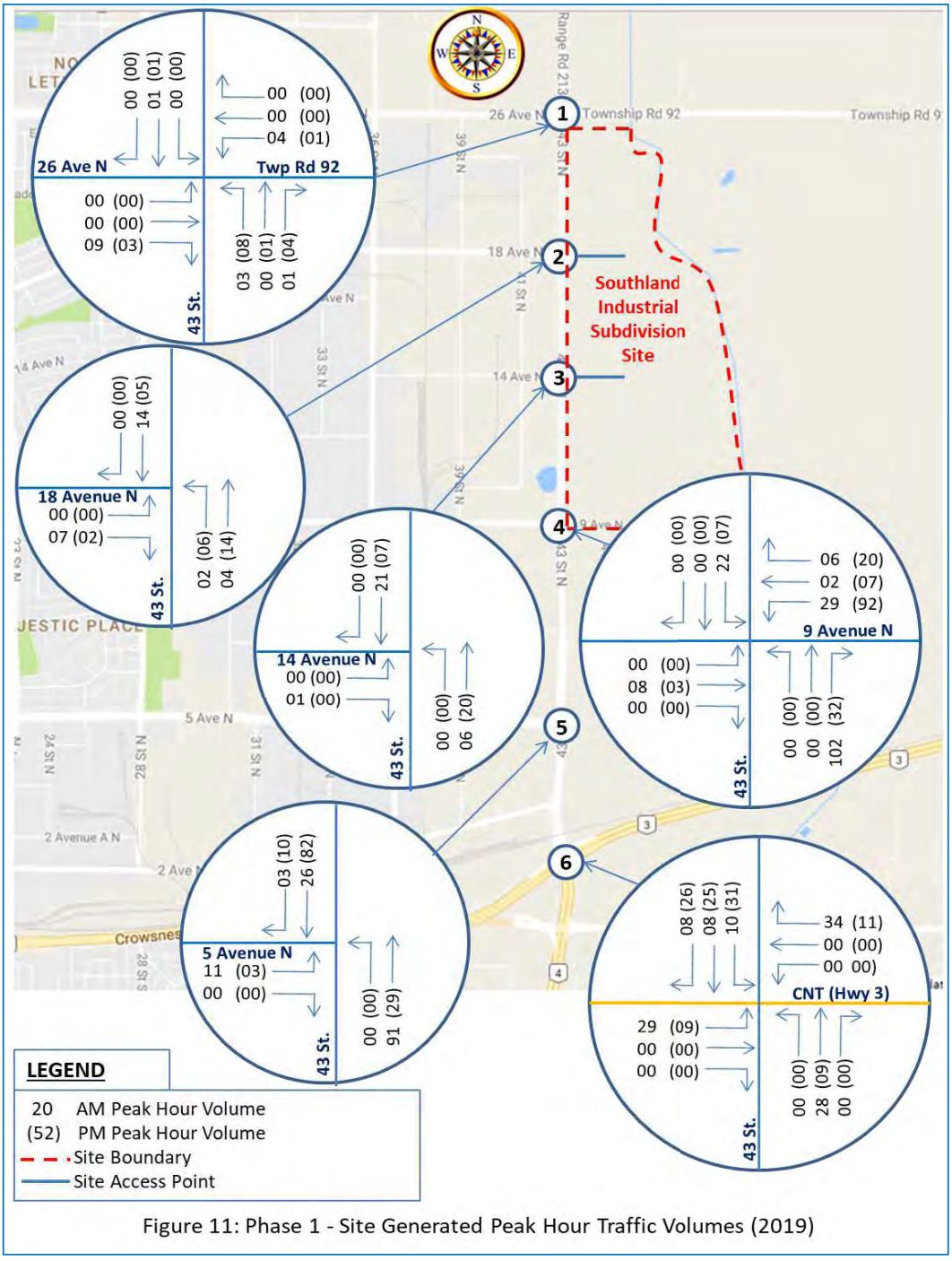


Figure 11: Phase 1 - Site Generated Peak Hour Traffic Volumes (2019)

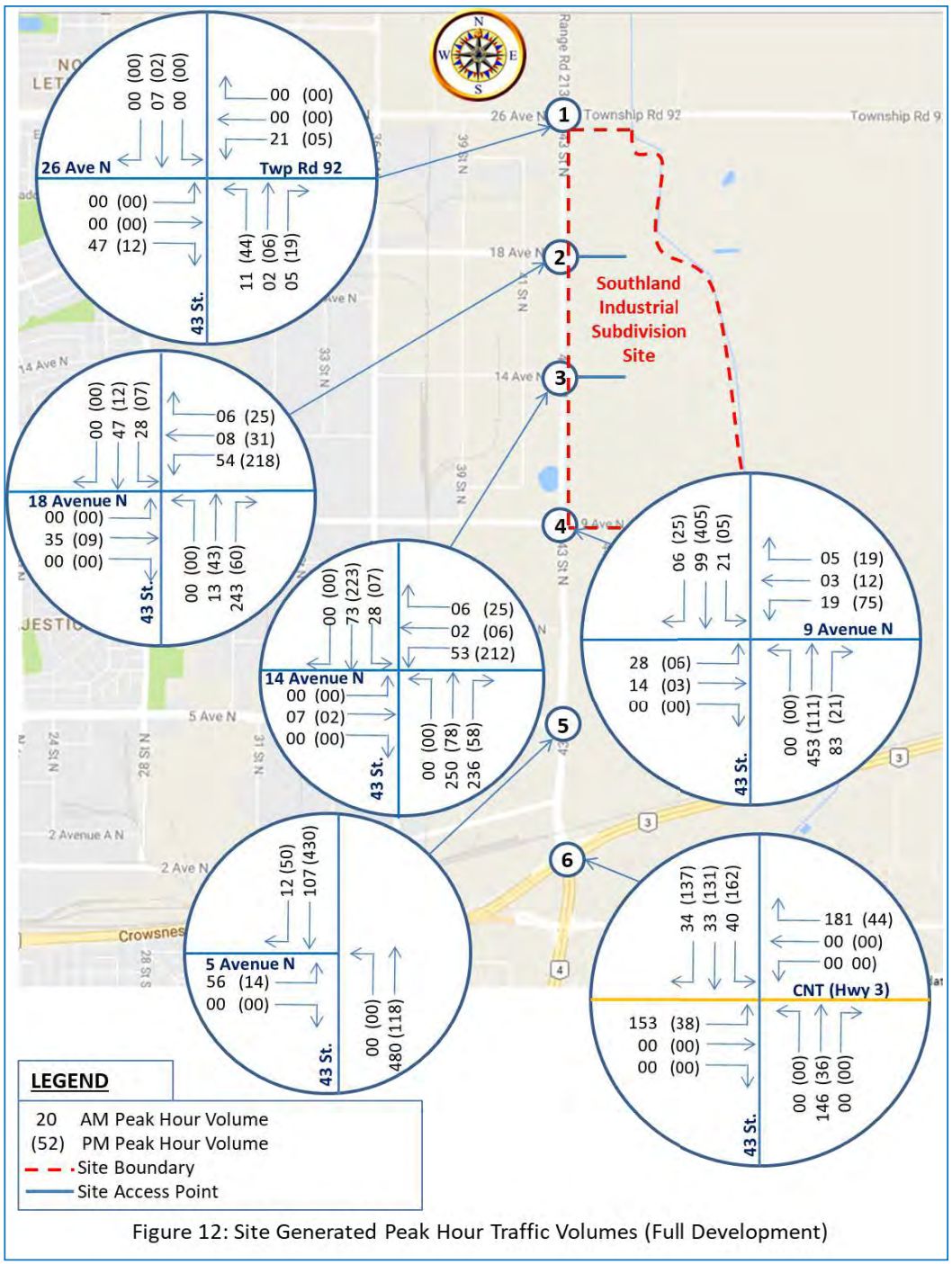


Figure 12: Site Generated Peak Hour Traffic Volumes (Full Development)

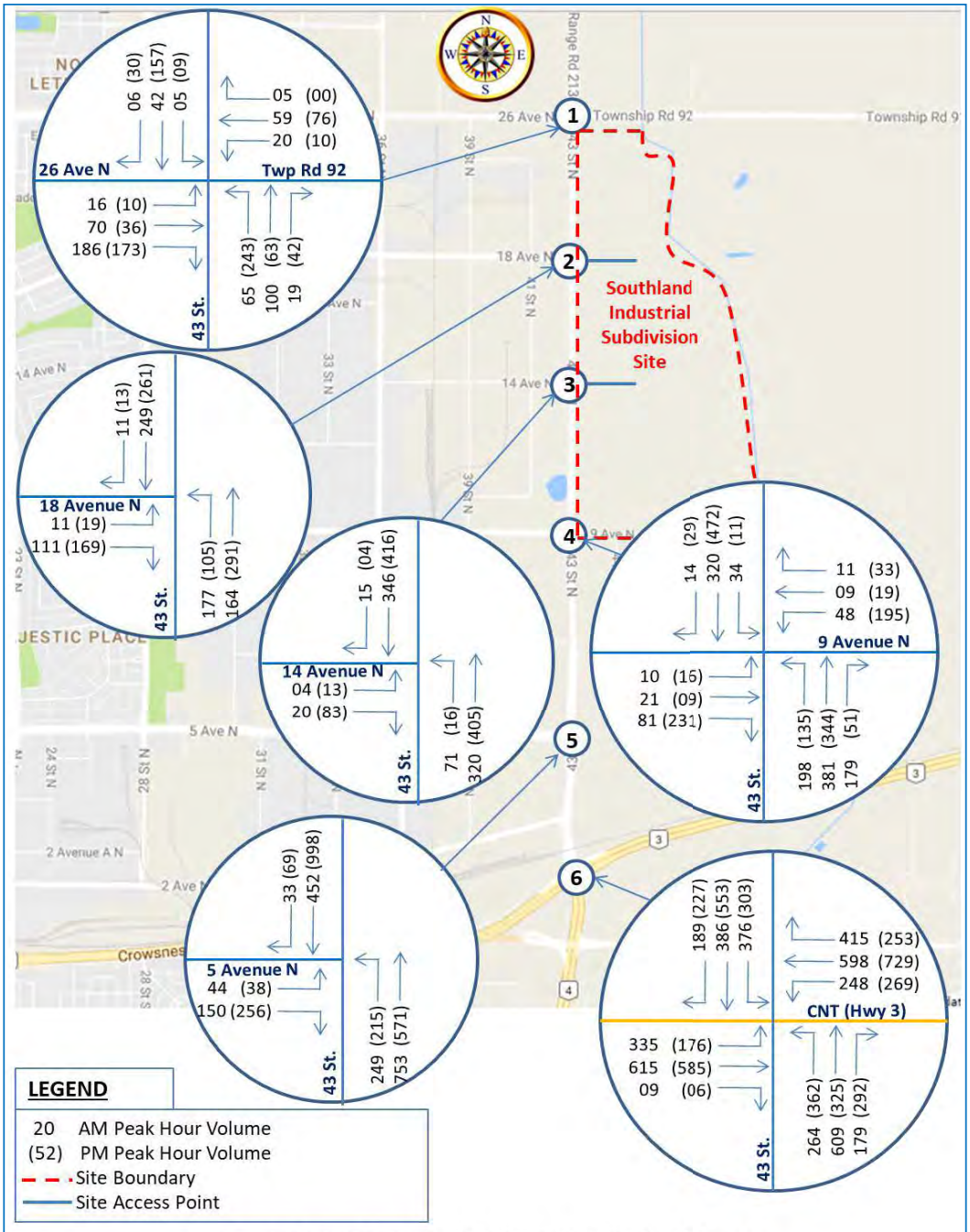


Figure 13: Total Future 2019 Peak Hour Traffic Volumes

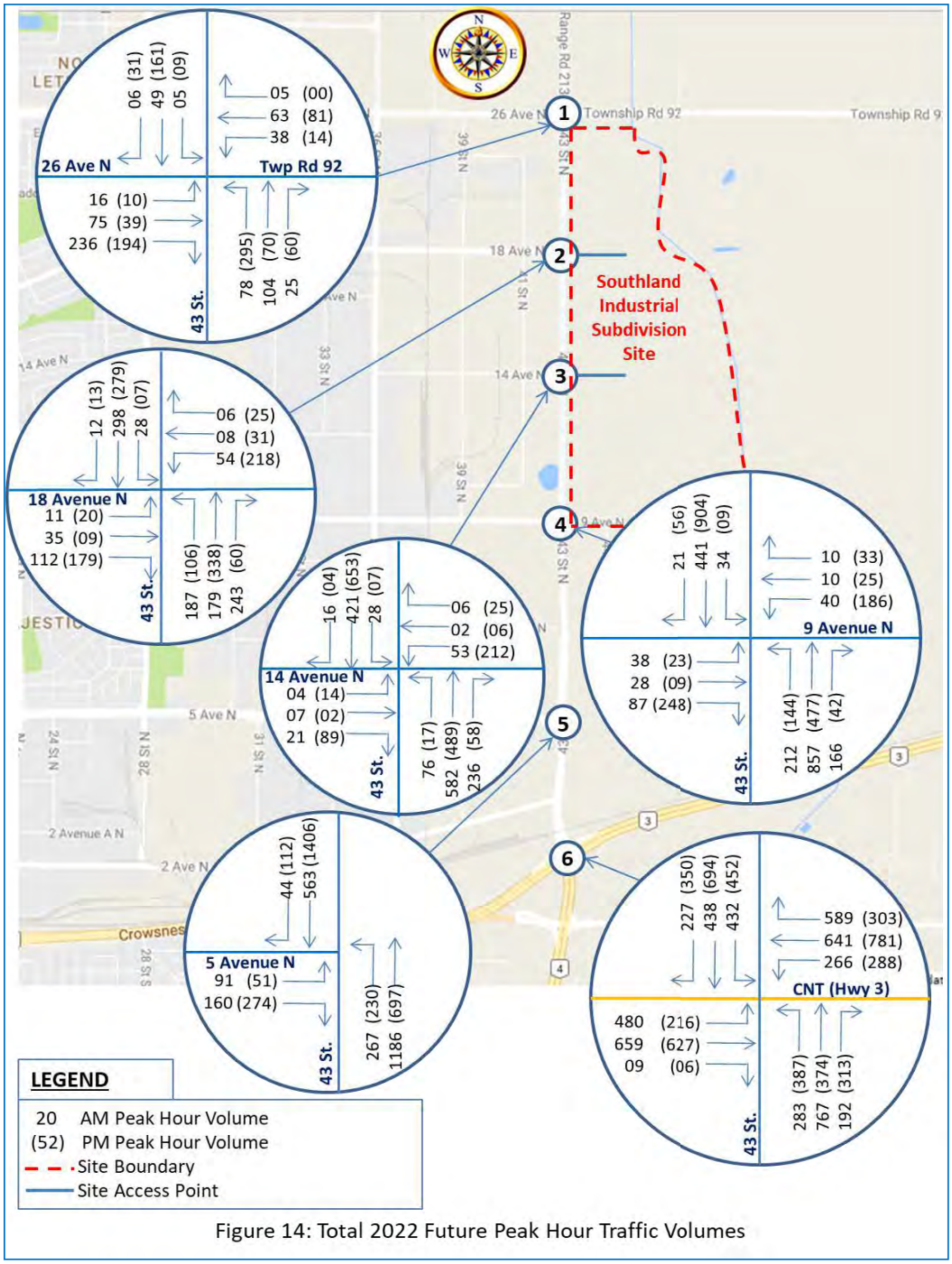


Figure 14: Total 2022 Future Peak Hour Traffic Volumes

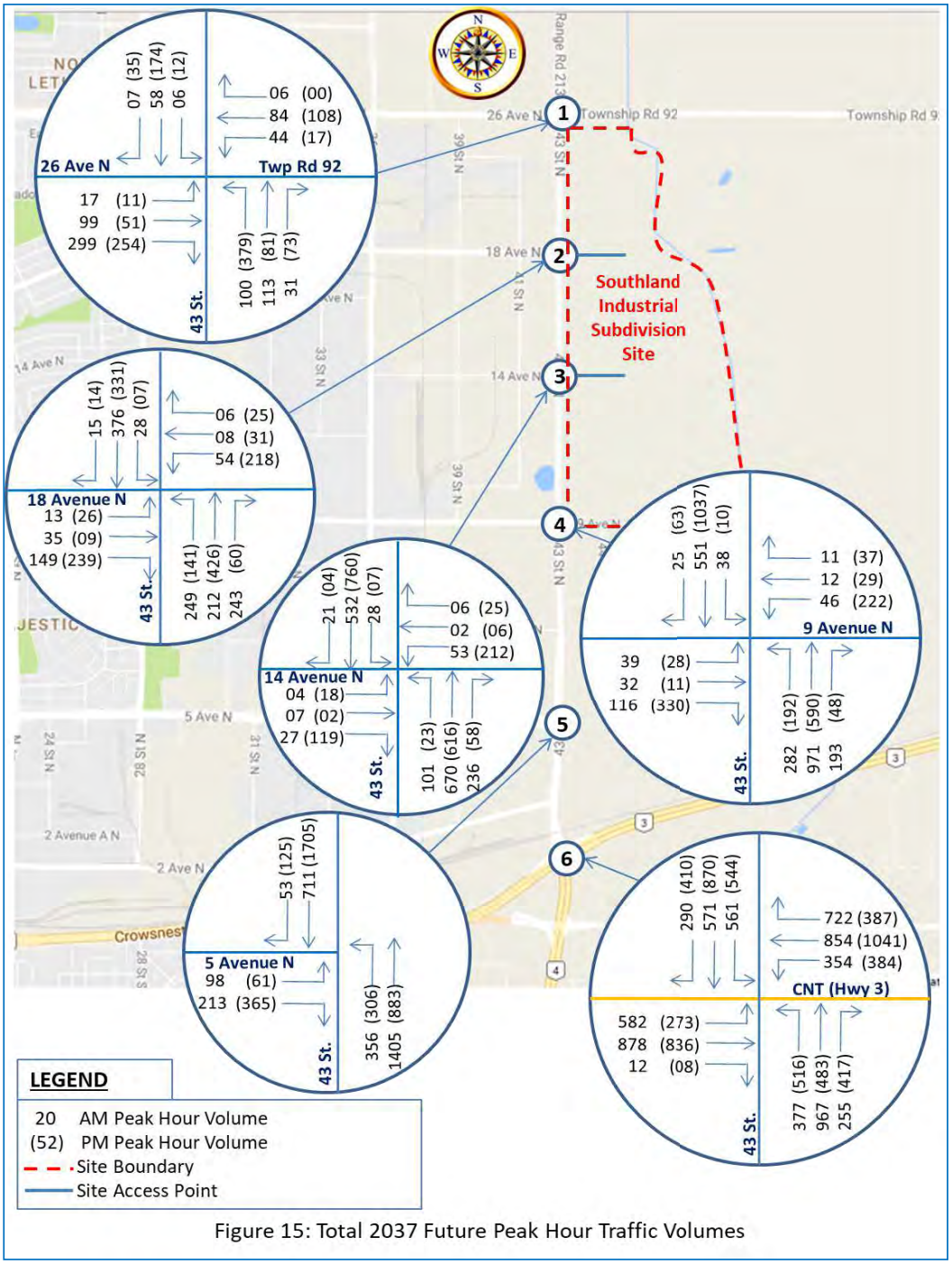


Figure 15: Total 2037 Future Peak Hour Traffic Volumes

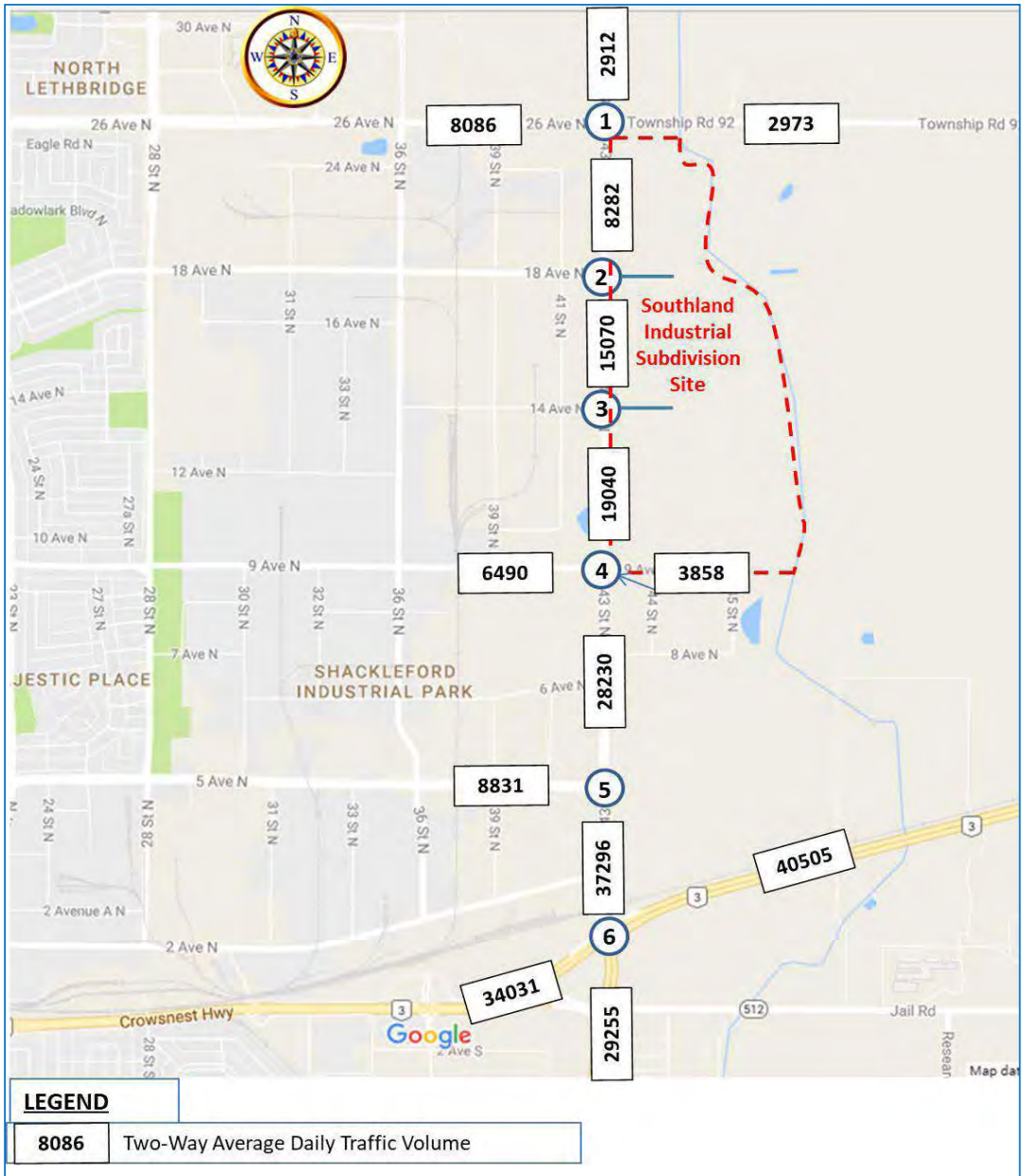


Figure 16: Future 2037 Average Daily Traffic (ADT) Volumes

4.0 EVALUATION AND RECOMMENDED IMPROVEMENTS

4.1 Level of Service Criteria for Intersections

The intersections identified for the study were analyzed according to the methodologies presented in the ***2010 Highway Capacity Manual***. The analysis determines the "Level of Service (LOS)" of unsignalized and signalized intersections considering the factors including but not limited to number and types of lanes, traffic volumes, heavy vehicle composition, peak hour factors, pedestrian activities, etc. Levels of service are expressed in a range from "A" through "F," with "A" being the highest level of service, and "F" representing the lowest level of service. **Table 4** shows the thresholds for Levels of Service "A" through "F" for unsignalized intersections and **Table 5** presents the LOS criteria for signalized intersections.

Table 4: Level of Service Criteria for Unsignalized Intersections *

Level of Service	Delay/Vehicle (seconds)	Description
A	≤ 10.0	Little or no delay, very low main street traffic.
B	10.1 to 15.0	Short traffic delays, many acceptable gaps.
C	15.1 to 25.0	Average traffic delays, frequent gaps still occur.
D	25.1 to 35.0	Long traffic delays, limited number of acceptable gaps.
E	35.1 to 50.0	Very long traffic delays, very small number of acceptable gaps.
F	> 50.0	Extreme traffic delays, virtually no acceptable gaps in traffic.

* Note: Capacity analysis for two-way stop-controlled intersection provides the LOS for the critical movements, not of the overall intersection.

Table 5: Level of Service Criteria for Signalized Intersections

Level of Service	Delay/Vehicle (seconds)	Description
A	≤ 10.0	Most vehicles do not stop at all.
B	10.1 to 20.0	Some vehicles stop.
C	20.1 to 35.0	The number of vehicles stopping is significant, although many pass through without stopping.
D	35.1 to 55.0	Many vehicles stop. Individual cycle failures are noticeable.
E	55.1 to 80.0	Considered to be the limit of acceptable delay. Individual cycle failures are frequent.
F	> 80.0	Unacceptable delay.

4.2 Capacity and Level of Service Analyses

Capacity and level of service analyses were conducted for the following conditions:

- Existing 2017 Conditions;
- Background 2019, 2022, and 2037 Conditions (without site traffic); and
- Future 2019, 2022 and 2037 Conditions (with the site traffic);

The software package Synchro 8 was utilized for the capacity analyses of all study intersections and site accesses. The Synchro software utilizes ***Highway Capacity Manual 2010*** methodologies for the evaluations.

Note that the observed heavy vehicle percentages and peak hour factors (PHF) were utilized in the Synchro software capacity analysis. For new approaches, a heavy vehicle percentage of 10% and a PHF of 0.92 were utilized for capacity analysis.

4.2.1 Existing 2017 Conditions

Existing capacity and level of service analysis results for the study intersections are presented in **Table 6**. These results were taken from the HCM 2010 Capacity Analyses Reports produced by Synchro software. Note that all capacity analysis results reported in all results tables that follow were also taken from the **HCM 2010**. The detailed capacity and LOS HCM 2010 analyses reports for all capacity analyses scenarios are contained in **Appendix C** of this report. The detailed capacity and LOS analyses reports, based on Synchro capacity analyses method, for all scenarios are contained in **Appendix D** for comparison purposes. The actual Synchro software capacity analyses files are contained in **Appendix E**.

A review of **Table 6** capacity analysis results indicates that all study area intersections, both signalized and unsignalized, are currently operating at acceptable levels of service during both the AM and the PM peak hours including the stop-controlled intersection approaches. Therefore, no mitigation is needed under existing traffic conditions.

A review of **Table 6** regarding the volume to capacity (V/C) ratios indicates that all existing intersections movements V/C have values below 0.80 except the northbound left-turn movements at the 43 Street N / 9 Avenue N intersection and 43 Street N / 5 Avenue N intersection that have values exceeding 0.80 and reaching 1.00. However, these reported V/C values in the results tables are based on the HCM 2010 analysis method. If these same values were compared with those produced based on the Synchro analysis method, the Synchro method estimated much lower values. For example, HCM estimated **1.00** V/C value for the NB left turn movement at the intersection of 43 Street N and 5 Avenue N; however, the Synchro method estimated **0.68** ratio for the same movement, this is significantly lower. Therefore, it is believed that the HCM analysis method, in general, estimates higher V/C ratios and therefore, these movements should be carefully reviewed before recommending improvements.

Table 6: HCM Capacity Analysis Results for Existing 2017 Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street N and 26 Avenue N / Twp. Road 92 (Unsignalized)	EB	0.360	11.5	B	0.293	12.0	B
	WB	0.173	12.8	B	0.261	19.8	C
	NB	0.050	4.3	A	0.157	6.0	A
	SB	0.004	1.0	A	0.005	1.0	A
43 Street North and 18 Avenue North (Unsignalized)	EB	0.195	11.5	B	0.264	11.3	A
	WB	-	-	-	-	-	-
	NB	0.172	5.6	A	0.080	2.2	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 14 Avenue North (Unsignalized)	EB	0.049	12.5	B	0.178	12.1	A
	WB	-	-	-	-	-	-
	NB	0.073	1.9	A	0.015	0.3	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 9 Avenue North (Signalized)	**Overall**	**-**	**27.9**	**C**	**-**	**20.8**	**C**
	EB	0.10	43.4	D	0.08	40.9	D
	WB	0.15	44.3	D	0.54	44.4	D
	NB	0.98	37.9	D	0.85	22.0	C
	SB	0.18	9.4	A	0.23	10.5	B
43 Street North and 5 Avenue North (Signalized)	**Overall**	**-**	**22.7**	**C**	**-**	**16.9**	**B**
	EB	0.15	46.3	D	0.16	45.3	D
	NB	1.00	28.9	C	0.89	22.2	C
	SB	0.24	9.4	A	0.44	11.6	B
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	**Overall**	**-**	**36.1**	**D**	**-**	**33.1**	**C**
	EB	0.75	36.1	D	0.59	33.4	C
	WB	0.67	34.7	C	0.67	29.8	C
	NB	0.78	40.2	D	0.60	31.6	C
	SB	0.64	33.9	C	0.73	37.4	D

[(a)] The V/C values presented are for the movements with highest V/C within that approach

4.2.2 Background 2019, 2022 and 2037 Conditions

LOS and capacity analyses results for the background 2019, 2022 and 2037 traffic conditions (without site development generated traffic) for all study area intersections are presented in **Table 7, Table 8 and Table 9,** respectively.

The Background 2037 Mitigated traffic conditions capacity analysis results are presented in **Table 10**.

Table 7: HCM Capacity Analysis Results for Background 2019 Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street N and 26 Avenue N / Twp. Road 92 (Unsignalized)	EB	0.452	13.6	B	0.433	16.7	C
	WB	0.228	15.2	C	0.404	31.0	D
	NB	0.053	2.6	A	0.188	5.8	A
	SB	0.005	0.7	A	0.007	0.4	A
43 Street North and 18 Avenue North (Unsignalized)	EB	0.254	13.3	B	0.349	13.9	B
	WB	-	-	-	-	-	-
	NB	0.187	4.5	A	0.097	2.2	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 14 Avenue North (Unsignalized)	EB	0.068	14.2	B	0.234	14.5	B
	WB	-	-	-	-	-	-
	NB	0.080	1.6	A	0.019	0.3	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 9 Avenue North (Signalized)	**Overall**	**-**	**29.5**	**C**	**-**	**20.4**	**C**
	EB	0.10	43.0	D	0.10	40.4	D
	WB	0.15	43.7	D	0.55	44.0	D
	NB	1.03	39.4	D	0.86	21.7	C
	SB	0.20	9.9	A	0.31	11.8	B
43 Street North and 5 Avenue North (Signalized)	**Overall**	**-**	**25.2**	**C**	**-**	**18.3**	**B**
	EB	0.19	44.7	D	0.18	44.5	D
	NB	1.05	31.8	C	0.92	23.9	C
	SB	0.27	10.5	B	0.51	13.0	B
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	**Overall**	**-**	**40.0**	**D**	**-**	**35.9**	**D**
	EB	0.83	40.8	D	0.64	37.2	D
	WB	0.71	38.4	D	0.73	33.5	C
	NB	0.86	45.2	D	0.65	32.5	C
	SB	0.71	35.8	D	0.78	39.7	D

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 7** indicates that all study intersections would continue to operate at acceptable levels during both AM peak hour and PM peak hour. Therefore, no mitigation would be needed for any of the study area intersections under background 2019 conditions.

Table 8: HCM Capacity Analysis Results for Background 2022 Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street N and 26 Avenue N / Twp. Road 92 (Unsignalized)	EB	0.489	14.4	B	0.485	18.5	C
	WB	0.253	16.0	C	0.456	35.5	E
	NB	0.058	2.7	A	0.202	5.9	A
	SB	0.005	0.7	A	0.007	0.3	A
43 Street North and 18 Avenue North (Unsignalized)	EB	0.281	13.9	B	0.385	14.7	B
	WB	-	-	-	-	-	-
	NB	0.203	4.7	A	0.105	2.2	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 14 Avenue North (Unsignalized)	EB	0.077	14.7	B	0.263	15.4	C
	WB	-	-	-	-	-	-
	NB	0.088	1.6	A	0.020	0..	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 9 Avenue North (Signalized)	**Overall**	**-**	**18.4**	**B**	**-**	**19.0**	**B**
	EB	0.11	42.9	D	0.10	39.9	D
	WB	0.16	43.7	D	0.57	43.7	D
	NB	0.87	19.9	B	0.84	17.3	B
	SB	0.23	11.9	B	0.34	12.9	B
43 Street North and 5 Avenue North (Signalized)	**Overall**	**-**	**14.8**	**B**	**-**	**16.5**	**B**
	EB	0.19	44.5	D	0.18	44.4	D
	NB	0.87	14.5	B	0.88	17.2	B
	SB	0.31	13.2	B	0.57	15.0	B
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	**Overall**	**-**	**44.8**	**D**	**-**	**39.3**	**D**
	EB	0.93	50.5	D	0.71	41.8	D
	WB	0.79	42.8	D	0.81	38.3	D
	NB	0.91	49.4	D	0.70	33.6	C
	SB	0.76	36.8	D	0.82	42.3	D

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 8** indicates that all study intersections would continue to operate at acceptable levels during both AM peak hour and PM peak hour under the 2022 background conditions. Therefore, no mitigation would be needed for any of the study area intersections under background 2022 conditions.

Table 9: HCM Capacity Analysis Results for Background 2037 Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street N and 26 Avenue N / Twp. Road 92 (Unsignalized)	EB	0.697	21.4	C	0.901	59.8	F
	WB	0.438	23.9	C	0.985	139.5	F
	NB	0.077	3.0	A	0.274	6.3	A
	SB	0.006	0.7	A	0.009	0.4	A
43 Street North and 18 Avenue North (Unsignalized)	EB	0.472	20.3	C	0.604	22.3	C
	WB	-	-	-	-	-	-
	NB	0.296	5.4	A	0.148	2.4	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 14 Avenue North (Unsignalized)	EB	0.125	18.4	C	0.445	22.3	C
	WB	-	-	-	-	-	-
	NB	0.132	1.8	A	0.031	0.4	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 9 Avenue North (Signalized)	**Overall**	**-**	**20.6**	**C**	**-**	**22.6**	**C**
	EB	0.13	42.5	D	0.11	37.7	D
	WB	0.21	43.7	D	0.63	41.9	D
	NB	0.90	21.3	C	0.88	20.2	C
	SB	0.33	15.9	B	0.49	18.8	B
43 Street North and 5 Avenue North (Signalized)	**Overall**	**-**	**17.4**	**B**	**-**	**23.4**	**C**
	EB	0.21	44.0	D	0.21	43.7	D
	NB	0.90	15.8	B	0.92	20.7	C
	SB	0.47	18.9	B	0.82	24.8	C
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	**Overall**	**-**	**114.5**	**F**	**-**	**80.2**	**F**
	EB	1.54	180.7	F	1.15	98.9	F
	WB	1.26	121.9	F	1.09	61.7	E
	NB	1.18	109.8	F	1.15	85.9	F
	SB	0.90	45.6	D	1.07	80.6	F

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 9** indicates that all study area intersections would continue to operate at acceptable levels during both AM peak hour and PM peak hour except for the following two intersections that would operate at unacceptable levels of service:

1. 43 Street N and 26 Avenue N / Township Road 92; and
2. Highway 3/Crowsnest Highway and 43 Street N.

Therefore, mitigations would be needed for these two intersections under the **background 2037 traffic conditions**. The proposed mitigations consist of the following:

43 Street N and 26 Avenue N / Township Road 92 Intersection

- Installation of a two-phase traffic signal

Highway 3/Crowsnest Highway and 43 Street Intersection

- Installation of a second westbound left-turn only lane;
- Installation of a second eastbound left-turn only lane;
- Installation of a third westbound through only lane;
- Installation of a third eastbound through only lane; and
- Optimization of the traffic signal splits.

The background 2037 Synchro traffic capacity analysis models were updated with the above suggested mitigations and the capacity analysis results of the mitigated traffic conditions are presented in **Table 10**.

Table 10: HCM Capacity Analysis Results for Background 2037 Mitigated Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street N and 26 Avenue N / Twp. Road 92 (Signalized)	**Overall**	**-**	**11.3**	**B**	**-**	**13.1**	**B**
	EB	0.64	10.9	B	0.66	18.0	B
	WB	0.19	7.8	A	0.23	14.2	B
	NB	0.54	13.8	B	0.68	12.0	B
	SB	0.16	11.3	B	0.29	8.2	A
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	**Overall**	**-**	**47.3**	**D**	**-**	**43.1**	**D**
	EB	0.83	39.8	D	0.74	35.1	D
	WB	0.72	34.3	C	0.91	39.3	D
	NB	1.05	63.5	E	1.05	55.7	E
	SB	1.05	52.0	D	0.97	44.5	D

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 10** indicates that the operation at these two intersections would improve significantly with the suggested mitigations. The intersection of 43 Street and 26 Avenue N / Township Road 92 would operate at acceptable levels of service during the AM and PM peak hours with the two-phase signal. The intersection of Highway 3 / Crowsnest Highway and 43 Street would improve but the NB would continue to operate at LOS "E", which represents full capacity level of service. Any additional traffic would cause this intersection to perform at unacceptable levels of service and therefore, grade separation would be the most appropriate solution after 20 years.

Also, as discussed earlier, the ***2006 Functional Planning Study completed by Stantec***[(1)] for Highways 3 & 4 in Lethbridge area proposes / recommends new alignments for these highways that would provide external links allowing external traffic to by-pass the City and hence reducing Crowsnest Highway traffic within Lethbridge city. When these external links are built, significant reductions in traffic volumes would occur at the Crowsnest Highway / 43 Street intersection and operation would improve. Therefore, a reevaluation of this intersection operations at that time, should be performed to determine whether intersection improvements would actually be required.

4.2.3 Future 2019, 2022 and 2037 Conditions

LOS and capacity analyses results for the future 2019, 2022 and 2037 traffic conditions (with site development generated traffic) for all study area intersections are presented in **Table 11, Table 12 and Table 14,** respectively.

The capacity analysis results for the future 2022 mitigated conditions and future 2037 mitigated conditions are presented in **Table 13 and Table 15,** respectively.

(1) http://www.transportation.alberta.ca/projects/assets/Area_8_South/Hwy%203%20Lethbridge/Executive_Summary.pdf

Table 11: HCM Capacity Analysis Results for Future 2019 Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street N and 26 Avenue N / Twp. Road 92 (Unsignalized)	EB	0.468	13.9	B	0.446	17.2	C
	WB	0.252	16.1	C	0.420	32.7	D
	NB	0.056	2.7	A	0.195	5.8	A
	SB	0.005	0.7	A	0.007	0.3	A
43 Street North and 18 Avenue North (Unsignalized)	EB	0.274	13.7	B	0.359	14.2	B
	WB	-	-	-	-	-	-
	NB	0.192	4.5	A	0.102	2.2	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 14 Avenue North (Unsignalized)	EB	0.073	14.6	B	0.239	14.8	B
	WB	-	-	-	-	-	-
	NB	0.082	1.6	A	0.019	0.3	A
	SB	-	0.0	A	-	0.0	A
43 Street North and 9 Avenue North (Signalized)	**Overall**	**-**	**19.2**	**B**	**-**	**22.9**	**C**
	EB	0.14	42.1	D	0.070	33.8	C
	WB	0.37	44.8	D	0.690	39.9	D
	NB	0.86	19.6	B	0.840	19.4	B
	SB	0.21	11.8	B	0.30	17.0	B
43 Street North and 5 Avenue North (Signalized)	**Overall**	**-**	**14.4**	**B**	**-**	**16.0**	**B**
	EB	0.21	43.9	D	0.19	44.3	D
	NB	0.87	13.8	B	0.87	16.6	B
	SB	0.31	13.0	B	0.57	14.5	B
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	**Overall**	**-**	**42.2**	**D**	**-**	**36.9**	**D**
	EB	0.91	45.2	D	0.650	37.9	D
	WB	0.72	39.0	D	0.740	34.6	C
	NB	0.90	48.6	D	0.660	33.1	C
	SB	0.74	36.1	D	0.800	40.8	D

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 11** indicates that all study intersections would continue to operate at acceptable levels during both AM peak hour and PM peak hour under the future 2019 traffic conditions with site generated traffic. Therefore, no mitigations would be needed for any of the study area intersections under future 2019 traffic conditions.

Table 12: HCM Capacity Analysis Results for Future 2022 Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street N and 26 Avenue N / Twp. Road 92 (Unsignalized)	EB	0.573	16.2	C	0.571	22.8	C
	WB	0.416	23.6	C	0.627	58.3	F
	NB	0.068	2.9	A	0.237	5.9	A
	SB	0.005	0.6	A	-	0.0	A
43 Street North and 18 Avenue North (Unsignalized)	EB	0.974	103.7	F	0.517	20.6	C
	WB	1.848	619.3	F	2.524	768.6	F
	NB	0.214	2.8	A	0.104	1.8	A
	SB	0.035	0.7	A	0.008	0.2	A
43 Street North and 14 Avenue North (Unsignalized)	EB	0.373	579	F	0.484	31.1	D
	WB	1.300	357.2	F	3.720	1345.6	F
	NB	0.095	0.8	A	0.026	0.3	A
	SB	0.052	0.6	A	0.008	0.1	A
43 Street North and 9 Avenue North (Signalized)	**Overall**	**-**	**16.9**	**B**	**-**	**23.9**	**C**
	EB	0.250	43.3	D	0.110	35.4	D
	WB	0.310	44.3	D	0.69	41.4	D
	NB	0.880	154	B	0.850	18.8	B
	SB	0.300	13.1	B	0.69	22.3	C
43 Street North and 5 Avenue North (Signalized)	**Overall**	**-**	**15.3**	**B**	**-**	**20.8**	**C**
	EB	0.350	43.1	D	0.220	43.5	D
	NB	0.880	13.5	B	0.89	17.3	B
	SB	0.410	15.6	B	0.83	22.1	C
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	**Overall**	**-**	**85.0**	**F**	**-**	**50.0**	**D**
	EB	1.720	188.6	F	0.830	47.3	D
	WB	0.860	41.4	D	0.800	36.2	D
	NB	0.950	56.7	E	0.860	44.7	D
	SB	0.880	39.3	D	1.030	64.1	E

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 12** indicates that the following four intersections would operate at unacceptable levels of service and would require mitigations:

1. 43 Street North and 18 Avenue North (Unsignalized);
2. 43 Street North and 14 Avenue North (Unsignalized); and
3. Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)

The intersection of 43 Street N and 26 Avenue N / Twp. Road 92 (Unsignalized) would have the westbound approach, during the PM peak hour only, operate at LOS “F” with an average delay of 58.3 seconds per vehicle and a V/C ratio of 0.627. This amount of delay is usually considered acceptable by the drivers especially noting that the V/C ratio is relatively low. However, to ensure that no such delays are experienced by intersection users the following is recommended:

- Installation of a two-phase traffic signal under future 2022 traffic conditions.

The remaining two signalized intersections located at 9 Avenue North and at 5 Avenue North would continue to operate at acceptable levels of service during both AM peak hour and PM peak hour. Therefore, mitigations would only be needed for the three study intersections listed above under future 2022 conditions (with site traffic).

The proposed mitigations under the future 2022 conditions consist of the following:

43 Street N and 18 Avenue N / Site Access

- Installation of a two-phase traffic signal

43 Street N and 14 Avenue N / Site Access

- Installation of a two-phase traffic signal; and
- Installation of a northbound left-turn only lane.

Highway 3 / Crowsnest Highway and 43 Street Intersection

- Installation of a second eastbound left-turn only lane; and
- Optimization of the traffic signal splits.

The future 2022 Synchro traffic capacity analysis models were updated with the above suggested mitigations and the capacity analysis results for the mitigated traffic conditions are presented in **Table 13**.

Table 13: HCM Capacity Analysis Results for Future 2022 Mitigated Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street North and 18 Avenue North (Signalized)	**Overall**	**-**	**32.7**	**C**	**-**	**26.3**	**C**
	EB	0.47	34.8	C	0.39	25.7	C
	WB	0.23	31.2	C	0.69	39.2	D
	NB	0.96	44.1	D	0.74	25.8	C
	SB	0.42	11.4	B	0.38	16.6	B
43 Street North and 14 Avenue North (Signalized)	**Overall**	**-**	**37.1**	**D**	**-**	**23.6**	**C**
	EB	0.14	32.2	C	0.24	28.0	C
	WB	0.18	32.4	C	0.62	38.8	D
	NB	0.95	34.1	C	0.66	17.8	B
	SB	0.93	43.6	D	0.78	22.8	C
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	Overall	-	47.4	D	-	46.2	D
	EB	0.89	53.4	D	0.70	43.8	D
	WB	0.86	42.1	D	0.82	38.8	D
	NB	0.93	53.8	D	0.83	42.1	D
	SB	0.88	39.4	D	0.97	54.9	D

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 13** results indicates that the three intersections that previously failed would operate at acceptable levels of service with the proposed mitigations. Therefore, no further mitigations to any of these intersections would be needed under the future 2022 traffic conditions.

Table 14: HCM Capacity Analysis Results for Future 2037 Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street N and 26 Avenue N / Twp. Road 92 (Unsignalized)	EB	0.793	27.4	D	1.641	350.2	F
	WB	0.440	28.6	D	0.968	143.4	F
	NB	0.088	3.1	A	0.31	6.4	A
	SB	0.006	0.7	A	0.01	0.4	A
43 Street North and 18 Avenue North (Signalized)	**Overall**	**-**	**102.9**	**F**	**-**	**42.5**	**D**
	EB	0.55	35.4	D	0.63	38.2	D
	WB	0.24	30.4	C	1.11	129.5	F
	NB	1.32	180.8	F	0.82	25.8	C
	SB	0.51	14.0	B	0.39	12.3	B
43 Street North and 14 Avenue North (Signalized)	**Overall**	**-**	**122.3**	**F**	**-**	**25.5**	**c**
	EB	0.17	32.7	C	0.39	36.2	D
	WB	0.18	32.4	C	0.88	69.0	E
	NB	1.05	58.5	E	0.73	15.8	B
	SB	1.45	264.4	F	0.81	20.0	B
43 Street North and 9 Avenue North (Signalized)	**Overall**	**-**	**21.7**	**C**	**-**	**33.2**	**C**
	EB	0.26	43.4	D	0.11	33.2	C
	WB	0.36	44.9	D	0.74	42.2	D
	NB	0.98	21.8	C	0.89	23.0	C
	SB	0.40	16.2	B	0.92	38.4	D
43 Street North and 5 Avenue North (Signalized)	**Overall**	**-**	**18.9**	**B**	**-**	**54.0**	**D**
	EB	0.38	43.2	D	0.24	43.2	D
	NB	0.92	16.4	B	0.96	22.1	C
	SB	0.58	21.5	C	1.10	75.1	E
Highway 3 (Crowsnest Hwy) and 43 Street (Signalized)	**Overall**	**-**	**78.6**	**E**	**-**	**50.6**	**D**
	EB	1.15	77.1	E	0.76	50.3	D
	WB	0.67	36.5	D	0.86	48.6	D
	NB	1.26	138.9	F	0.91	43.7	D
	SB	1.05	59.0	E	0.99	56.2	E

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 14** results indicates that four intersections of the total six intersections would operate at unacceptable levels of service. Therefore, mitigations would be required under the future 2037 conditions at these intersections.

The proposed mitigations under the **future 2037** conditions consist of the following:

43 Street N and 26 Avenue N / Township Road 92 Intersection

- Installation of a two-phase traffic signal

43 Street N and 18 Avenue N / Site Access

- Installation of a northbound left-turn only lane; and
- Optimization of the traffic signal splits.

43 Street N and 14 Avenue N / Site Access

- Optimization of the traffic signal splits.

Highway 3 / Crowsnest Highway and 43 Street Intersection

- As mentioned earlier, the **2006 Functional Planning Study completed by Stantec**[(1)] for Highways 3 & 4 in Lethbridge area proposes / recommends new alignments for these two highways that would provide external links allowing external traffic to by-pass the City and hence reducing Crowsnest Highway traffic within Lethbridge city. When these external links are built, significant reductions in traffic volumes would occur at the Crowsnest Highway / 43 Street intersection and operation would improve. Therefore, a reevaluation of this intersection operations at that time, should be performed to determine whether intersection improvements would be required.

The future 2037 Synchro traffic capacity analysis models were updated with the above suggested mitigations (excluding Highway 3 / Crowsnest Highway and 43 Street Intersection) and the capacity analysis results for the mitigated traffic conditions are presented in **Table 15**.

(1) http://www.transportation.alberta.ca/projects/assets/Area_8_South/Hwy%203%20Lethbridge/Executive_Summary.pdf

Table 15: HCM Capacity Analysis Results for Future 2037 Mitigated Traffic Conditions

Intersection	App.	AM Peak Hour			PM Peak Hour		
		V/C[(a)]	Delay "Sec"	LOS	V/C[(a)]	Delay "Sec"	LOS
43 Street North and 26 Avenue North / Township Road 92 (Signalized)	**Overall**	**-**	**19.1**	**B**	**-**	**17.8**	**B**
	EB	0..84	26.0	C	0.67	18.9	B
	WB	0.33	12.0	B	0.24	14.6	B
	NB	0.46	13.7	B	0.80	21.5	C
	SB	0.13	10.3	B	0.29	9.1	A
43 Street North and 18 Avenue North (Signalized)	**Overall**	**-**	**16.9**	**B**	**-**	**25.3**	**C**
	EB	0.78	48.4	D	0.48	24.3	C
	WB	0.40	38.6	D	0.74	37.3	D
	NB	0.54	11.5	B	0.69	24.3	C
	SB	0.44	8.4	A	0.47	19.3	B
43 Street North and 14 Avenue North/Site Access (Signalized)	**Overall**	**-**	**12.1**	**B**	**-**	**27.9**	**C**
	EB	0.42	47.9	D	0.32	29.0	C
	WB	0.40	47.0	D	0.70	37.00	D
	NB	0.84	12.4	B	0.80	22.4	C
	SB	0.58	6.0	A	0.89	30.0	C

[(a)] The V/C values presented are for the movements with highest V/C within that approach

A review of **Table 15** results indicates that the three mitigated intersections would operate at acceptable levels of service with the proposed mitigations. Therefore, no further mitigations would be needed under the future 2037 traffic conditions.

4.2.4 Highway 3 / Crowsnest Highway and 43 Street Intersection

The capacity analysis results for the at grade intersection of Highway 3 / Crowsnest Highway and 43 Street with traffic signal showed unacceptable operations under background 2037 traffic conditions (without proposed site traffic) as well as under future 2037 with proposed site traffic. Therefore, by the year 2037 significant improvements including considering an interchange would be required based on the above capacity analysis results. However, if the proposed / recommended Highway 3 & 4 external links were built, Highway 3 east-west traffic volumes would be reduced significantly. Therefore, a reevaluation of this intersection is recommended.

A review of this intersection's future 2037 AM and PM left turning movement traffic volumes shown on Figure 15 indicates that they range between 287 and 705 vehicles per hour. These amounts of hourly traffic volumes indicate that a single free-flow interchange lane for each left turn movement would be able to accommodate the expected volumes. Merge / diverge capacity analysis has not been performed since there is no information about the future interchange configuration if it were determined needed.

4.2.5 Average Daily Traffic Volume Review

Figure 16 presents the Future 2037 ADT volumes for the study area roadway links with the proposed Chinook Industrial Park traffic volumes included. Note that these ADT's were estimated from the AM and PM peak hour volumes based on the City of Lethbridge recommended procedure discussed previously in subsection 3.6.3.

A review of the 43 Street North ADT volumes shown on Figure 16 between 9 Avenue N and 26 Avenue N indicates that they range between 8282 and 19040 vehicles per day these volumes are higher than the acceptable two-lane two-way facilities capacity levels as the City of Lethbridge's roadway design standards indicate 4-lane cross sections are required for ADT volumes above 8,000 vehicles per day. Based on the above, the existing 43 Street North two-lane roadway section between 9 Avenue N and 26 Avenue N would not be able to accommodate the future 2037 estimated traffic volumes. Therefore, under 2037 traffic conditions this section of 43 Street must be upgraded to 4-lane cross section to allow it to accommodate the 2037 expected daily traffic volumes.

A review of the 43 Street and Crowsnest Highway ADT volumes shown on Figure 16 indicates that they range between 28230 and 40505 vehicles per day. These daily traffic volumes are well below the full capacity of a four-lane divide highway capacity. Therefore, the existing four-lane divided highways (43 Street south of 9 Avenue to Crowsnest Highway; and the Crowsnest Highway east and west of 43 Street) would be able to accommodate the estimated ADT through volumes with the proposed site traffic. Note however, that the intersection widening recommended based on the intersection capacity analysis would still be needed at Highway 3 and 43 Street signalized intersection.

4.3 Traffic Control Signal Warrants

Traffic signal installation warrants for the unsignalized study intersections were conducted for several traffic volume scenarios as shown in **Table 16**. The purposes of these analyses were to determine if the installation of traffic signal controls would be warranted and when would it be expected to become warranted. Signal warrant analysis was performed in accordance with Transportation Association of Canada (TAC) standards and utilizing TAC warrants table. The 6-hour traffic volumes for each analysis year scenario considered were estimated as follows:

- AM peak hour volumes presented on the corresponding scenario figure were used for the 2 AM hours in TAC warrants table.
- PM peak hour volumes presented on the corresponding scenario figure were used for the 2 PM hours in TAC warrants table.
- To estimate the 2 mid-day hours, 60% of the AM volumes were used for one hour and 60% of the PM volumes were used for the second hour.

Table 16 presents a summary of the signal warrant analyses results for the three currently unsignalized intersections. The worksheet results for the traffic signal warrant analysis are included in **Appendix F**.

Table 16: TAC - Traffic Signal Warrant Results

Intersection	Scenario / Analyses Year	Warranting Score	Traffic Signal, Warranted?
43 Street North and 26 Avenue North / Township Road 92	Future 2022	59	**No**
	Future 2037	89	**No**
43 Street North and 18 Avenue North / Site Access	Background 2037	61	**No**
	Future 2022	131	**Yes**
	Future 2037	182	**Yes**
43 Street North and 14 Avenue North / Site Access	Background 2037	34	**No**
	Future 2022	133	**Yes**
	Future 2037	174	**Yes**

A review of **Table 16** indicates that traffic signal installation would NOT be warranted at the intersection of 43 Street North and 26 Avenue North / Township Road 92 by the future 2022 or the future 2037 traffic conditions with proposed site traffic volumes. However, by the year 2037 the TAC warranting score is 89, which is very close to the traffic signal warranting score of 100 breaking point. Also, the high expected delays to be experienced by the eastbound and westbound traffic, indicates a traffic signal installation would probably be required by the future 2037.

Additionally, a review of **Table 16** regarding the following two study intersections:

- 43 Street North and 18 Avenue North / Site Access
- 43 Street North and 14 Avenue North / Site Access

indicates that a traffic signal installation would be warranted under the future 2022 traffic conditions as well as under the future 2037 traffic conditions (with the proposed site traffic).

5.0 BICYCLE ROUTE MAP, BUS ROUTES AND STOPS REVIEW

5.1 Bicycle Route Map

Per the discussion and consultation with the City of Lethbridge Transportation Department, a review of the Cycling Master Plan should be considered as part of this TIA. Figure 17 presents the city-wide cycling network and infrastructure plan. A review of the cycling infrastructure plan indicated that 43 Street corridor has an existing Multi-use Pathway between 2 Avenue North and just north of 9 Avenue North. Additionally, a proposed Multi-use Pathway is also planned to connect to the existing Pathway along 43 Street south of 2 Avenue N and will continue all the way to the southern border of the City. Similarly, another Multi-use Pathway is planned to connect to the existing one along 43 Street N just north of 9 Avenue N and will extend all the way to the northern border of the City.

In addition to the above, there are four Multi-use Pathways planned along 5 Avenue N, 9 Avenue N, 18 Avenue N, and 26 Avenue N that would connect 43 Street N with the City of Lethbridge internal areas west of 43 Street N. These proposed Multi-use Pathways would connect to the existing facilities along 26 Avenue N and 28 Street N creating an efficient cycling and pedestrian connectivity.

The existing as well as the proposed Multi-use Pathways would allow significant percentages of the proposed development generated trips / customers to utilize active modes to access the proposed development, which would reduce vehicle trips and reduce vehicle traffic congestions. Additionally, it should be noted that the proposed development is proposing to have internal pedestrian infrastructure including sidewalks and/or multi-use pathways that would connect to the external Multi-use Pathways and sidewalks to ensure smooth and easy pedestrian / cyclist movements and access to the proposed development.

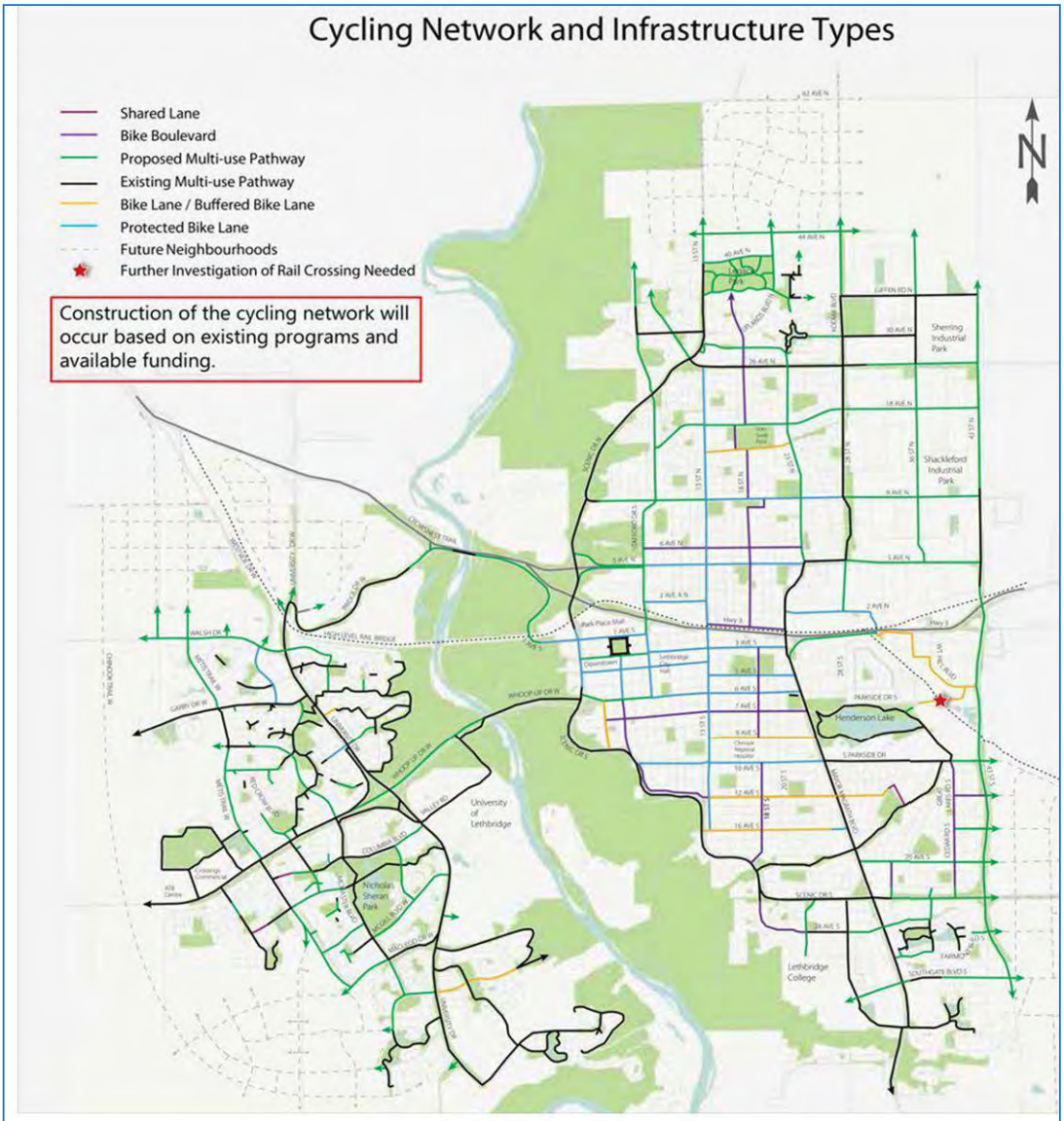


Figure 17: City of Lethbridge Cycling Master Plan

5.2 Bus Routes and Stops

As part of this TIA, a review of the Lethbridge Transit System and the available bus routes / stops to serve the project area is required. Figure 18 presents the Lethbridge Transit System Map with all available bus routes within the city shown. Figure 19 presents Route 21 Map as Route 21 with its varieties is the route that serves the vicinity of the proposed project area.

A review of Figure 18 indicates that there are a total of 18 routes, including their different service areas and service time varieties, available to serve the public within Lethbridge. There is a total of four transit terminals that provide connectivity of the service routes to allow full coverage of the city, these terminals are:

- University Terminal;
- North Terminal;
- College Terminal; and
- City Centre Terminal.

These terminals are placed at key locations within the City that allow smooth passenger transfers between the different routes in order to access different areas of the city. Reviewing Figure 18 closely indicates that Route “21S Day” is the route that directly serves the project vicinity as it passes through 43 Street N, north of Crowsnest Highway until it reaches 9 Avenue N where it turns left into the city.

A review of Figure 19 indicates that Route “21S Day” service is only available during the weekdays, Monday through Friday during daytime hours only. There is one bus stop along 9 Avenue N just west of 43 Street N that would be suitable to serve the proposed project site.

Consider modifying Route “21S Day” operation to also cover the weekends and the nights starting from year 2022, which is the opening year of Phase 2 of the proposed Chinook Industrial Park development. Also consider that the service coverage area of this route be modified to cover 43 Street N north of 9 Avenue N until 26 Avenue N and provision of two new bus stops in the vicinity of 14 Avenue and 18 Avenue to help Transit users access the proposed development since the site has an access point at each of these two roads.

Modifying the service area coverage and time / days coverage of Route “21S Day” would encourage reducing private vehicle trips and increasing the utilization of the transit, which in turn reduces traffic congestions.

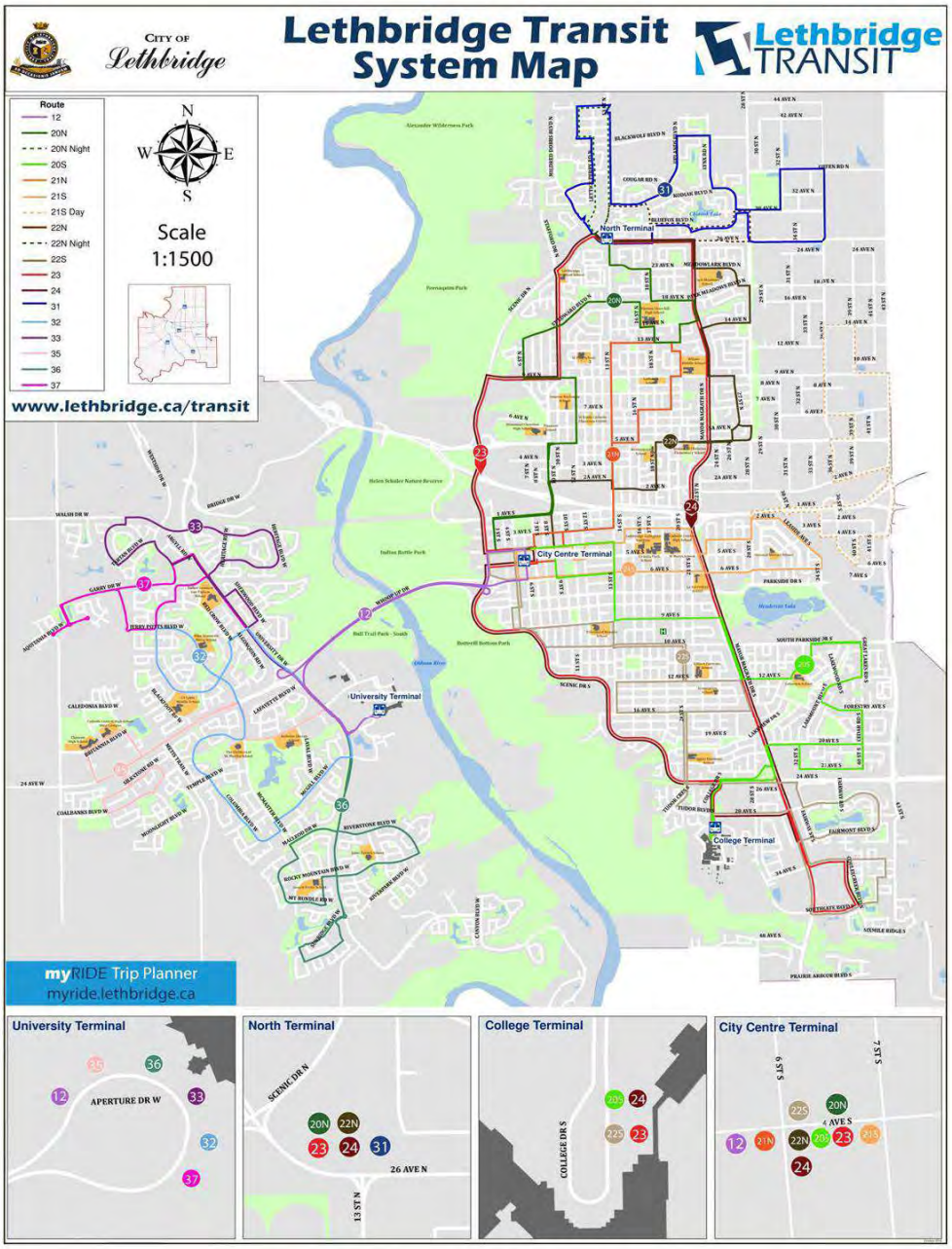


Figure 18: Lethbridge Transit System Map

Route 21 South - Map



Figure 19: Lethbridge – Transit Route 21 Map

6.0 CONCLUSIONS AND RECOMMENDATIONS

This study analyzed the traffic impacts of the proposed Chinook Industrial Park Development project to be located in Lethbridge County, Alberta. The proposed development will have a total of five phases with Phase 1 including 18.56 acres of General Light Industrial land use and 18.62 acres of Business Park land use. Phase 1 will be completed after 2 years from today. Phases 2 to 5 will consist of 95.17 acres of General Light Industrial land use and 40.66 acres of Business Park land use. Phases 2 to 5 will be completed within 5 years from today. The estimated number of total site generated trips entering and exiting the development would be 10,674 trips daily, 850 trips during the AM peak, and 794 trips during the PM peak hour. The following conclusions have been reached by this traffic impact assessment study:

- LOS and capacity analyses indicated that under the **Existing 2017, Background 2019 and Background 2022** traffic conditions (without site traffic), all study area intersections operate at acceptable levels of service with no issues. Therefore, no intersection improvements required for any study intersection under these traffic conditions.

- **Background 2037** without the Project Site Traffic LOS analyses indicated that four study intersections would continue to operate at acceptable levels of service. However, the following two intersections would operate at unacceptable levels of service:

    a. 43 Street N and 26 Avenue N / Township Road 92; and
    b. Highway 3/Crowsnest Highway and 43 Street N.

    Therefore, mitigations would be needed for these two intersections under the background 2037 traffic conditions.

- The proposed mitigations under the Background 2037 conditions include:
  <u>43 Street N and 26 Avenue N / Township Road 92 Intersection</u>
    - Installation of a traffic signal

  <u>Highway 3 / Crowsnest Highway and 43 Street Intersection</u>
    - Installation of a second westbound left-turn only lane;
    - Installation of a second eastbound left-turn only lane;
    - Installation of a third westbound through only lane;
    - Installation of a third eastbound through only lane; and
    - Optimization of the traffic signal splits.

- The above mitigation would improve the operations at the above intersections. However, the intersection of Highway 3 / Crowsnest Highway and 43 Street would have the NB approach continue to operate at LOS “E”, which represents full capacity level of service.

- Any additional traffic would cause this intersection to perform at unacceptable levels of service and therefore, grade separation would be the most appropriate solution after 20 years from today.

- LOS and capacity analyses indicated that under the **Future 2019** traffic conditions (with site traffic), all study area intersections would operate at acceptable levels of service with no issues. Therefore, no intersection improvements would be required for any study intersection under future 2019 traffic conditions.

- **Future 2022** with the Project Site Traffic LOS analyses indicated that the three unsignalized study intersections and one of the signalized intersections would operate with unacceptable levels of service. The remaining two signalized intersections would continue to operate at acceptable levels of service. Therefore, mitigations would be needed for four of the study intersections under future 2022 conditions (with site traffic).

- The proposed mitigations under the future 2022 conditions consist of the following:
  43 Street N and 26 Avenue N / Township Road 92 Intersection
    - Installation of a two-phase traffic signal.

  43 Street N and 18 Avenue N / Site Access
    - Installation of a two-phase traffic signal

  43 Street N and 14 Avenue N / Site Access
    - Installation of a two-phase traffic signal; and
    - Installation of a northbound left-turn only lane.

  Highway 3 / Crowsnest Highway and 43 Street Intersection
    - Installation of a second eastbound left-turn only lane; and
    - Optimization of the traffic signal splits.

- The mitigated Future 2022 capacity analysis results indicate that the four intersections that previously failed would operate at acceptable levels of service with the proposed mitigations. Therefore, no further mitigations to any of these intersections would be needed under the future 2022 traffic conditions.

- **Future 2037** with the Project Site Traffic LOS analyses indicated that four intersections of the total six intersections would operate at unacceptable levels of service. Therefore, mitigations would be required under the Future 2037 conditions at these intersections.

- The proposed mitigations under the Future 2037 conditions consist of the following:
  43 Street N and 26 Avenue N / Township Road 92 Intersection
    - Installation of two-phase traffic signal.

43 Street N and 18 Avenue N / Site Access

- Installation of a northbound left-turn only lane; and
- Optimization of the traffic signal splits.

43 Street N and 14 Avenue N / Site Access

- Optimization of the traffic signal splits.

Highway 3 / Crowsnest Highway and 43 Street Intersection

- If the Stantec 2006 Functional Planning Study's proposed / recommended Highway 3 & 4 external links were built, Highway 3 east-west traffic volumes would be reduced significantly, and this intersection operation would improve. Therefore, a reevaluation of this intersection operation is recommended after the external highway links are built.

- Traffic signal control warrant analyses were performed for three stop-controlled intersections and the results indicated:
  - Traffic signal installation would NOT be warranted at the intersection of 43 Street North and 26 Avenue North / Township Road 92 by the future 2037 traffic conditions. **However, a traffic signal will be required to mitigate delays to traffic.** This is why it is recommended to monitor this intersection starting from year 2022 to determine when the installation of a traffic signal becomes warranted based on actual traffic count data.

- The traffic signal control warrant analyses further indicated that a traffic signal installation would be warranted under the future 2022 and future 2037 traffic conditions at the following two study intersections:
  - 43 Street North and 18 Avenue North / Site Access
  - 43 Street North and 14 Avenue North / Site Access

- A thorough review of the Cycling Master Plan / Infrastructure Plan has been completed and the results of the review indicated that the existing as well as the proposed Multi-use Pathways could allow significant percentages of the proposed development generated trips / customers to utilize active modes to access the proposed development, which would reduce vehicle trips and reduce vehicle traffic congestions.

- A review of the Lethbridge Transit System and the available bus routes / stops to serve the proposed project area was completed, the results indicated the following:

  - Route "21S Day" is the route that directly serves the project vicinity as it passes through 43 Street N, north of Crowsnest Highway until it reaches 9 Avenue N where it turns left into the city.

- Route “21S Day” service is only available during the weekdays, Monday through Friday during daytime hours only. There is one bus stop along 9 Avenue N just west of 43 Street N that would be suitable to serve the proposed project site.

- Consider modifying Route “21S Day” operation to also cover the weekends and the nights starting from year 2022, which is the opening year of Phase 2 of the proposed development.

- It is also recommended to consider that the service coverage area of this route be modified to cover 43 Street N north of 9 Avenue N until 26 Avenue N and provision of two new bus stops in the vicinity of 14 Avenue and 18 Avenue to help Transit users access the proposed development since the site has access points at each of these two roads.

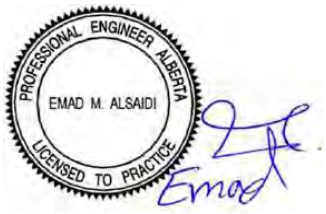
- Modifying the service area coverage and time / days coverage of Route “21S Day” would encourage reducing private vehicle trips and increasing the utilization of the transit, which in turn reduces traffic congestions.

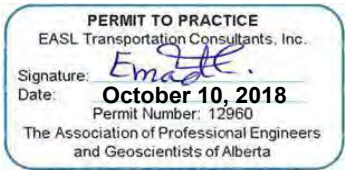
In summary, this traffic impact assessment concludes that the proposed Chinook Industrial Park Development will have impact on the traffic operations of both existing and future road network. However, this impact will be alleviated by implementing the improvements recommended above.

Yours truly,

EASL Transportation Consultants, Inc.

Prepared by:

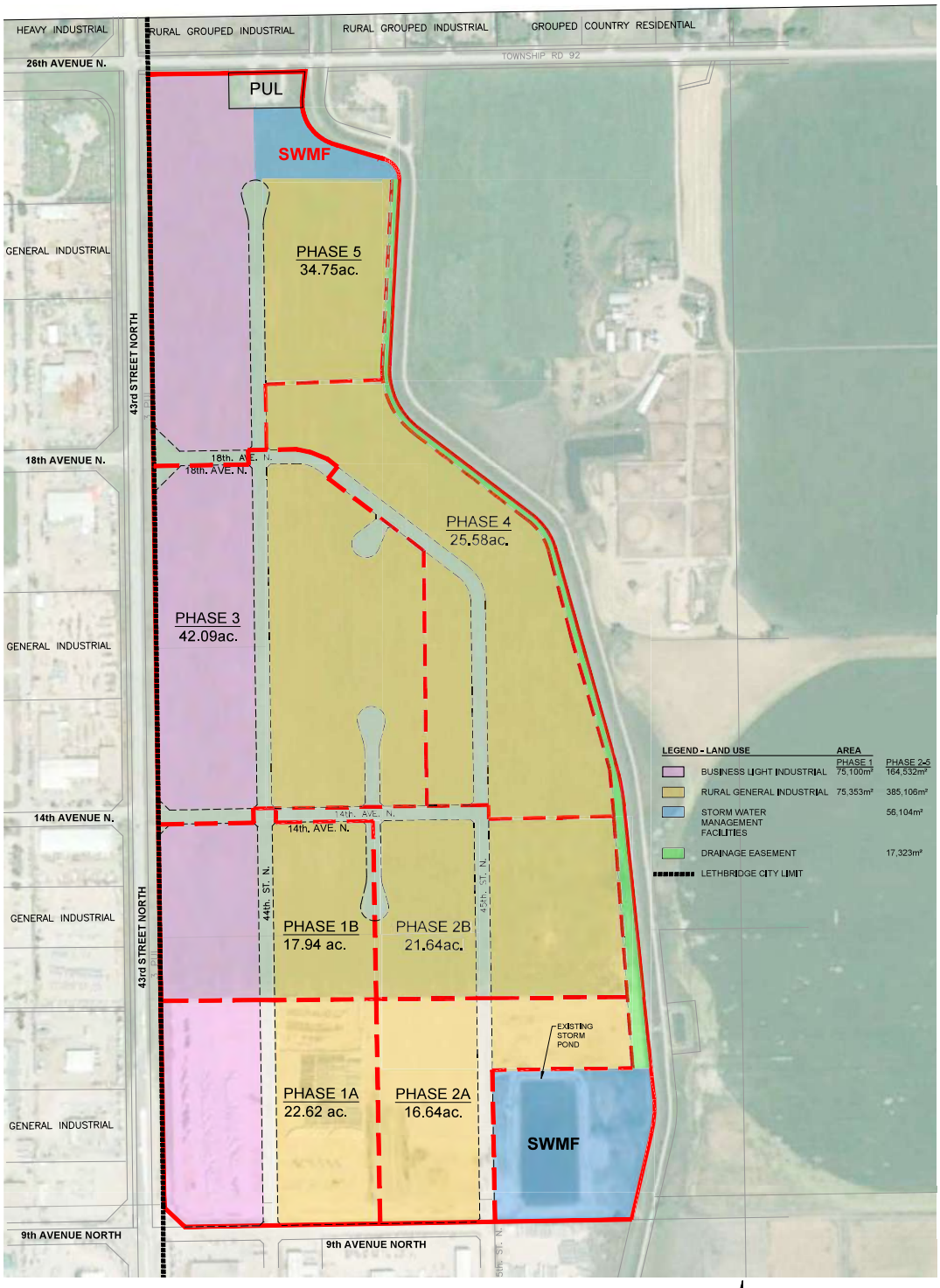




Emad Alsaidi, PhD, PEng, PE
Phone: (403) 930-1928
Direct Phone: (587) 703-5222
E-mail: ealsaidi@easltransportation.ca

Appendix A

Proposed Development Site Plan



PROPOSED DEVELOPMENT & PHASING PLAN

0 50 100 150 200 250

SCALE=1:5,000

NOTES

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Contractor to check and verify all dimensions before construction, any errors and omissions shall be reported to the engineer immediately

Drawing shall not be used for construction until approved

Do not scale the drawing

All construction shall be in accordance with the latest codes, may it be construction, mechanical, etc

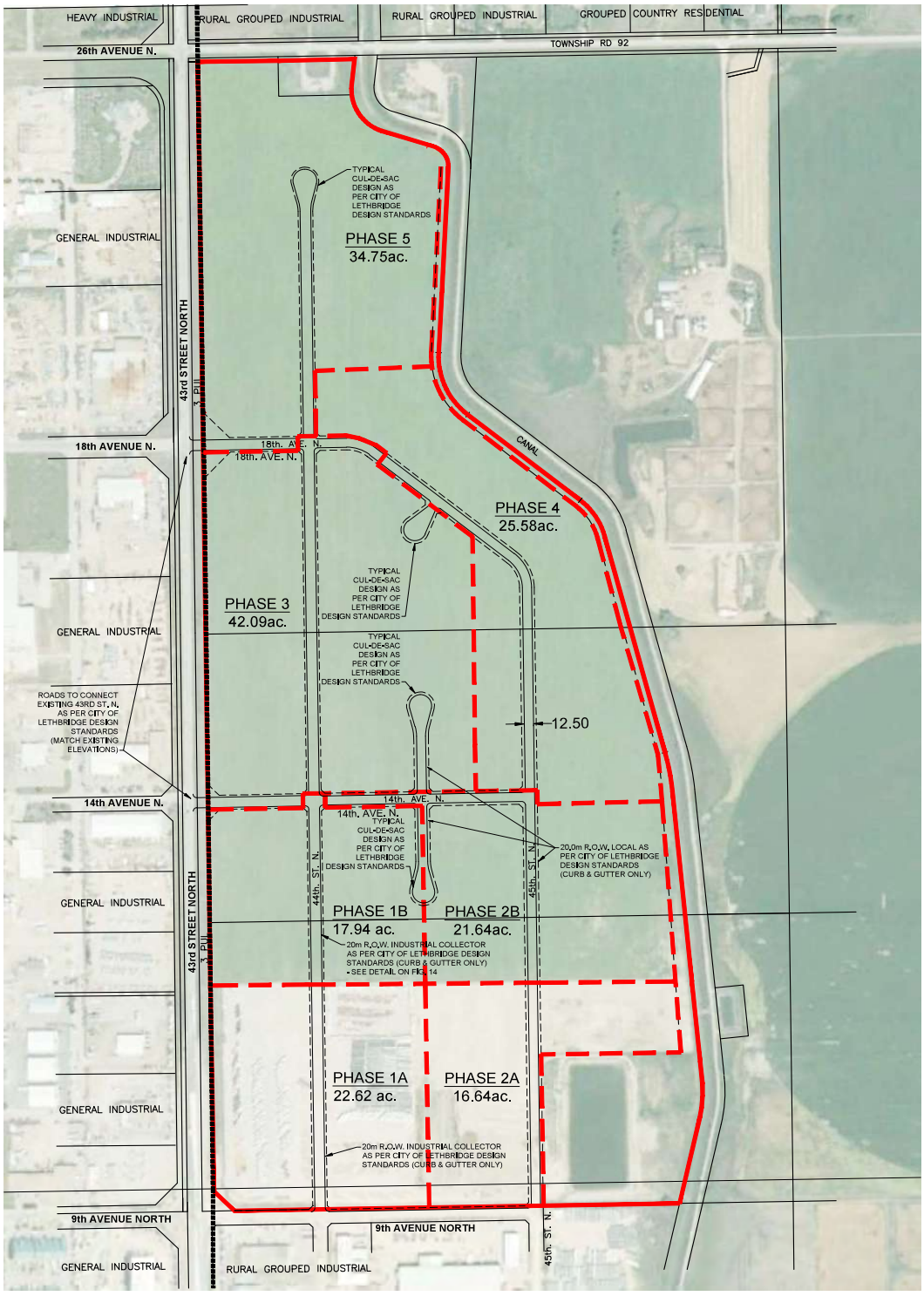
HASEGAWA ENGINEERING & DESIGN LTD.
330 3120-32ND ST. S.
LETHBRIDGE, AB T1K 7B4
PH: 403-328-2686
FAX: 403-329-2728
EMAIL: office@hasegawa.ca

DESIGN	MAH
DRAWN	MDO
CHECKED	MAH
APPROVED	MAH
SCALE	AS SHOWN

PRELIMINARY

NO.	REVISION	DATE

CLIENT	GEORGE KIRKHAM & ED FRIESEN
PROJECT	CHINOOK INDUSTRIAL PARK ASP
DRAWING TITLE	PROPOSED DEVELOPMENT & PHASING PLAN
PROJECT NUMBER	17-006
DATE	Mar 26, 2018
DRAWING NUMBER	FIG.4



PROPOSED ROADS LAYOUT

N

0 50 100 150 200 250

SCALE=1:5,000

NOTES

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HASEGAWA
330 3120-32ND ST. S.
LETHBRIDGE, AB T1K 7B4
PH: 403-328-2686
FAX: 403-329-2728
EMAIL: office@hasegawa.ca

DESIGN	MAH
DRAWN	MDO
CHECKED	MAH
APPROVED	MAH
SCALE	AS SHOWN

PRELIMINARY

#	REVISION	DATE

GEORGE KIRKHAM & ED FRIESEN

CHINOOK INDUSTRIAL PARK ASP

PROPOSED ROADS LAYOUT

PROJECT NUMBER 17-006

DRAWING DATE Mar 26, 2018

FIG.7

Appendix B

Intersection Turning Movement Traffic Counts

1. **City of Lethbridge 2016 Traffic Count**
2. **Cavendish Farms Background Volumes**
3. **Alberta Transportation 2016 Traffic Count**

City of Lethbridge: Intersection Summary

Northbound Street:	43 St N	RTOR	Y	Speed	70	Heavy Veh %	7	Next Signal		Median Wth		Bus Route	N		
Eastbound Street:	26 Ave N	RTOR	Y	Speed	60	Heavy Veh %	4	Next Signal		Median Wth		Bus Route	N		
Southbound Street:	43 St N	RTOR	Y	Speed	80	Heavy Veh %	16	Next Signal		Median Wth		Bus Route	N		
Westbound Street:	Twp 92	RTOR	Y	Speed	50	Heavy Veh %	4	Next Signal		Median Wth		Bus Route	N		
Weather	-16°C	Persons Challenged by Mobility Issues	N					Adjacent to Elementary School	N			Pathway for School	N		
Date:	Thu, Dec 15, 2016	Counted By	MioVision			Intersection	N-451	Senior Centre or Junior High	N			CBD	N		
Notes:	Site Code N-451														

AM

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			Crosswalks					15 Minute Totals	60 Minute Totals	Peak Hour
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	North	South	East	West	Total			
7:00 - 7:15	10	5	1		2			8	37	3	8	1						75		
7:15 - 7:30	10	1			6		1	14	37	4	4							77		
7:30 - 7:45	11	8	2		8	1		14	48	2	9							103		
7:45 - 8:00	24	12	1	2	6		2	21	51	7	17	1						144	399	
8:00 - 8:15	17	4	8	1	4	1	1	15	45	1	13							110	434	
8:15 - 8:30	7	2	6	1	6	1	1	16	24	5	17	2						88	445	7:30-8:30
8:30 - 8:45	21	4	3		6	1		10	23	4	19	1						92	434	
8:45 - 9:00	17	7	4	1	3	1	1	6	21	3	6	2						72	362	
Peak Hour:	*59*	*26*	*17*	*4*	*24*	*3*	*4*	*66*	*168*	*15*	*56*	*3*							*PHF:*	*0.77*
PHF:	*0.61*	*0.54*	*0.53*	*0.50*	*0.75*	*0.75*	*0.50*	*0.79*	*0.82*	*0.54*	*0.82*	*0.38*								

MID

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			Crosswalks					15 Minute Totals	60 Minute Totals	Peak Hour
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	North	South	East	West	Total			
11:00 - 11:15	17	7	7		8	1	1	4	18	3	4							70		
11:15 - 11:30	18	2	7		5			7	29	6	11							85		
11:30 - 11:45	28	4	3		6	4	1	8	30	3	12							99		
11:45 - 12:00	35	3	3		3	2	4	5	27	7	10							99	353	
12:00 - 12:15	43	3	4	1	7			3	30	1	11							103	386	
12:15 - 12:30	46	1	4		11	3		10	36	2	6							119	420	
12:30 - 12:45	27	4	4	1	5	1		5	28	2	5							82	403	
12:45 - 13:00	33	9	2		4	1	1	7	50	2	7	1						117	421	12:00-13:00
Peak Hour:	*149*	*17*	*14*	*2*	*27*	*5*	*1*	*25*	*144*	*7*	*29*	*1*							*PHF:*	*0.88*
PHF:	*0.81*	*0.47*	*0.88*	*0.50*	*0.61*	*0.42*	*0.25*	*0.63*	*0.72*	*0.88*	*0.66*	*0.25*								

PM

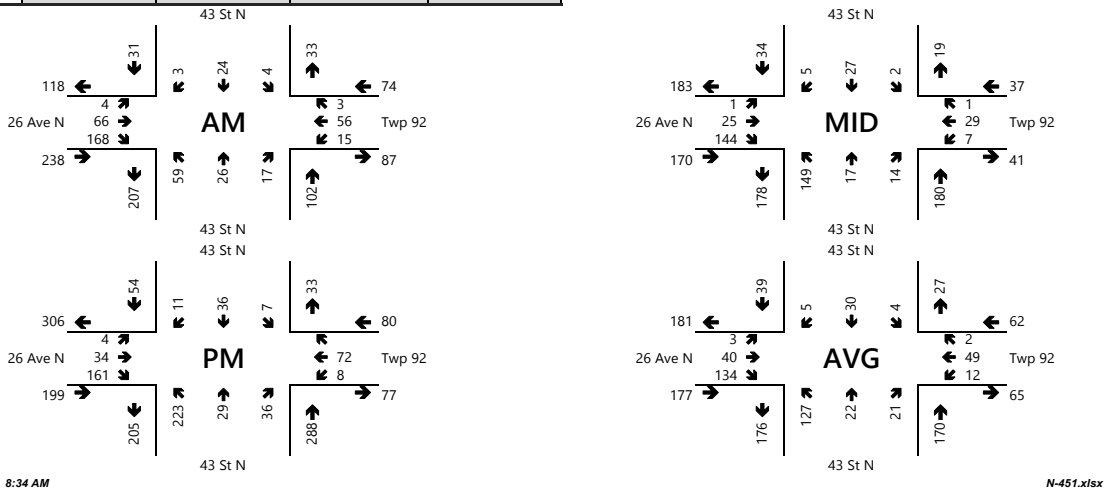
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			Crosswalks					15 Minute Totals	60 Minute Totals	Peak Hour
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	North	South	East	West	Total			
15:00 - 15:15	32	2	7		8		4	10	31	3	4							101		
15:15 - 15:30	26	1	4		10	1	1	22	28	2	10	1						106		
15:30 - 15:45	47	4	10	3	32		1	17	26	1	15							156		
15:45 - 16:00	44	8	4	3	8			13	21	3	20							124	487	
16:00 - 16:15	41	8	5	1	10	2		11	35	1	12	1						127	513	
16:15 - 16:30	54	9	5	1	11	6	1	8	32	2	15							144	551	
16:30 - 16:45	66	6	4	4	11	1	1	10	45	2	17							167	562	
16:45 - 17:00	56	7	14		6	2	2	12	41	3	21							164	602	
17:00 - 17:15	47	7	13	2	8	2		4	43	1	19							146	621	16:15-17:15
17:15 - 17:30	40	7	14		6	2		10	28	1	16	1						125	602	
Peak Hour:	*223*	*29*	*36*	*7*	*36*	*11*	*4*	*34*	*161*	*8*	*72*								*PHF:*	*0.93*
PHF:	*0.84*	*0.81*	*0.64*	*0.44*	*0.82*	*0.46*	*0.50*	*0.71*	*0.89*	*0.67*	*0.86*									

6 Hour Average	127	22	21	4	30	5	3	40	134	12	49	2				
Approach Lanes	0.5	1	0.5	0.5	1	0.5	0.5	1	0.5	0.5	1	0.5				
Departure Lanes	1			1			1			1						

2 Hour PM Range Used for Vehicles: 15:30 to 17:30

Not Warranted

Pedestrian Points:	0
Vehicle Points:	21
Total:	21



Intersection: 43 Street N and 18 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

ALL VEHICLES

AM Peak Hour Traffic Count at 43 Street N and 18 Avenue N Intersection

Time Period	18 Avenue N Eastbound			18 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum	4-P Total	PHF
AM	L	T	R	L	T	R	L	T	R	L	T	R			
7:00 - 7:15	0	0	25	0	0	0	25	10	0	0	44	0	104		
7:15 - 7:30	0	0	28	0	0	0	25	17	0	0	50	2	122		
7:30 - 7:45	1	0	17	0	0	0	49	18	0	0	58	0	143		
7:45 - 8:00	2	0	33	0	0	0	59	31	0	0	56	5	186	555	
8:00 - 8:15	2	0	21	0	0	0	33	22	0	0	46	2	126	**577**	**0.78**
8:15 - 8:30	1	0	28	0	0	0	25	22	0	0	29	2	107	562	
8:30 - 8:45	0	0	25	0	0	0	22	18	0	0	29	1	95	514	
8:45 - 9:00	3	0	18	0	0	0	24	29	0	0	44	2	120	448	
Peak Hour	**5**	**0**	**99**	**0**	**0**	**0**	**166**	**88**	**0**	**0**	**210**	**9**	**577**		
App Total	104			0			254			219			577		
HV %	**12%**			**#DIV/0!**			**10%**			**3%**			**7%**		

ALL VEHICLES

PM Peak Hour Traffic Count at 43 Street N and 18 Avenue N Intersection

Time Period	18 Avenue N Eastbound			18 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum	4-P Total	PHF
PM	L	T	R	L	T	R	L	T	R	L	T	R			
4:00 – 4:15	2	0	33	0	0	0	19	41	0	0	43	2	140		
4:15 – 4:30	1	0	26	0	0	0	24	55	0	0	29	3	138		
4:30 – 4:45	5	0	53	0	0	0	27	74	0	0	26	0	185		
4:45 – 5:00	5	0	32	0	0	0	25	42	0	0	32	0	136	599	
5:00 – 5:15	5	0	48	0	0	0	18	65	0	0	53	0	189	**648**	**0.86**
5:15 – 5:30	1	0	15	0	0	0	29	44	0	0	41	4	134	644	
5:30 – 5:45	1	0	23	0	0	0	16	54	0	0	31	2	127	586	
5:45 – 6:00	3	0	15	0	0	0	17	32	0	0	26	1	94	544	
Peak Hour	**16**	**0**	**159**	**0**	**0**	**0**	**94**	**236**	**0**	**0**	**140**	**3**	**648**		
App Total	175			0			330			143			648		
HV %	**9%**			**#DIV/0!**			**9%**			**8%**			**9%**		

Intersection: 43 Street N and 18 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

TRUCKS, MULTI-AXLE VEHICLE, CITY BUS OR SCHOOL BUS

AM Peak Hour Traffic Count at 43 Street N and 18 Avenue N Intersection

Time Period	18 Avenue N Eastbound			18 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum
AM	L	T	R	L	T	R	L	T	R	L	T	R	
7:00 - 7:15	0	0	1	0	0	0	3	2	0	0	2	0	8
7:15 - 7:30	0	0	1	0	0	0	2	1	0	0	2	1	7
7:30 - 7:45	0	0	1	0	0	0	4	3	0	0	3	0	11
7:45 - 8:00	0	0	4	0	0	0	5	4	0	0	0	0	13
8:00 - 8:15	0	0	6	0	0	0	4	2	0	0	0	0	12
8:15 - 8:30	0	0	9	0	0	0	4	3	0	0	1	1	18
8:30 - 8:45	0	0	6	0	0	0	7	0	0	0	3	0	16
8:45 - 9:00	2	0	2	0	0	0	4	5	0	0	3	0	16
Peak Hour	**0**	**0**	**12**	**0**	**0**	**0**	**15**	**10**	**0**	**0**	**5**	**1**	**43**
App Total	**12**			**0**			**25**			**6**			**43**

TRUCKS, MULTI-AXLE VEHICLE, CITY BUS OR SCHOOL BUS

PM Peak Hour Traffic Count at 43 Street N and 18 Avenue N Intersection

Time Period	18 Avenue N Eastbound			18 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum
PM	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 – 4:15	0	0	3	0	0	0	2	2	0	0	3	0	10
4:15 – 4:30	0	0	4	0	0	0	4	3	0	0	6	0	17
4:30 – 4:45	0	0	2	0	0	0	4	7	0	0	1	0	14
4:45 – 5:00	0	0	5	0	0	0	7	1	0	0	0	0	13
5:00 – 5:15	0	0	4	0	0	0	2	3	0	0	4	0	13
5:15 – 5:30	0	0	0	0	0	0	2	0	0	0	1	1	4
5:30 – 5:45	0	0	2	0	0	0	2	1	0	0	0	0	5
5:45 – 6:00	0	0	0	0	0	0	1	0	0	0	0	0	1
Peak Hour	0	0	15	0	0	0	17	14	0	0	11	0	57
App Total	**15**			**0**			**31**			**11**			**57**

Intersection: 43 Street N and 18 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

PASSENGER CARS, MINI-VANS, TWO AXLE TRUCKS, MOTOR CYCLES AND STATION WAGONS

AM Peak Hour Traffic Count at 43 Street N and 18 Avenue N Intersection

Time Period	18 Avenue N Eastbound			18 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum
AM	L	T	R	L	T	R	L	T	R	L	T	R	
7:00 - 7:15	0	0	24	0	0	0	22	8	0	0	42	0	96
7:15 - 7:30	0	0	27	0	0	0	23	16	0	0	48	1	115
7:30 - 7:45	1	0	16	0	0	0	45	15	0	0	55	0	132
7:45 - 8:00	2	0	29	0	0	0	54	27	0	0	56	5	173
8:00 - 8:15	2	0	15	0	0	0	29	20	0	0	46	2	114
8:15 - 8:30	1	0	19	0	0	0	21	19	0	0	28	1	89
8:30 - 8:45	0	0	19	0	0	0	15	18	0	0	26	1	79
8:45 - 9:00	1	0	16	0	0	0	20	24	0	0	41	2	104
Peak Hour	**5**	**0**	**87**	**0**	**0**	**0**	**151**	**78**	**0**	**0**	**205**	**8**	**534**
App Total	**92**			**0**			**229**			**213**			**534**

PASSENGER CARS, MINI-VANS, TWO AXLE TRUCKS, MOTOR CYCLES AND STATION WAGONS

PM Peak Hour Traffic Count at 43 Street N and 18 Avenue N Intersection

Time Period	18 Avenue N Eastbound			18 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum
PM	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 – 4:15	2	0	30	0	0	0	17	39	0	0	40	2	130
4:15 – 4:30	1	0	22	0	0	0	20	52	0	0	23	3	121
4:30 – 4:45	5	0	51	0	0	0	23	67	0	0	25	0	171
4:45 – 5:00	5	0	27	0	0	0	18	41	0	0	32	0	123
5:00 – 5:15	5	0	44	0	0	0	16	62	0	0	49	0	176
5:15 – 5:30	1	0	15	0	0	0	27	44	0	0	40	3	130
5:30 – 5:45	1	0	21	0	0	0	14	53	0	0	31	2	122
5:45 – 6:00	3	0	15	0	0	0	16	32	0	0	26	1	93
Peak Hour	**16**	**0**	**144**	**0**	**0**	**0**	**77**	**222**	**0**	**0**	**129**	**3**	**591**
App Total	**160**			**0**			**299**			**132**			**591**

Intersection: 43 Street N and 14 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

ALL VEHICLES

AM Peak Hour Traffic Count at 43 Street N and 14 Avenue N Intersection

Time Period	14 Avenue N Eastbound			14 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum	4-P Total	PHF
AM	L	T	R	L	T	R	L	T	R	L	T	R			
7:00 - 7:15	0	0	0	0	0	0	10	32	0	0	60	1	103		
7:15 - 7:30	0	0	2	0	0	0	19	39	0	0	72	4	136		
7:30 - 7:45	0	0	5	0	0	0	22	62	0	0	76	2	167		
7:45 - 8:00	1	0	6	0	0	0	18	86	0	0	80	5	196	602	
8:00 - 8:15	1	0	5	0	0	0	8	49	0	0	69	2	134	633	**0.81**
8:15 - 8:30	0	0	4	0	0	0	10	51	0	0	60	1	126	623	
8:30 - 8:45	0	0	7	0	0	0	11	47	0	0	53	1	119	575	
8:45 - 9:00	1	0	5	0	0	0	10	49	0	0	53	3	121	500	
Peak Hour	**2**	**0**	**18**	**0**	**0**	**0**	**67**	**236**	**0**	**0**	**297**	**13**	**633**		
App Total	20			0			303			310			633		
HV %	**55%**			**#DIV/0!**			**10%**			**6%**			**10%**		

ALL VEHICLES

PM Peak Hour Traffic Count at 43 Street N and 14 Avenue N Intersection

Time Period	14 Avenue N Eastbound			14 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum	4-P Total	PHF
PM	L	T	R	L	T	R	L	T	R	L	T	R			
4:00 – 4:15	0	0	20	0	0	0	2	59	0	0	69	1	151		
4:15 – 4:30	3	0	9	0	0	0	4	89	0	0	62	1	168		
4:30 – 4:45	6	0	43	0	0	0	4	99	0	0	69	0	221		
4:45 – 5:00	0	0	17	0	0	0	3	68	0	0	62	0	150	690	
5:00 – 5:15	3	0	10	0	0	0	4	83	0	0	93	1	194	**733**	**0.83**
5:15 – 5:30	0	0	7	0	0	0	6	76	0	0	56	0	145	710	
5:30 – 5:45	1	0	5	0	0	0	3	74	0	0	52	0	135	624	
5:45 – 6:00	0	0	8	0	0	0	4	51	0	0	48	0	111	585	
Peak Hour	**12**	**0**	**79**	**0**	**0**	**0**	**15**	**339**	**0**	**0**	**286**	**2**	**733**		
App Total	91			0			354			288			733		
HV %	**3%**			**#DIV/0!**			**9%**			**10%**			**9%**		

Intersection: 43 Street N and 14 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

TRUCKS, MULTI-AXLE VEHICLE, CITY BUS OR SCHOOL BUS

AM Peak Hour Traffic Count at 43 Street N and 14 Avenue N Intersection

Time Period	14 Avenue N Eastbound			14 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum
AM	L	T	R	L	T	R	L	T	R	L	T	R	
7:00 - 7:15	0	0	0	0	0	0	0	5	0	0	1	0	6
7:15 - 7:30	0	0	2	0	0	0	1	3	0	0	4	0	10
7:30 - 7:45	0	0	2	0	0	0	0	8	0	0	4	0	14
7:45 - 8:00	0	0	2	0	0	0	0	9	0	0	3	2	16
8:00 - 8:15	0	1	4	0	0	0	2	7	0	0	7	0	21
8:15 - 8:30	0	0	1	0	0	0	1	8	0	0	10	1	21
8:30 - 8:45	0	0	2	0	0	0	1	9	0	0	9	1	22
8:45 - 9:00	1	0	1	0	0	0	3	7	0	0	4	1	17
Peak Hour	**0**	**1**	**10**	**0**	**0**	**0**	**3**	**27**	**0**	**0**	**18**	**2**	**61**
App Total	**11**			**0**			**30**			**20**			**61**

TRUCKS, MULTI-AXLE VEHICLE, CITY BUS OR SCHOOL BUS

PM Peak Hour Traffic Count at 43 Street N and 14 Avenue N Intersection

Time Period	14 Avenue N Eastbound			14 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum
PM	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 – 4:15	0	0	2	0	0	0	0	4	0	0	7	0	13
4:15 – 4:30	0	0	0	0	0	0	1	8	0	0	11	1	21
4:30 – 4:45	0	0	2	0	0	0	0	10	0	0	3	0	15
4:45 – 5:00	0	0	0	0	0	0	1	8	0	0	5	0	14
5:00 – 5:15	1	0	0	0	0	0	0	4	0	0	7	1	13
5:15 – 5:30	0	0	0	0	0	0	2	3	0	0	1	0	6
5:30 – 5:45	0	0	1	0	0	0	1	4	0	0	1	0	7
5:45 – 6:00	0	0	0	0	0	0	1	1	0	0	1	0	3
Peak Hour	1	0	2	0	0	0	2	30	0	0	26	2	63
App Total	**3**			**0**			**32**			**28**			**63**

Intersection: 43 Street N and 14 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

PASSENGER CARS, MINI-VANS, TWO AXLE TRUCKS, MOTOR CYCLES AND STATION WAGONS

AM Peak Hour Traffic Count at 43 Street N and 14 Avenue N Intersection

Time Period	14 Avenue N Eastbound			14 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum
AM	L	T	R	L	T	R	L	T	R	L	T	R	
7:00 - 7:15	0	0	0	0	0	0	10	27	0	0	59	1	97
7:15 - 7:30	0	0	0	0	0	0	18	36	0	0	68	4	126
7:30 - 7:45	0	0	3	0	0	0	22	54	0	0	72	2	153
7:45 - 8:00	1	0	4	0	0	0	18	77	0	0	77	3	180
8:00 - 8:15	0	0	1	0	0	0	6	42	0	0	62	2	113
8:15 - 8:30	0	0	3	0	0	0	9	43	0	0	50	0	105
8:30 - 8:45	0	0	5	0	0	0	10	38	0	0	44	0	97
8:45 - 9:00	0	0	4	0	0	0	7	42	0	0	49	2	104
Peak Hour	**1**	**0**	**8**	**0**	**0**	**0**	**64**	**209**	**0**	**0**	**279**	**11**	**572**
App Total	**9**			**0**			**273**			**290**			**572**

PASSENGER CARS, MINI-VANS, TWO AXLE TRUCKS, MOTOR CYCLES AND STATION WAGONS

PM Peak Hour Traffic Count at 43 Street N and 14 Avenue N Intersection

Time Period	14 Avenue N Eastbound			14 Avenue N Westbaoun			43 Street N Northbound			43 Street N Southbound			Sum
PM	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 – 4:15	0	0	18	0	0	0	2	55	0	0	62	1	138
4:15 – 4:30	3	0	9	0	0	0	3	81	0	0	51	0	147
4:30 – 4:45	6	0	41	0	0	0	4	89	0	0	66	0	206
4:45 – 5:00	0	0	17	0	0	0	2	60	0	0	57	0	136
5:00 – 5:15	2	0	10	0	0	0	4	79	0	0	86	0	181
5:15 – 5:30	0	0	7	0	0	0	4	73	0	0	55	0	139
5:30 – 5:45	1	0	4	0	0	0	2	70	0	0	51	0	128
5:45 – 6:00	0	0	8	0	0	0	3	50	0	0	47	0	108
Peak Hour	**11**	**0**	**77**	**0**	**0**	**0**	**13**	**309**	**0**	**0**	**260**	**0**	**670**
App Total	**88**			**0**			**322**			**260**			**670**

Intersection: 43 Street N and 9 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

ALL VEHICLES

AM Peak Hour Traffic Count at 43 Street N and 9 Avenue N Intersection

Time Period	9 Avenue N Eastbound			9 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum	4-P Total	PHF
AM	L	T	R	L	T	R	L	T	R	L	T	R			
7:00 - 7:15	0	4	9	2	0	0	24	36	24	5	52	2	158		
7:15 - 7:30	0	7	13	2	3	2	39	67	20	7	68	2	230		
7:30 - 7:45	1	3	18	8	3	1	35	88	16	2	71	1	247		
7:45 - 8:00	1	2	22	1	0	0	60	101	24	1	85	4	301	936	
8:00 - 8:15	1	0	24	7	0	1	54	49	13	1	69	5	224	**1002**	**0.83**
8:15 - 8:30	2	2	29	7	2	1	39	54	13	4	62	4	219	991	
8:30 - 8:45	3	4	25	7	1	1	33	58	14	1	55	1	203	947	
8:45 - 9:00	1	5	27	6	2	2	42	56	11	3	54	3	212	858	
Peak Hour	**3**	**12**	**77**	**18**	**6**	**4**	**188**	**305**	**73**	**11**	**293**	**12**	**1002**		
App Total	92			28			566			316			1002		
HV %	**3%**			**36%**			**9%**			**9%**			**9%**		

ALL VEHICLES

PM Peak Hour Traffic Count at 43 Street N and 9 Avenue N Intersection

Time Period	9 Avenue N Eastbound			9 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum	4-P Total	PHF
PM	L	T	R	L	T	R	L	T	R	L	T	R			
4:00 – 4:15	2	1	41	32	14	12	30	39	2	1	69	5	248		
4:15 – 4:30	1	4	46	13	4	2	38	71	3	1	59	5	247		
4:30 – 4:45	7	0	49	53	3	4	26	93	4	0	126	5	370		
4:45 – 5:00	1	1	42	15	1	2	32	63	7	2	67	6	239	1104	
5:00 – 5:15	4	0	83	17	3	4	32	74	4	0	103	3	327	**1183**	**0.80**
5:15 – 5:30	1	1	38	13	0	0	27	92	1	0	65	3	241	1177	
5:30 – 5:45	0	0	27	20	62	2	17	5	1	0	53	1	188	995	
5:45 – 6:00	0	0	21	5	0	1	14	51	2	0	54	1	149	905	
Peak Hour	**13**	**5**	**220**	**98**	**11**	**12**	**128**	**301**	**18**	**3**	**355**	**19**	**1183**		
App Total	238			121			447			377			1183		
HV %	**6%**			**2%**			**13%**			**7%**			**9%**		

Intersection: 43 Street N and 9 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

TRUCKS, MULTI-AXLE VEHICLE, CITY BUS OR SCHOOL BUS

AM Peak Hour Traffic Count at 43 Street N and 9 Avenue N Intersection

Time Period	9 Avenue N Eastbound			9 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum
AM	L	T	R	L	T	R	L	T	R	L	T	R	
7:00 - 7:15	0	0	0	0	0	0	0	4	0	0	1	0	5
7:15 - 7:30	0	0	0	1	0	1	3	4	2	0	5	1	17
7:30 - 7:45	0	0	1	2	1	0	2	8	2	0	6	0	22
7:45 - 8:00	0	0	2	1	0	0	2	9	1	0	5	0	20
8:00 - 8:15	0	0	0	3	0	1	9	8	2	1	11	0	35
8:15 - 8:30	1	0	3	2	0	0	2	8	2	1	9	0	28
8:30 - 8:45	1	1	4	5	0	0	3	9	1	0	10	1	35
8:45 - 9:00	0	1	2	3	0	2	3	7	3	1	6	0	28
Peak Hour	**0**	**0**	**3**	**7**	**1**	**2**	**16**	**29**	**7**	**1**	**27**	**1**	**94**
App Total	**3**			**10**			**52**			**29**			**94**

TRUCKS, MULTI-AXLE VEHICLE, CITY BUS OR SCHOOL BUS

PM Peak Hour Traffic Count at 43 Street N and 9 Avenue N Intersection

Time Period	9 Avenue N Eastbound			9 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum
PM	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 – 4:15	1	0	2	1	1	0	3	3	0	0	9	1	21
4:15 – 4:30	0	2	4	0	0	0	5	8	0	1	10	0	30
4:30 – 4:45	0	0	4	1	0	0	6	11	0	0	3	1	26
4:45 – 5:00	0	0	0	0	1	0	6	9	2	1	5	0	24
5:00 – 5:15	0	0	5	0	1	0	4	4	1	0	7	0	22
5:15 – 5:30	0	0	3	0	0	0	5	5	1	0	1	0	15
5:30 – 5:45	0	0	5	2	0	0	2	4	0	0	2	0	15
5:45 – 6:00	0	0	5	0	0	0	2	3	1	0	1	0	12
Peak Hour	0	2	13	1	2	0	21	32	3	2	25	1	102
App Total	**15**			**3**			**56**			**28**			**102**

Intersection: 43 Street N and 9 Avenue N
Count Date: 14-Mar-17
Count Day: Tuesday
Counted By: Hasegawa Consulting Professional Engineers

PASSENGER CARS, MINI-VANS, TWO AXLE TRUCKS, MOTOR CYCLES AND STATION WAGONS

AM Peak Hour Traffic Count at 43 Street N and 9 Avenue N Intersection

Time Period	9 Avenue N Eastbound			9 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum
AM	L	T	R	L	T	R	L	T	R	L	T	R	
7:00 - 7:15	0	4	9	2	0	0	24	32	24	5	51	2	153
7:15 - 7:30	0	7	13	1	3	1	36	63	18	7	63	1	213
7:30 - 7:45	1	3	17	6	2	1	33	80	14	2	65	1	225
7:45 - 8:00	1	2	20	0	0	0	58	92	23	1	80	4	281
8:00 - 8:15	1	0	24	4	0	0	45	41	11	0	58	5	189
8:15 - 8:30	1	2	26	5	2	1	37	46	11	3	53	4	191
8:30 - 8:45	2	3	21	2	1	1	30	49	13	1	45	0	168
8:45 - 9:00	1	4	25	3	2	0	39	49	8	2	48	3	184
Peak Hour	**3**	**12**	**74**	**11**	**5**	**2**	**172**	**276**	**66**	**10**	**266**	**11**	**908**
App Total	**89**			**18**			**514**			**287**			**908**

PASSENGER CARS, MINI-VANS, TWO AXLE TRUCKS, MOTOR CYCLES AND STATION WAGONS

PM Peak Hour Traffic Count at 43 Street N and 9 Avenue N Intersection

Time Period	9 Avenue N Eastbound			9 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum
PM	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 – 4:15	1	1	39	31	13	12	27	36	2	1	60	4	227
4:15 – 4:30	1	2	42	13	4	2	33	63	3	0	49	5	217
4:30 – 4:45	7	0	45	52	3	4	20	82	4	0	123	4	344
4:45 – 5:00	1	1	42	15	0	2	26	54	5	1	62	6	215
5:00 – 5:15	4	0	78	17	2	4	28	70	3	0	96	3	305
5:15 – 5:30	1	1	35	13	0	0	22	87	0	0	64	3	226
5:30 – 5:45	0	0	22	18	62	2	15	1	1	0	51	1	173
5:45 – 6:00	0	0	16	5	0	1	12	48	1	0	53	1	137
Peak Hour	**13**	**3**	**207**	**97**	**9**	**12**	**107**	**269**	**15**	**1**	**330**	**18**	**1081**
App Total	**223**			**118**			**391**			**349**			**1081**

Intersection: 43 Street N and 5 Avenue N
Count Date: 16-Mar-17
Count Day: Thursday
Counted By: Hasegawa Consulting Professional Engineers

ALL VEHICLES

AM Peak Hour Traffic Count at 43 Street N and 5 Avenue N Intersection

Time Period	5 Avenue N Eastbound			5 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum	4-P Total	PHF
AM	L	T	R	L	T	R	L	T	R	L	T	R			
7:00 - 7:15	6	0	23	0	0	0	38	76	0	0	65	4	212		
7:15 - 7:30	5	0	35	0	0	0	64	116	0	0	79	3	302		
7:30 - 7:45	3	0	27	0	0	0	67	136	0	0	101	8	342		
7:45 - 8:00	8	0	44	0	0	0	57	168	0	0	119	10	406	1262	
8:00 - 8:15	3	0	36	0	0	0	49	165	0	0	97	5	355	**1405**	**0.87**
8:15 - 8:30	3	0	22	0	0	0	45	119	0	0	116	4	309	1412	
8:30 - 8:45	4	0	36	0	0	0	32	104	0	0	95	5	276	1346	
8:45 - 9:00	5	0	37	0	0	0	50	93	0	0	86	5	276	1216	
Peak Hour	**19**	**0**	**142**	**0**	**0**	**0**	**237**	**585**	**0**	**0**	**396**	**26**	**1405**		
App Total	161			0			822			422			1405		
HV %	**12%**			**#DIV/0!**			**6%**			**16%**			**10%**		

ALL VEHICLES

PM Peak Hour Traffic Count at 43 Street N and 5 Avenue N Intersection

Time Period	5 Avenue N Eastbound			5 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum	4-P Total	PHF
PM	L	T	R	L	T	R	L	T	R	L	T	R			
4:00 – 4:15	8	0	45	0	0	0	60	105	0	0	162	4	384		
4:15 – 4:30	6	0	46	0	0	0	53	138	0	0	140	10	393		
4:30 – 4:45	9	0	58	0	0	0	57	128	0	0	235	12	499		
4:45 – 5:00	6	0	59	0	0	0	48	113	0	0	202	3	431	1707	
5:00 – 5:15	6	0	80	0	0	0	46	117	0	0	221	11	481	**1804**	**0.90**
5:15 – 5:30	3	0	41	0	0	0	37	106	0	0	172	3	362	1773	
5:30 – 5:45	1	0	41	0	0	0	35	74	0	0	103	5	259	1533	
5:45 – 6:00	1	0	40	0	0	0	24	57	0	0	102	5	229	1331	
Peak Hour	**27**	**0**	**243**	**0**	**0**	**0**	**204**	**496**	**0**	**0**	**798**	**36**	**1804**		
App Total	270			0			700			834			1804		
HV %	**7%**			**#DIV/0!**			**12%**			**6%**			**8%**		

Intersection: 43 Street N and 5 Avenue N
Count Date: 16-Mar-17
Count Day: Thursday
Counted By: Hasegawa Consulting Professional Engineers

TRUCKS, MULTI-AXLE VEHICLE, CITY BUS OR SCHOOL BUS

AM Peak Hour Traffic Count at 43 Street N and 5 Avenue N Intersection

Time Period	5 Avenue N Eastbound			5 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum
AM	L	T	R	L	T	R	L	T	R	L	T	R	
7:00 - 7:15	0	0	6	0	0	0	3	3	0	0	17	1	30
7:15 - 7:30	0	0	6	0	0	0	2	8	0	0	9	0	25
7:30 - 7:45	0	0	2	0	0	0	3	7	0	0	11	3	26
7:45 - 8:00	2	0	5	0	0	0	0	11	0	0	18	2	38
8:00 - 8:15	0	0	4	0	0	0	3	14	0	0	24	2	47
8:15 - 8:30	1	0	5	0	0	0	4	7	0	0	19	0	36
8:30 - 8:45	0	0	6	0	0	0	8	16	0	0	26	1	57
8:45 - 9:00	0	0	7	0	0	0	4	13	0	0	16	1	41
Peak Hour	**2**	**0**	**17**	**0**	**0**	**0**	**8**	**40**	**0**	**0**	**62**	**7**	**136**
App Total		**19**			**0**			**48**			**69**		**136**

TRUCKS, MULTI-AXLE VEHICLE, CITY BUS OR SCHOOL BUS

PM Peak Hour Traffic Count at 43 Street N and 5 Avenue N Intersection

Time Period	5 Avenue N Eastbound			5 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum
PM	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 – 4:15	1	0	5	0	0	0	13	10	0	0	6	0	35
4:15 – 4:30	1	0	5	0	0	0	15	15	0	0	9	5	50
4:30 – 4:45	1	0	4	0	0	0	9	11	0	0	13	1	39
4:45 – 5:00	4	0	2	0	0	0	7	13	0	0	6	0	32
5:00 – 5:15	0	0	2	0	0	0	5	6	0	0	9	3	25
5:15 – 5:30	1	0	2	0	0	0	3	7	0	0	14	0	27
5:30 – 5:45	1	0	2	0	0	0	11	12	0	0	7	1	34
5:45 – 6:00	0	0	2	0	0	0	2	5	0	0	4	1	14
Peak Hour	6	0	13	0	0	0	36	45	0	0	37	9	146
App Total		**19**			**0**			**81**			**46**		**146**

Intersection: 43 Street N and 5 Avenue N
Count Date: 16-Mar-17
Count Day: Thursday
Counted By: Hasegawa Consulting Professional Engineers

PASSENGER CARS, MINI-VANS, TWO AXLE TRUCKS, MOTOR CYCLES AND STATION WAGONS

AM Peak Hour Traffic Count at 43 Street N and 5 Avenue N Intersection

Time Period	5 Avenue N Eastbound			5 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum
AM	L	T	R	L	T	R	L	T	R	L	T	R	
7:00 - 7:15	6	0	17	0	0	0	35	73	0	0	48	3	182
7:15 - 7:30	5	0	29	0	0	0	62	108	0	0	70	3	277
7:30 - 7:45	3	0	25	0	0	0	64	129	0	0	90	5	316
7:45 - 8:00	6	0	39	0	0	0	57	157	0	0	101	8	368
8:00 - 8:15	3	0	32	0	0	0	46	151	0	0	73	3	308
8:15 - 8:30	2	0	17	0	0	0	41	112	0	0	97	4	273
8:30 - 8:45	4	0	30	0	0	0	24	88	0	0	69	4	219
8:45 - 9:00	5	0	30	0	0	0	46	80	0	0	70	4	235
Peak Hour	**17**	**0**	**125**	**0**	**0**	**0**	**229**	**545**	**0**	**0**	**334**	**19**	**1269**
App Total	**142**			**0**			**774**			**353**			**1269**

PASSENGER CARS, MINI-VANS, TWO AXLE TRUCKS, MOTOR CYCLES AND STATION WAGONS

PM Peak Hour Traffic Count at 43 Street N and 5 Avenue N Intersection

Time Period	5 Avenue N Eastbound			5 Avenue N Westbound			43 Street N Northbound			43 Street N Southbound			Sum
PM	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 – 4:15	7	0	40	0	0	0	47	95	0	0	156	4	349
4:15 – 4:30	5	0	41	0	0	0	38	123	0	0	131	5	343
4:30 – 4:45	8	0	54	0	0	0	48	117	0	0	222	11	460
4:45 – 5:00	2	0	57	0	0	0	41	100	0	0	196	3	399
5:00 – 5:15	6	0	78	0	0	0	41	111	0	0	212	8	456
5:15 – 5:30	2	0	39	0	0	0	34	99	0	0	158	3	335
5:30 – 5:45	0	0	39	0	0	0	24	62	0	0	96	4	225
5:45 – 6:00	1	0	38	0	0	0	22	52	0	0	98	4	215
Peak Hour	**21**	**0**	**230**	**0**	**0**	**0**	**168**	**451**	**0**	**0**	**761**	**27**	**1658**
App Total	**251**			**0**			**619**			**788**			**1658**

Reference No.: 50000010

Intersection of:

3 & 4 & 843 IN LETHBRIDGE 4-29-21-400001320

2016 AADT / ASDT ESTIMATES

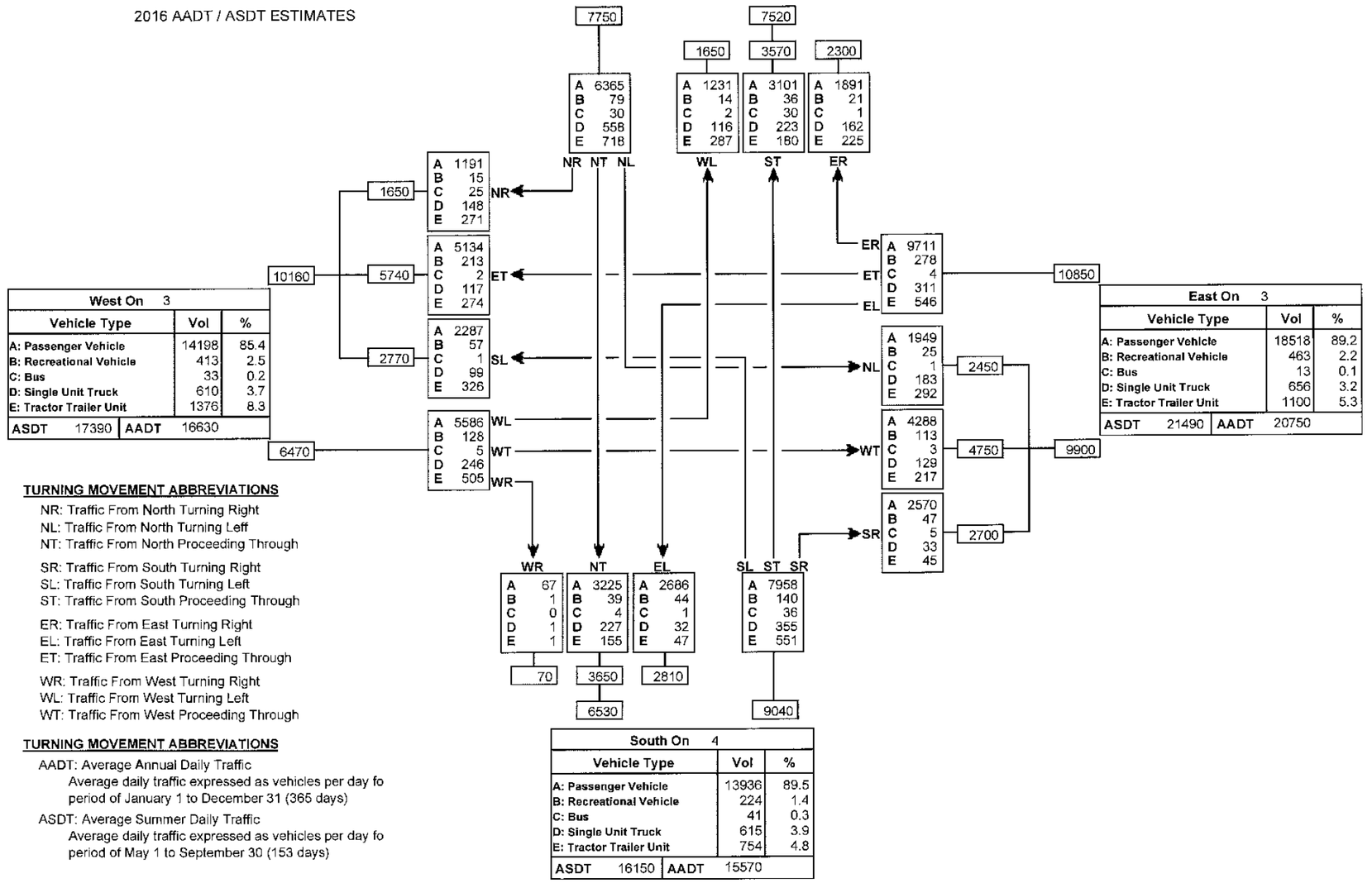
Turning Movement Summary Diagram

North On 843		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	12588	82.4
B: Recreational Vehicle	150	1.0
C: Bus	63	0.4
D: Single Unit Truck	1059	6.9
E: Tractor Trailer Unit	1410	9.2
ASDT 15820	**AADT** 15270	

West On 3		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	14198	85.4
B: Recreational Vehicle	413	2.5
C: Bus	33	0.2
D: Single Unit Truck	610	3.7
E: Tractor Trailer Unit	1376	8.3
ASDT 17390	**AADT** 16630	

East On 3		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	18518	89.2
B: Recreational Vehicle	463	2.2
C: Bus	13	0.1
D: Single Unit Truck	656	3.2
E: Tractor Trailer Unit	1100	5.3
ASDT 21490	**AADT** 20750	

South On 4		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	13936	89.5
B: Recreational Vehicle	224	1.4
C: Bus	41	0.3
D: Single Unit Truck	615	3.9
E: Tractor Trailer Unit	754	4.8
ASDT 16150	**AADT** 15570	



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Leff
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

TURNING MOVEMENT ABBREVIATIONS

AADT: Average Annual Daily Traffic
Average daily traffic expressed as vehicles per day fo period of January 1 to December 31 (365 days)

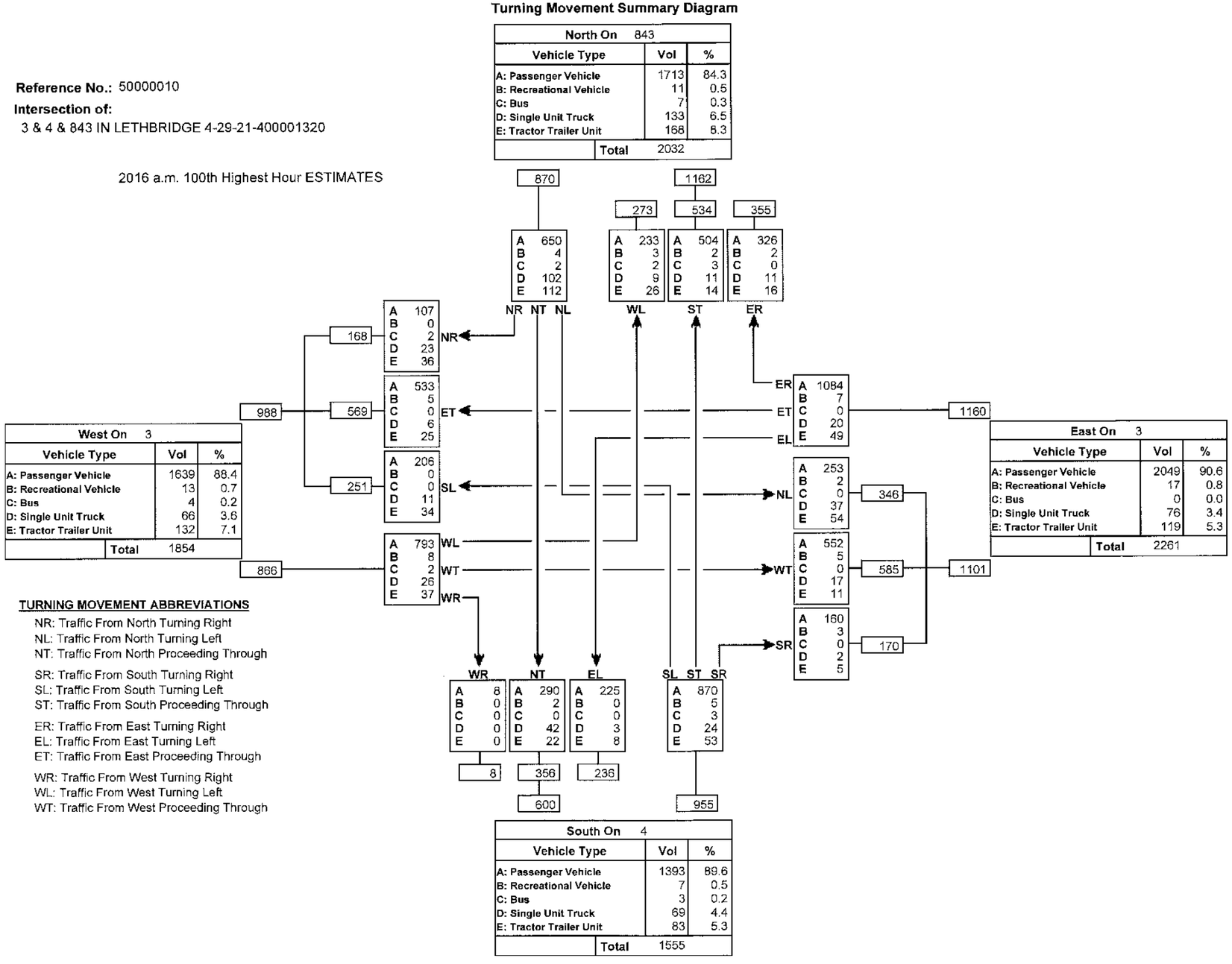
ASDT: Average Summer Daily Traffic
Average daily traffic expressed as vehicles per day fo period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 50000010

Intersection of:
3 & 4 & 843 IN LETHBRIDGE 4-29-21-400001320

2016 a.m. 100th Highest Hour ESTIMATES



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

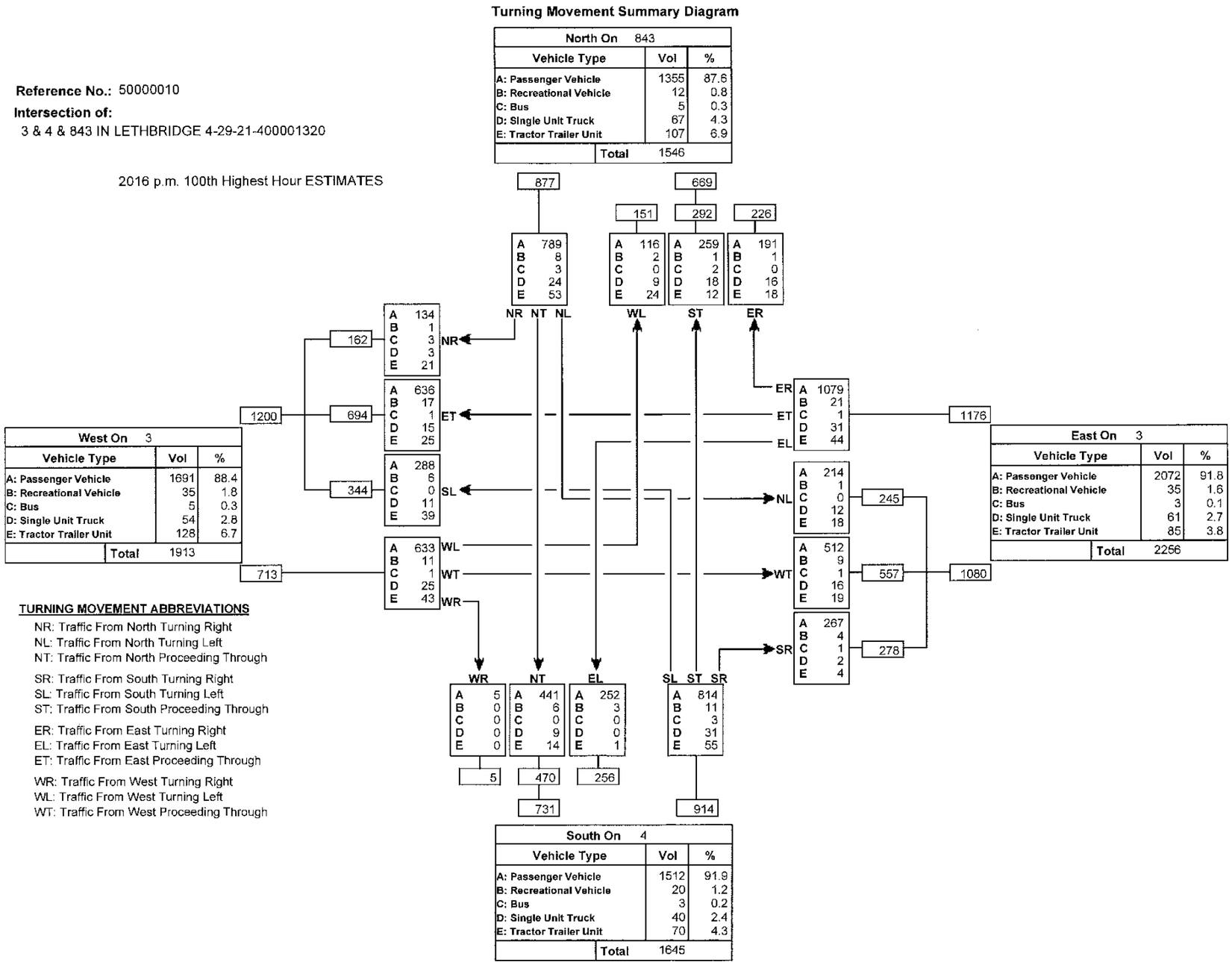
Reference No.: 50000010

Intersection of:

3 & 4 & 843 IN LETHBRIDGE 4-29-21-400001320

2016 p.m. 100th Highest Hour ESTIMATES

Turning Movement Summary Diagram



TURNING MOVEMENT ABBREVIATIONS

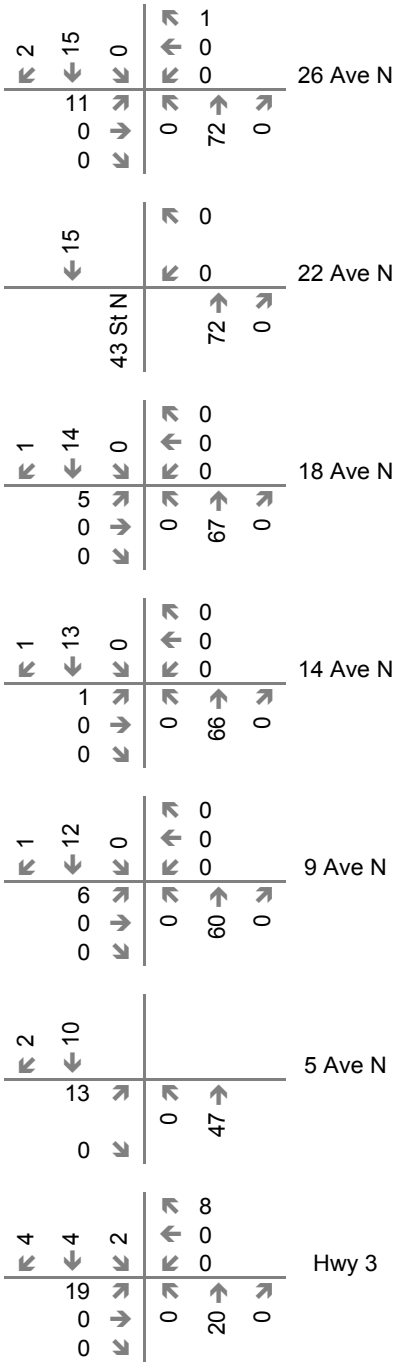
NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
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ST: Traffic From South Proceeding Through

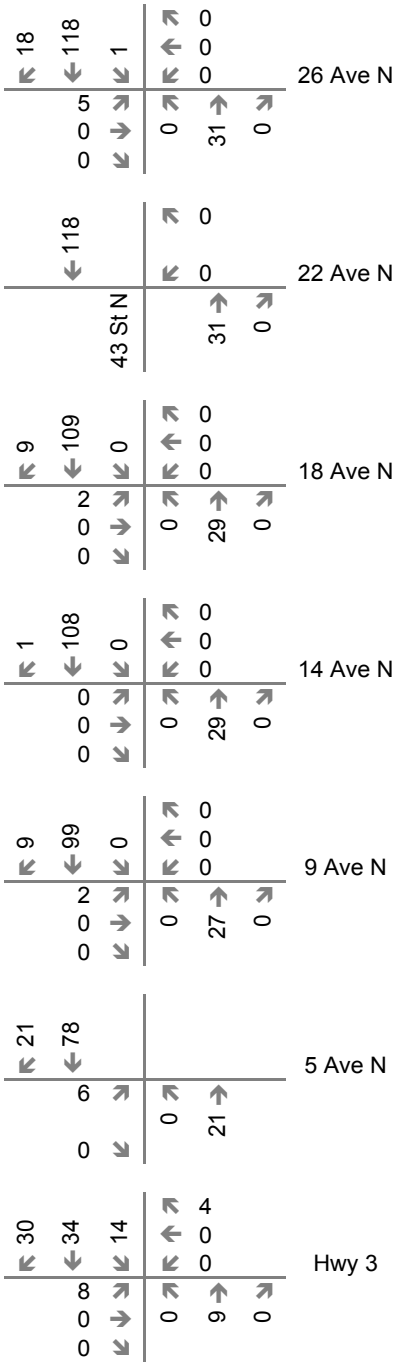
ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

AM Peak Hour



PM Peak Hour



Appendix C

HCM Capacity Analysis Results Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	12	77	18	6	4	188	305	73	11	293	12
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	4	14	0	22	7	5	227	367	0	13	353	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	166	141	120	145	58	41	232	2628	1176	634	1966	879
Arrive On Green	0.08	0.08	0.00	0.08	0.08	0.08	0.14	0.79	0.00	0.59	0.59	0.00
Sat Flow, veh/h	1383	1845	1568	1046	759	542	1660	3312	1482	946	3312	1482
Grp Volume(v), veh/h	4	14	0	22	0	12	227	367	0	13	353	0
Grp Sat Flow(s),veh/h/ln	1383	1845	1568	1046	0	1301	1660	1656	1482	946	1656	1482
Q Serve(g_s), s	0.3	0.7	0.0	2.0	0.0	0.9	13.6	2.6	0.0	0.6	4.8	0.0
Cycle Q Clear(g_c), s	1.1	0.7	0.0	2.7	0.0	0.9	13.6	2.6	0.0	0.6	4.8	0.0
Prop In Lane	1.00		1.00	1.00		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	166	141	120	145	0	99	232	2628	1176	634	1966	879
V/C Ratio(X)	0.02	0.10	0.00	0.15	0.00	0.12	0.98	0.14	0.00	0.02	0.18	0.00
Avail Cap(c_a), veh/h	427	489	416	342	0	345	232	2628	1176	634	1966	879
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.6	43.0	0.0	44.2	0.0	43.0	42.8	2.4	0.0	8.4	9.2	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.0	0.5	0.0	0.5	52.3	0.1	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	0.0	0.6	0.0	0.3	9.6	1.2	0.0	0.2	2.3	0.0
LnGrp Delay(d),s/veh	43.6	43.3	0.0	44.7	0.0	43.6	95.1	2.5	0.0	8.4	9.4	0.0
LnGrp LOS	D	D		D		D	F	A		A	A	
Approach Vol, veh/h		18			34			594			366	
Approach Delay, s/veh		43.4			44.3			37.9			9.4	
Approach LOS		D			D			D			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		85.9		14.1	20.0	65.9		14.1
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		60.5		26.5	14.0	40.5		26.5
Max Q Clear Time (g_c+I1), s		4.6		3.1	15.6	6.8		4.7
Green Ext Time (p_c), s		6.6		0.2	0.0	6.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	27.9
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	19	142	237	585	396	26
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	22	0	272	672	455	30
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	143	66	273	2807	1881	841
Arrive On Green	0.05	0.00	0.16	0.82	0.60	0.60
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	22	0	272	672	455	30
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	0.7	0.0	15.9	4.3	6.8	0.9
Cycle Q Clear(g_c), s	0.7	0.0	15.9	4.3	6.8	0.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	143	66	273	2807	1881	841
V/C Ratio(X)	0.15	0.00	1.00	0.24	0.24	0.04
Avail Cap(c_a), veh/h	580	267	273	2807	1881	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.9	0.0	42.0	1.9	9.2	8.0
Incr Delay (d2), s/veh	0.5	0.0	53.2	0.2	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	11.5	2.0	3.0	0.4
LnGrp Delay(d),s/veh	46.3	0.0	95.2	2.1	9.5	8.1
LnGrp LOS	D		F	A	A	A
Approach Vol, veh/h	22			944	485	
Approach Delay, s/veh	46.3			28.9	9.4	
Approach LOS	D			C	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		88.9		11.1	22.0	66.9		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		68.5		18.5	16.0	46.5		
Max Q Clear Time (g_c+I1), s		6.3		2.7	17.9	8.8		
Green Ext Time (p_c), s		12.3		0.0	0.0	11.3		

Intersection Summary	
HCM 2010 Ctrl Delay	22.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	273	585	8	236	569	355	251	534	170	346	356	168
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	297	636	9	257	618	0	273	580	0	376	387	183
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	398	1022	14	383	971	434	649	741	332	585	804	360
Arrive On Green	0.15	0.31	0.31	0.13	0.29	0.00	0.09	0.23	0.00	0.12	0.26	0.26
Sat Flow, veh/h	1630	3283	46	1660	3312	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	297	315	330	257	618	0	273	580	0	376	387	183
Grp Sat Flow(s),veh/h/ln	1630	1626	1704	1660	1656	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	14.1	18.6	18.6	11.9	18.3	0.0	7.2	18.7	0.0	10.3	11.8	12.5
Cycle Q Clear(g_c), s	14.1	18.6	18.6	11.9	18.3	0.0	7.2	18.7	0.0	10.3	11.8	12.5
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	398	506	530	383	971	434	649	741	332	585	804	360
V/C Ratio(X)	0.75	0.62	0.62	0.67	0.64	0.00	0.42	0.78	0.00	0.64	0.48	0.51
Avail Cap(c_a), veh/h	436	506	530	451	971	434	1065	846	378	891	809	362
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.1	33.1	33.1	24.2	34.6	0.0	29.1	41.0	0.0	29.2	35.5	35.8
Incr Delay (d2), s/veh	6.3	5.7	5.4	3.1	3.2	0.0	0.4	4.3	0.0	1.2	0.4	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	9.1	9.6	5.7	8.8	0.0	3.2	8.9	0.0	4.4	5.2	5.0
LnGrp Delay(d),s/veh	30.4	38.8	38.5	27.3	37.8	0.0	29.5	45.2	0.0	30.4	36.0	37.0
LnGrp LOS	C	D	D	C	D		C	D		C	D	D
Approach Vol, veh/h		942			875			853			946	
Approach Delay, s/veh		36.1			34.7			40.2			33.9	
Approach LOS		D			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.4	42.0	18.7	31.4	22.4	40.0	15.3	34.8
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	13.9	20.6	12.3	20.7	16.1	20.3	9.2	14.5
Green Ext Time (p_c), s	0.5	6.9	1.5	4.7	0.4	7.1	1.1	6.9

Intersection Summary	
HCM 2010 Ctrl Delay	36.1
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	66	168	15	56	3	59	26	17	4	24	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	5	86	218	19	73	4	77	34	22	5	31	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	280	253	33	393	243	45	35	0	0	56	0	0
Stage 1	44	44	-	198	198	-	-	-	-	-	-	-
Stage 2	236	209	-	195	45	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	668	647	1035	563	655	1019	1544	-	-	1464	-	-
Stage 1	965	854	-	799	733	-	-	-	-	-	-	-
Stage 2	763	725	-	802	853	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	581	612	1035	380	619	1019	1544	-	-	1464	-	-
Mov Cap-2 Maneuver	581	612	-	380	619	-	-	-	-	-	-	-
Stage 1	915	851	-	757	695	-	-	-	-	-	-	-
Stage 2	645	687	-	567	850	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	12.8	4.3	1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1544	-	-	859	557	1464	-	-
HCM Lane V/C Ratio	0.05	-	-	0.36	0.173	0.004	-	-
HCM Control Delay (s)	7.5	0	-	11.5	12.8	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.6	0.6	0	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	99	166	88	210	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	12	12	10	10	3	3
Mvmt Flow	6	127	213	113	269	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	813	275	281	0	-	0
Stage 1	275	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Critical Hdwy	6.52	6.32	4.2	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	2.29	-	-	-
Pot Cap-1 Maneuver	335	740	1237	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	273	740	1237	-	-	-
Mov Cap-2 Maneuver	273	-	-	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	462	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	5.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1237	-	684	-	-
HCM Lane V/C Ratio	0.172	-	0.195	-	-
HCM Control Delay (s)	8.5	0	11.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.6	-	0.7	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	2	18	67	236	297	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	55	55	10	10	6	6
Mvmt Flow	2	22	83	291	367	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	832	375	383	0	-	0
Stage 1	375	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Critical Hdwy	6.95	6.75	4.2	-	-	-
Critical Hdwy Stg 1	5.95	-	-	-	-	-
Critical Hdwy Stg 2	5.95	-	-	-	-	-
Follow-up Hdwy	3.995	3.795	2.29	-	-	-
Pot Cap-1 Maneuver	277	569	1133	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	253	569	1133	-	-	-
Mov Cap-2 Maneuver	253	-	-	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	493	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	1.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1133	-	506	-	-
HCM Lane V/C Ratio	0.073	-	0.049	-	-
HCM Control Delay (s)	8.4	0	12.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	5	220	98	11	12	128	301	18	3	355	19
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	16	6	0	122	14	15	160	376	0	4	444	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	201	203	172	227	93	100	188	2418	1082	626	1954	874
Arrive On Green	0.11	0.11	0.00	0.11	0.11	0.11	0.12	0.76	0.00	0.58	0.58	0.00
Sat Flow, veh/h	1323	1792	1524	1404	824	883	1601	3195	1429	956	3374	1509
Grp Volume(v), veh/h	16	6	0	122	0	29	160	376	0	4	444	0
Grp Sat Flow(s),veh/h/ln	1323	1792	1524	1404	0	1707	1601	1597	1429	956	1687	1509
Q Serve(g_s), s	1.1	0.3	0.0	8.5	0.0	1.5	9.8	3.2	0.0	0.2	6.4	0.0
Cycle Q Clear(g_c), s	2.6	0.3	0.0	8.8	0.0	1.5	9.8	3.2	0.0	0.2	6.4	0.0
Prop In Lane	1.00		1.00	1.00		0.52	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	201	203	172	227	0	193	188	2418	1082	626	1954	874
V/C Ratio(X)	0.08	0.03	0.00	0.54	0.00	0.15	0.85	0.16	0.00	0.01	0.23	0.00
Avail Cap(c_a), veh/h	402	475	404	440	0	452	224	2418	1082	626	1954	874
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.2	39.5	0.0	43.4	0.0	40.0	43.2	3.3	0.0	8.9	10.2	0.0
Incr Delay (d2), s/veh	0.2	0.1	0.0	2.0	0.0	0.4	22.3	0.1	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.1	0.0	3.4	0.0	0.7	5.5	1.5	0.0	0.0	3.0	0.0
LnGrp Delay(d),s/veh	41.4	39.5	0.0	45.3	0.0	40.4	65.5	3.5	0.0	8.9	10.5	0.0
LnGrp LOS	D	D		D		D	E	A		A	B	
Approach Vol, veh/h		22			151			536			448	
Approach Delay, s/veh		40.9			44.4			22.0			10.5	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		82.2		17.8	17.8	64.4		17.8
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		60.5		26.5	14.0	40.5		26.5
Max Q Clear Time (g_c+I1), s		5.2		4.6	11.8	8.4		10.8
Green Ext Time (p_c), s		7.7		0.7	0.1	7.1		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.8
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	27	243	204	496	798	36
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	30	0	227	551	887	40
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	185	85	255	2622	2029	908
Arrive On Green	0.06	0.00	0.16	0.81	0.60	0.60
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	30	0	227	551	887	40
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	0.9	0.0	13.8	3.8	14.2	1.1
Cycle Q Clear(g_c), s	0.9	0.0	13.8	3.8	14.2	1.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	185	85	255	2622	2029	908
V/C Ratio(X)	0.16	0.00	0.89	0.21	0.44	0.04
Avail Cap(c_a), veh/h	607	279	259	2622	2029	908
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	41.3	2.1	11.0	8.4
Incr Delay (d2), s/veh	0.4	0.0	29.3	0.2	0.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	8.2	1.8	6.8	0.5
LnGrp Delay(d),s/veh	45.3	0.0	70.6	2.3	11.7	8.5
LnGrp LOS	D		E	A	B	A
Approach Vol, veh/h	30			778	927	
Approach Delay, s/veh	45.3			22.2	11.6	
Approach LOS	D			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		87.8		12.2	21.8	66.1		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		68.5		18.5	16.0	46.5		
Max Q Clear Time (g_c+I1), s		5.8		2.9	15.8	16.2		
Green Ext Time (p_c), s		18.3		0.1	0.0	14.3		

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	151	557	5	256	694	226	344	292	278	245	470	162
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	164	605	5	278	754	0	374	317	0	266	511	176
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	327	1032	9	413	1178	527	619	807	361	734	696	311
Arrive On Green	0.09	0.31	0.31	0.13	0.35	0.00	0.12	0.24	0.00	0.09	0.21	0.21
Sat Flow, veh/h	1645	3336	28	1691	3374	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	164	298	312	278	754	0	374	317	0	266	511	176
Grp Sat Flow(s),veh/h/ln	1645	1641	1722	1691	1687	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	7.1	16.3	16.3	11.7	20.0	0.0	9.2	8.4	0.0	6.8	15.6	11.5
Cycle Q Clear(g_c), s	7.1	16.3	16.3	11.7	20.0	0.0	9.2	8.4	0.0	6.8	15.6	11.5
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	327	507	533	413	1178	527	619	807	361	734	696	311
V/C Ratio(X)	0.50	0.59	0.59	0.67	0.64	0.00	0.60	0.39	0.00	0.36	0.73	0.57
Avail Cap(c_a), veh/h	466	507	533	489	1178	527	997	917	410	1178	884	395
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	31.1	31.1	21.7	29.1	0.0	28.4	34.1	0.0	28.1	39.1	37.5
Incr Delay (d2), s/veh	1.2	4.9	4.7	2.9	2.7	0.0	1.0	0.3	0.0	0.3	2.4	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	8.0	8.4	5.7	9.8	0.0	4.2	4.0	0.0	3.0	7.3	4.8
LnGrp Delay(d),s/veh	23.9	36.0	35.8	24.6	31.8	0.0	29.3	34.4	0.0	28.4	41.5	39.1
LnGrp LOS	C	D	D	C	C		C	C		C	D	D
Approach Vol, veh/h		774			1032			691			953	
Approach Delay, s/veh		33.4			29.8			31.6			37.4	
Approach LOS		C			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.2	40.0	15.0	31.5	15.9	44.3	17.7	28.8
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	13.7	18.3	8.8	10.4	9.1	22.0	11.2	17.6
Green Ext Time (p_c), s	0.5	8.4	1.1	6.8	0.4	6.9	1.5	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	33.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	34	161	8	72	0	223	29	36	7	36	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	4	37	173	9	77	0	240	31	39	8	39	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	629	609	45	695	596	51	51	0	0	70	0	0
Stage 1	60	60	-	530	530	-	-	-	-	-	-	-
Stage 2	569	549	-	165	66	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	392	407	1019	354	414	1011	1524	-	-	1446	-	-
Stage 1	946	841	-	529	523	-	-	-	-	-	-	-
Stage 2	504	513	-	832	836	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	283	338	1019	235	344	1011	1524	-	-	1446	-	-
Mov Cap-2 Maneuver	283	338	-	235	344	-	-	-	-	-	-	-
Stage 1	790	836	-	442	437	-	-	-	-	-	-	-
Stage 2	346	428	-	656	831	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	19.8	6	1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1524	-	-	730	329	1446	-	-
HCM Lane V/C Ratio	0.157	-	-	0.293	0.261	0.005	-	-
HCM Control Delay (s)	7.8	0	-	12	19.8	7.5	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.6	-	-	1.2	1	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	16	159	94	236	140	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	9	9	9	9	8	8
Mvmt Flow	19	185	109	274	163	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	658	165	166	0	-	0
Stage 1	165	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	418	862	1371	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	600	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	379	862	1371	-	-	-
Mov Cap-2 Maneuver	379	-	-	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	544	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	2.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1371	-	772	-	-
HCM Lane V/C Ratio	0.08	-	0.264	-	-
HCM Control Delay (s)	7.9	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.1	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	12	79	15	339	286	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	3	3	9	9	10	10
Mvmt Flow	14	95	18	408	345	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	791	346	347	0	-	0
Stage 1	346	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.19	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.281	-	-	-
Pot Cap-1 Maneuver	357	695	1174	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	644	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	350	695	1174	-	-	-
Mov Cap-2 Maneuver	350	-	-	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	631	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1174	-	615	-	-
HCM Lane V/C Ratio	0.015	-	0.178	-	-
HCM Control Delay (s)	8.1	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	13	81	19	7	5	198	381	77	12	320	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	12	16	0	23	8	6	239	459	0	14	386	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	174	154	131	151	62	47	232	2605	1165	582	1942	869
Arrive On Green	0.08	0.08	0.00	0.08	0.08	0.08	0.14	0.79	0.00	0.59	0.59	0.00
Sat Flow, veh/h	1380	1845	1568	1044	742	557	1660	3312	1482	869	3312	1482
Grp Volume(v), veh/h	12	16	0	23	0	14	239	459	0	14	386	0
Grp Sat Flow(s),veh/h/ln	1380	1845	1568	1044	0	1299	1660	1656	1482	869	1656	1482
Q Serve(g_s), s	0.8	0.8	0.0	2.1	0.0	1.0	14.0	3.4	0.0	0.7	5.5	0.0
Cycle Q Clear(g_c), s	1.8	0.8	0.0	2.9	0.0	1.0	14.0	3.4	0.0	0.7	5.5	0.0
Prop In Lane	1.00		1.00	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	174	154	131	151	0	109	232	2605	1165	582	1942	869
V/C Ratio(X)	0.07	0.10	0.00	0.15	0.00	0.13	1.03	0.18	0.00	0.02	0.20	0.00
Avail Cap(c_a), veh/h	424	489	416	340	0	344	232	2605	1165	582	1942	869
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.3	42.4	0.0	43.7	0.0	42.5	43.0	2.6	0.0	8.7	9.7	0.0
Incr Delay (d2), s/veh	0.2	0.3	0.0	0.5	0.0	0.5	66.6	0.1	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.4	0.0	0.6	0.0	0.4	10.7	1.6	0.0	0.2	2.5	0.0
LnGrp Delay(d),s/veh	43.5	42.7	0.0	44.2	0.0	43.0	109.7	2.8	0.0	8.8	9.9	0.0
LnGrp LOS	D	D		D		D	F	A		A	A	
Approach Vol, veh/h		28			37			698			400	
Approach Delay, s/veh		43.0			43.7			39.4			9.9	
Approach LOS		D			D			D			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		85.1		14.9	20.0	65.1		14.9
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		60.5		26.5	14.0	40.5		26.5
Max Q Clear Time (g_c+I1), s		5.4		3.8	16.0	7.5		4.9
Green Ext Time (p_c), s		8.1		0.3	0.0	7.6		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	33	150	249	662	426	30
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	38	0	286	761	490	34
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	204	94	273	2741	1820	814
Arrive On Green	0.07	0.00	0.16	0.80	0.58	0.58
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	38	0	286	761	490	34
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	1.1	0.0	16.0	5.6	7.8	1.0
Cycle Q Clear(g_c), s	1.1	0.0	16.0	5.6	7.8	1.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	204	94	273	2741	1820	814
V/C Ratio(X)	0.19	0.00	1.05	0.28	0.27	0.04
Avail Cap(c_a), veh/h	580	267	273	2741	1820	814
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.2	0.0	42.0	2.5	10.2	8.8
Incr Delay (d2), s/veh	0.4	0.0	67.3	0.3	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	12.6	2.6	3.4	0.4
LnGrp Delay(d),s/veh	44.7	0.0	109.3	2.7	10.6	8.9
LnGrp LOS	D		F	A	B	A
Approach Vol, veh/h	38			1047	524	
Approach Delay, s/veh	44.7			31.8	10.5	
Approach LOS	D			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		87.0		13.0	22.0	65.0		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		68.5		18.5	16.0	46.5		
Max Q Clear Time (g_c+I1), s		7.6		3.1	18.0	9.8		
Green Ext Time (p_c), s		14.4		0.1	0.0	12.9		

Intersection Summary	
HCM 2010 Ctrl Delay	25.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	306	615	9	248	598	381	264	581	179	366	378	181
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	333	668	10	270	650	0	287	632	0	398	411	197
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	400	1015	15	378	937	419	635	737	330	563	806	361
Arrive On Green	0.16	0.31	0.31	0.13	0.28	0.00	0.09	0.22	0.00	0.13	0.26	0.26
Sat Flow, veh/h	1630	3280	49	1660	3312	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	333	331	347	270	650	0	287	632	0	398	411	197
Grp Sat Flow(s),veh/h/ln	1630	1626	1703	1660	1656	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	16.7	20.6	20.6	13.2	20.4	0.0	7.9	21.6	0.0	11.2	13.1	14.2
Cycle Q Clear(g_c), s	16.7	20.6	20.6	13.2	20.4	0.0	7.9	21.6	0.0	11.2	13.1	14.2
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	400	503	527	378	937	419	635	737	330	563	806	361
V/C Ratio(X)	0.83	0.66	0.66	0.71	0.69	0.00	0.45	0.86	0.00	0.71	0.51	0.55
Avail Cap(c_a), veh/h	404	503	527	426	937	419	1018	816	365	831	806	361
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	34.9	34.9	25.8	37.3	0.0	30.2	43.4	0.0	30.5	37.1	37.5
Incr Delay (d2), s/veh	13.6	6.6	6.3	4.9	4.2	0.0	0.5	8.4	0.0	1.6	0.5	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	10.1	10.6	6.5	9.9	0.0	3.5	10.6	0.0	4.8	5.7	5.6
LnGrp Delay(d),s/veh	39.6	41.5	41.3	30.7	41.6	0.0	30.7	51.8	0.0	32.1	37.6	39.2
LnGrp LOS	D	D	D	C	D		C	D		C	D	D
Approach Vol, veh/h		1011			920			919			1006	
Approach Delay, s/veh		40.8			38.4			45.2			35.8	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.6	43.1	19.7	32.2	24.7	40.0	16.0	36.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	15.2	22.6	13.2	23.6	18.7	22.4	9.9	16.2
Green Ext Time (p_c), s	0.4	6.4	1.5	2.6	0.1	6.5	1.2	6.9

Intersection Summary	
HCM 2010 Ctrl Delay	40.0
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	9.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	70	177	16	59	5	62	100	18	5	41	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	21	91	230	21	77	6	81	130	23	6	53	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	414	384	57	534	377	142	61	0	0	153	0	0
Stage 1	70	70	-	303	303	-	-	-	-	-	-	-
Stage 2	344	314	-	231	74	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	545	546	1004	454	551	900	1511	-	-	1346	-	-
Stage 1	935	833	-	702	660	-	-	-	-	-	-	-
Stage 2	667	653	-	767	829	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	457	511	1004	288	516	900	1511	-	-	1346	-	-
Mov Cap-2 Maneuver	457	511	-	288	516	-	-	-	-	-	-	-
Stage 1	880	829	-	661	621	-	-	-	-	-	-	-
Stage 2	546	614	-	524	825	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	15.2	2.6	0.7
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1511	-	-	755	456	1346	-	-
HCM Lane V/C Ratio	0.053	-	-	0.452	0.228	0.005	-	-
HCM Control Delay (s)	7.5	0	-	13.6	15.2	7.7	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.4	0.9	0	-	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	11	104	175	160	235	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	12	12	10	10	3	3
Mvmt Flow	14	133	224	205	301	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	962	308	315	0	-	0
Stage 1	308	-	-	-	-	-
Stage 2	654	-	-	-	-	-
Critical Hdwy	6.52	6.32	4.2	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	2.29	-	-	-
Pot Cap-1 Maneuver	272	709	1201	-	-	-
Stage 1	723	-	-	-	-	-
Stage 2	499	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	215	709	1201	-	-	-
Mov Cap-2 Maneuver	215	-	-	-	-	-
Stage 1	723	-	-	-	-	-
Stage 2	394	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	4.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1201	-	581	-	-
HCM Lane V/C Ratio	0.187	-	0.254	-	-
HCM Control Delay (s)	8.7	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.7	-	1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	4	19	71	314	325	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	55	55	10	10	6	6
Mvmt Flow	5	23	88	388	401	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	973	410	420	0	-	0
Stage 1	410	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Critical Hdwy	6.95	6.75	4.2	-	-	-
Critical Hdwy Stg 1	5.95	-	-	-	-	-
Critical Hdwy Stg 2	5.95	-	-	-	-	-
Follow-up Hdwy	3.995	3.795	2.29	-	-	-
Pot Cap-1 Maneuver	225	542	1097	-	-	-
Stage 1	570	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	202	542	1097	-	-	-
Mov Cap-2 Maneuver	202	-	-	-	-	-
Stage 1	570	-	-	-	-	-
Stage 2	429	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1097	-	419	-	-
HCM Lane V/C Ratio	0.08	-	0.068	-	-
HCM Control Delay (s)	8.6	0	14.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	6	231	103	12	13	135	344	19	4	472	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	20	8	0	129	15	16	169	430	0	5	590	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	209	215	183	234	99	106	197	2396	1072	588	1912	856
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.12	0.12	0.75	0.00	0.57	0.57	0.00
Sat Flow, veh/h	1321	1792	1524	1402	826	881	1601	3195	1429	909	3374	1509
Grp Volume(v), veh/h	20	8	0	129	0	31	169	430	0	5	590	0
Grp Sat Flow(s),veh/h/ln	1321	1792	1524	1402	0	1707	1601	1597	1429	909	1687	1509
Q Serve(g_s), s	1.4	0.4	0.0	9.0	0.0	1.6	10.3	3.9	0.0	0.2	9.2	0.0
Cycle Q Clear(g_c), s	3.0	0.4	0.0	9.4	0.0	1.6	10.3	3.9	0.0	0.2	9.2	0.0
Prop In Lane	1.00		1.00	1.00		0.52	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	209	215	183	234	0	205	197	2396	1072	588	1912	856
V/C Ratio(X)	0.10	0.04	0.00	0.55	0.00	0.15	0.86	0.18	0.00	0.01	0.31	0.00
Avail Cap(c_a), veh/h	401	475	404	438	0	452	224	2396	1072	588	1912	856
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.8	38.9	0.0	43.0	0.0	39.4	43.0	3.6	0.0	9.4	11.4	0.0
Incr Delay (d2), s/veh	0.2	0.1	0.0	2.0	0.0	0.3	24.3	0.2	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	0.0	3.6	0.0	0.8	5.9	1.7	0.0	0.1	4.4	0.0
LnGrp Delay(d),s/veh	41.0	39.0	0.0	45.0	0.0	39.8	67.2	3.8	0.0	9.5	11.8	0.0
LnGrp LOS	D	D		D		D	E	A		A	B	
Approach Vol, veh/h		28			160			599			595	
Approach Delay, s/veh		40.4			44.0			21.7			11.8	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		81.5		18.5	18.3	63.2		18.5
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		60.5		26.5	14.0	40.5		26.5
Max Q Clear Time (g_c+I1), s		5.9		5.0	12.3	11.2		11.4
Green Ext Time (p_c), s		10.3		0.8	0.1	9.1		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.4
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	256	215	542	916	59
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	39	0	239	602	1018	66
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	217	100	259	2591	1988	890
Arrive On Green	0.07	0.00	0.16	0.80	0.58	0.58
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	39	0	239	602	1018	66
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	1.1	0.0	14.6	4.5	17.7	1.9
Cycle Q Clear(g_c), s	1.1	0.0	14.6	4.5	17.7	1.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	217	100	259	2591	1988	890
V/C Ratio(X)	0.18	0.00	0.92	0.23	0.51	0.07
Avail Cap(c_a), veh/h	607	279	259	2591	1988	890
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.1	0.0	41.4	2.4	12.4	9.1
Incr Delay (d2), s/veh	0.4	0.0	36.3	0.2	0.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	9.1	2.0	8.6	0.8
LnGrp Delay(d),s/veh	44.5	0.0	77.7	2.6	13.3	9.2
LnGrp LOS	D		E	A	B	A
Approach Vol, veh/h	39			841	1084	
Approach Delay, s/veh	44.5			23.9	13.0	
Approach LOS	D			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		86.9		13.1	22.0	64.9		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		68.5		18.5	16.0	46.5		
Max Q Clear Time (g_c+I1), s		6.5		3.1	16.6	19.7		
Green Ext Time (p_c), s		22.7		0.1	0.0	15.5		

Intersection Summary	
HCM 2010 Ctrl Delay	18.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	167	585	6	269	729	242	362	316	292	272	528	201
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	182	636	7	292	792	0	393	343	0	296	574	218
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	310	989	11	397	1144	512	604	841	376	744	737	330
Arrive On Green	0.10	0.30	0.30	0.14	0.34	0.00	0.12	0.25	0.00	0.10	0.23	0.23
Sat Flow, veh/h	1645	3325	37	1691	3374	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	182	314	329	292	792	0	393	343	0	296	574	218
Grp Sat Flow(s),veh/h/ln	1645	1641	1721	1691	1687	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	8.4	18.4	18.5	12.9	22.5	0.0	9.9	9.4	0.0	7.7	18.4	15.1
Cycle Q Clear(g_c), s	8.4	18.4	18.5	12.9	22.5	0.0	9.9	9.4	0.0	7.7	18.4	15.1
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	310	488	512	397	1144	512	604	841	376	744	737	330
V/C Ratio(X)	0.59	0.64	0.64	0.73	0.69	0.00	0.65	0.41	0.00	0.40	0.78	0.66
Avail Cap(c_a), veh/h	433	488	512	452	1144	512	946	881	394	1145	850	380
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	33.9	33.9	23.6	31.7	0.0	29.0	34.8	0.0	28.1	40.3	39.0
Incr Delay (d2), s/veh	1.8	6.4	6.1	5.3	3.5	0.0	1.2	0.3	0.0	0.3	4.1	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	9.2	9.6	6.6	11.0	0.0	4.5	4.4	0.0	3.4	8.7	6.4
LnGrp Delay(d),s/veh	26.7	40.3	40.0	28.9	35.1	0.0	30.2	35.1	0.0	28.5	44.4	42.5
LnGrp LOS	C	D	D	C	D		C	D		C	D	D
Approach Vol, veh/h		825			1084			736			1088	
Approach Delay, s/veh		37.2			33.5			32.5			39.7	
Approach LOS		D			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.4	40.0	15.9	33.7	16.7	44.6	18.4	31.2
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	14.9	20.5	9.7	11.4	10.4	24.5	11.9	20.4
Green Ext Time (p_c), s	0.5	7.9	1.2	7.5	0.4	5.8	1.6	4.8

Intersection Summary	
HCM 2010 Ctrl Delay	35.9
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	36	170	10	76	0	235	62	38	9	156	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	11	39	183	11	82	0	253	67	41	10	168	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	836	816	184	906	811	87	200	0	0	108	0	0
Stage 1	203	203	-	592	592	-	-	-	-	-	-	-
Stage 2	633	613	-	314	219	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	284	309	853	255	311	966	1343	-	-	1400	-	-
Stage 1	794	730	-	489	491	-	-	-	-	-	-	-
Stage 2	464	480	-	693	718	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	179	245	853	149	247	966	1343	-	-	1400	-	-
Mov Cap-2 Maneuver	179	245	-	149	247	-	-	-	-	-	-	-
Stage 1	634	724	-	391	392	-	-	-	-	-	-	-
Stage 2	293	384	-	511	712	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	31	5.8	0.4
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1343	-	-	537	229	1400	-	-
HCM Lane V/C Ratio	0.188	-	-	0.433	0.404	0.007	-	-
HCM Control Delay (s)	8.3	0	-	16.7	31	7.6	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.7	-	-	2.2	1.8	0	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	19	167	101	277	256	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	9	9	9	9	8	8
Mvmt Flow	22	194	117	322	298	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	862	305	313	0	-	0
Stage 1	305	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	317	719	1209	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	280	719	1209	-	-	-
Mov Cap-2 Maneuver	280	-	-	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	494	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.9	2.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1209	-	620	-	-
HCM Lane V/C Ratio	0.097	-	0.349	-	-
HCM Control Delay (s)	8.3	0	13.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.6	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	13	83	16	385	409	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	3	3	9	9	10	10
Mvmt Flow	16	100	19	464	493	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	997	495	498	0	-	0
Stage 1	495	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.19	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.281	-	-	-
Pot Cap-1 Maneuver	269	573	1031	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	262	573	1031	-	-	-
Mov Cap-2 Maneuver	262	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	591	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.5	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1031	-	494	-	-
HCM Lane V/C Ratio	0.019	-	0.234	-	-
HCM Control Delay (s)	8.6	0	14.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	14	87	21	7	5	212	404	83	13	342	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	12	17	0	25	8	6	255	487	0	16	412	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	175	157	133	152	63	47	293	2600	1163	537	1818	813
Arrive On Green	0.08	0.08	0.00	0.08	0.08	0.08	0.18	0.79	0.00	0.55	0.55	0.00
Sat Flow, veh/h	1380	1845	1568	1043	742	557	1660	3312	1482	847	3312	1482
Grp Volume(v), veh/h	12	17	0	25	0	14	255	487	0	16	412	0
Grp Sat Flow(s),veh/h/ln	1380	1845	1568	1043	0	1299	1660	1656	1482	847	1656	1482
Q Serve(g_s), s	0.8	0.9	0.0	2.3	0.0	1.0	15.0	3.7	0.0	0.9	6.4	0.0
Cycle Q Clear(g_c), s	1.8	0.9	0.0	3.1	0.0	1.0	15.0	3.7	0.0	0.9	6.4	0.0
Prop In Lane	1.00		1.00	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	175	157	133	152	0	110	293	2600	1163	537	1818	813
V/C Ratio(X)	0.07	0.11	0.00	0.16	0.00	0.13	0.87	0.19	0.00	0.03	0.23	0.00
Avail Cap(c_a), veh/h	424	489	416	339	0	344	432	2600	1163	537	1818	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.2	42.3	0.0	43.7	0.0	42.3	40.1	2.7	0.0	10.4	11.6	0.0
Incr Delay (d2), s/veh	0.2	0.3	0.0	0.5	0.0	0.5	12.3	0.2	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.4	0.0	0.7	0.0	0.4	7.9	1.7	0.0	0.2	3.0	0.0
LnGrp Delay(d),s/veh	43.3	42.6	0.0	44.2	0.0	42.8	52.4	2.9	0.0	10.5	11.9	0.0
LnGrp LOS	D	D		D		D	D	A		B	B	
Approach Vol, veh/h		29			39			742			428	
Approach Delay, s/veh		42.9			43.7			19.9			11.9	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		85.0		15.0	23.6	61.4		15.0
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		60.5		26.5	26.0	28.5		26.5
Max Q Clear Time (g_c+I1), s		5.7		3.8	17.0	8.4		5.1
Green Ext Time (p_c), s		8.8		0.3	0.7	6.9		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	160	267	706	456	32
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	40	0	307	811	524	37
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	210	97	352	2734	1671	748
Arrive On Green	0.07	0.00	0.21	0.80	0.54	0.54
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	40	0	307	811	524	37
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	1.2	0.0	17.4	6.2	9.4	1.3
Cycle Q Clear(g_c), s	1.2	0.0	17.4	6.2	9.4	1.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	210	97	352	2734	1671	748
V/C Ratio(X)	0.19	0.00	0.87	0.30	0.31	0.05
Avail Cap(c_a), veh/h	360	166	615	2734	1671	748
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.1	0.0	38.4	2.5	12.9	11.0
Incr Delay (d2), s/veh	0.4	0.0	6.8	0.3	0.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	8.9	2.9	4.1	0.5
LnGrp Delay(d),s/veh	44.5	0.0	45.3	2.8	13.4	11.1
LnGrp LOS	D		D	A	B	B
Approach Vol, veh/h	40			1118	561	
Approach Delay, s/veh	44.5			14.5	13.2	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		86.8		13.2	26.6	60.2		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		75.5		11.5	36.0	33.5		
Max Q Clear Time (g_c+I1), s		8.2		3.2	19.4	11.4		
Green Ext Time (p_c), s		16.2		0.1	1.2	11.1		

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	327	659	9	266	641	408	283	621	192	392	405	193
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	355	716	10	289	697	0	308	675	0	426	440	210
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	380	973	14	364	921	412	634	746	334	561	818	366
Arrive On Green	0.16	0.30	0.30	0.14	0.28	0.00	0.10	0.23	0.00	0.13	0.26	0.26
Sat Flow, veh/h	1630	3284	46	1660	3312	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	355	354	372	289	697	0	308	675	0	426	440	210
Grp Sat Flow(s),veh/h/ln	1630	1626	1704	1660	1656	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	18.6	23.3	23.3	14.5	22.8	0.0	8.5	23.8	0.0	12.2	14.3	15.4
Cycle Q Clear(g_c), s	18.6	23.3	23.3	14.5	22.8	0.0	8.5	23.8	0.0	12.2	14.3	15.4
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	380	482	505	364	921	412	634	746	334	561	818	366
V/C Ratio(X)	0.93	0.74	0.74	0.79	0.76	0.00	0.49	0.91	0.00	0.76	0.54	0.57
Avail Cap(c_a), veh/h	380	482	505	394	921	412	989	802	359	800	818	366
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.7	37.6	37.6	27.4	39.2	0.0	30.4	44.6	0.0	30.7	37.7	38.2
Incr Delay (d2), s/veh	29.9	9.6	9.2	10.0	5.8	0.0	0.6	13.2	0.0	2.6	0.7	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	11.7	12.2	7.6	11.2	0.0	3.8	12.2	0.0	5.2	6.3	6.2
LnGrp Delay(d),s/veh	57.6	47.2	46.8	37.4	45.0	0.0	31.0	57.9	0.0	33.4	38.4	40.3
LnGrp LOS	E	D	D	D	D		C	E		C	D	D
Approach Vol, veh/h		1081			986			983			1076	
Approach Delay, s/veh		50.5			42.8			49.4			36.8	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.8	42.2	20.7	33.0	25.0	40.0	16.8	36.9
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	16.5	25.3	14.2	25.8	20.6	24.8	10.5	17.4
Green Ext Time (p_c), s	0.3	5.3	1.6	1.2	0.0	5.6	1.2	6.8

Intersection Summary	
HCM 2010 Ctrl Delay	44.8
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	75	189	17	63	5	67	102	20	5	42	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	21	97	245	22	82	6	87	132	26	6	55	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	435	403	58	562	394	145	62	0	0	158	0	0
Stage 1	71	71	-	319	319	-	-	-	-	-	-	-
Stage 2	364	332	-	243	75	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	528	533	1002	435	539	897	1510	-	-	1341	-	-
Stage 1	934	832	-	688	649	-	-	-	-	-	-	-
Stage 2	651	641	-	756	829	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	436	497	1002	265	503	897	1510	-	-	1341	-	-
Mov Cap-2 Maneuver	436	497	-	265	503	-	-	-	-	-	-	-
Stage 1	875	828	-	645	608	-	-	-	-	-	-	-
Stage 2	524	601	-	501	825	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	16	2.7	0.7
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1510	-	-	744	436	1341	-	-
HCM Lane V/C Ratio	0.058	-	-	0.489	0.253	0.005	-	-
HCM Control Delay (s)	7.5	0	-	14.4	16	7.7	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.7	1	0	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	11	112	187	166	251	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	12	12	10	10	3	3
Mvmt Flow	14	144	240	213	322	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1021	329	337	0	-	0
Stage 1	329	-	-	-	-	-
Stage 2	692	-	-	-	-	-
Critical Hdwy	6.52	6.32	4.2	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	2.29	-	-	-
Pot Cap-1 Maneuver	251	690	1179	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	193	690	1179	-	-	-
Mov Cap-2 Maneuver	193	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	368	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.9	4.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1179	-	561	-	-
HCM Lane V/C Ratio	0.203	-	0.281	-	-
HCM Control Delay (s)	8.8	0	13.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.8	-	1.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	4	21	76	332	348	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	55	55	10	10	6	6
Mvmt Flow	5	26	94	410	430	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1038	440	449	0	-	0
Stage 1	440	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Critical Hdwy	6.95	6.75	4.2	-	-	-
Critical Hdwy Stg 1	5.95	-	-	-	-	-
Critical Hdwy Stg 2	5.95	-	-	-	-	-
Follow-up Hdwy	3.995	3.795	2.29	-	-	-
Pot Cap-1 Maneuver	205	520	1070	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	459	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	182	520	1070	-	-	-
Mov Cap-2 Maneuver	182	-	-	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	407	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1070	-	401	-	-
HCM Lane V/C Ratio	0.088	-	0.077	-	-
HCM Control Delay (s)	8.7	0	14.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	6	248	111	13	14	144	366	21	4	499	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	21	8	0	139	16	18	180	458	0	5	624	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	216	227	193	244	102	114	214	2374	1062	559	1855	830
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.13	0.74	0.00	0.55	0.55	0.00
Sat Flow, veh/h	1317	1792	1524	1402	802	902	1601	3195	1429	886	3374	1509
Grp Volume(v), veh/h	21	8	0	139	0	34	180	458	0	5	624	0
Grp Sat Flow(s),veh/h/ln	1317	1792	1524	1402	0	1704	1601	1597	1429	886	1687	1509
Q Serve(g_s), s	1.4	0.4	0.0	9.7	0.0	1.8	11.0	4.3	0.0	0.3	10.2	0.0
Cycle Q Clear(g_c), s	3.2	0.4	0.0	10.0	0.0	1.8	11.0	4.3	0.0	0.3	10.2	0.0
Prop In Lane	1.00		1.00	1.00		0.53	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	216	227	193	244	0	216	214	2374	1062	559	1855	830
V/C Ratio(X)	0.10	0.04	0.00	0.57	0.00	0.16	0.84	0.19	0.00	0.01	0.34	0.00
Avail Cap(c_a), veh/h	371	439	373	410	0	417	368	2374	1062	559	1855	830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.3	38.3	0.0	42.7	0.0	38.9	42.3	3.9	0.0	10.2	12.4	0.0
Incr Delay (d2), s/veh	0.2	0.1	0.0	2.1	0.0	0.3	8.7	0.2	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	0.0	3.9	0.0	0.9	5.4	1.9	0.0	0.1	4.9	0.0
LnGrp Delay(d),s/veh	40.5	38.3	0.0	44.8	0.0	39.2	51.0	4.0	0.0	10.2	12.9	0.0
LnGrp LOS	D	D		D		D	D	A		B	B	
Approach Vol, veh/h		29			173			638			629	
Approach Delay, s/veh		39.9			43.7			17.3			12.9	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		80.8		19.2	19.3	61.5		19.2
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		62.5		24.5	23.0	33.5		24.5
Max Q Clear Time (g_c+I1), s		6.3		5.2	13.0	12.2		12.0
Green Ext Time (p_c), s		11.3		0.8	0.5	8.6		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	19.0
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	37	274	230	579	976	62
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	41	0	256	643	1084	69
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	223	103	292	2585	1912	855
Arrive On Green	0.07	0.00	0.18	0.80	0.56	0.56
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	41	0	256	643	1084	69
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	1.2	0.0	15.4	4.9	20.5	2.1
Cycle Q Clear(g_c), s	1.2	0.0	15.4	4.9	20.5	2.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	223	103	292	2585	1912	855
V/C Ratio(X)	0.18	0.00	0.88	0.25	0.57	0.08
Avail Cap(c_a), veh/h	328	151	420	2585	1912	855
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.0	0.0	39.9	2.4	14.1	10.1
Incr Delay (d2), s/veh	0.4	0.0	13.6	0.2	1.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	8.0	2.2	9.8	0.9
LnGrp Delay(d),s/veh	44.4	0.0	53.5	2.7	15.3	10.3
LnGrp LOS	D		D	A	B	B
Approach Vol, veh/h	41			899	1153	
Approach Delay, s/veh	44.4			17.2	15.0	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		86.7		13.3	24.1	62.6		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	26.0	45.0		
Max Q Clear Time (g_c+I1), s		6.9		3.2	17.4	22.5		
Green Ext Time (p_c), s		26.2		0.0	0.7	14.8		

Intersection Summary	
HCM 2010 Ctrl Delay	16.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	178	627	6	288	781	259	387	338	313	290	563	213
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	193	682	7	313	849	0	421	367	0	315	612	232
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	295	957	10	385	1120	501	603	859	384	744	749	335
Arrive On Green	0.10	0.29	0.29	0.15	0.33	0.00	0.13	0.25	0.00	0.10	0.23	0.23
Sat Flow, veh/h	1645	3328	34	1691	3374	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	193	336	353	313	849	0	421	367	0	315	612	232
Grp Sat Flow(s),veh/h/ln	1645	1641	1721	1691	1687	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	9.3	21.1	21.1	14.5	25.8	0.0	10.9	10.4	0.0	8.5	20.5	16.8
Cycle Q Clear(g_c), s	9.3	21.1	21.1	14.5	25.8	0.0	10.9	10.4	0.0	8.5	20.5	16.8
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	295	472	495	385	1120	501	603	859	384	744	749	335
V/C Ratio(X)	0.65	0.71	0.71	0.81	0.76	0.00	0.70	0.43	0.00	0.42	0.82	0.69
Avail Cap(c_a), veh/h	399	472	495	417	1120	501	902	859	384	1109	822	368
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	36.7	36.7	25.4	34.2	0.0	29.8	35.8	0.0	28.7	41.9	40.5
Incr Delay (d2), s/veh	2.5	8.9	8.5	11.0	4.8	0.0	1.5	0.3	0.0	0.4	6.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	10.7	11.2	7.9	12.8	0.0	5.0	4.9	0.0	3.7	9.8	7.2
LnGrp Delay(d),s/veh	29.4	45.5	45.1	36.4	39.0	0.0	31.3	36.1	0.0	29.1	47.9	45.4
LnGrp LOS	C	D	D	D	D		C	D		C	D	D
Approach Vol, veh/h		882			1162			788			1159	
Approach Delay, s/veh		41.8			38.3			33.6			42.3	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.8	40.0	16.7	35.2	17.7	45.1	19.5	32.4
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	16.5	23.1	10.5	12.4	11.3	27.8	12.9	22.5
Green Ext Time (p_c), s	0.3	6.9	1.3	7.8	0.4	4.0	1.7	4.0

Intersection Summary	
HCM 2010 Ctrl Delay	39.3
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	11

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	39	182	9	81	0	251	64	41	9	159	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	11	42	196	10	87	0	270	69	44	10	171	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	881	860	188	957	855	91	204	0	0	113	0	0
Stage 1	207	207	-	631	631	-	-	-	-	-	-	-
Stage 2	674	653	-	326	224	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	265	291	849	235	293	961	1338	-	-	1394	-	-
Stage 1	790	727	-	466	471	-	-	-	-	-	-	-
Stage 2	441	461	-	682	715	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	156	226	849	129	228	961	1338	-	-	1394	-	-
Mov Cap-2 Maneuver	156	226	-	129	228	-	-	-	-	-	-	-
Stage 1	619	721	-	365	369	-	-	-	-	-	-	-
Stage 2	264	361	-	490	709	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.5	35.5	5.9	0.3
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1338	-	-	512	212	1394	-	-
HCM Lane V/C Ratio	0.202	-	-	0.485	0.456	0.007	-	-
HCM Control Delay (s)	8.4	0	-	18.5	35.5	7.6	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0.8	-	-	2.6	2.2	0	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	20	179	108	295	267	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	9	9	9	9	8	8
Mvmt Flow	23	208	126	343	310	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	912	318	326	0	-	0
Stage 1	318	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	295	707	1195	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	257	707	1195	-	-	-
Mov Cap-2 Maneuver	257	-	-	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	468	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	2.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1195	-	601	-	-
HCM Lane V/C Ratio	0.105	-	0.385	-	-
HCM Control Delay (s)	8.4	0	14.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.4	-	1.8	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	14	89	17	411	430	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	3	3	9	9	10	10
Mvmt Flow	17	107	20	495	518	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1056	520	523	0	-	0
Stage 1	520	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.19	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.281	-	-	-
Pot Cap-1 Maneuver	248	554	1009	-	-	-
Stage 1	595	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	241	554	1009	-	-	-
Mov Cap-2 Maneuver	241	-	-	-	-	-
Stage 1	595	-	-	-	-	-
Stage 2	569	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.4	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1009	-	471	-	-
HCM Lane V/C Ratio	0.02	-	0.263	-	-
HCM Control Delay (s)	8.6	0	15.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	11	18	116	27	9	6	282	518	110	17	452	19
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	13	22	0	33	11	7	340	624	0	20	545	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	179	168	142	155	73	46	378	2581	1154	439	1628	728
Arrive On Green	0.09	0.09	0.00	0.09	0.09	0.09	0.23	0.78	0.00	0.49	0.49	0.00
Sat Flow, veh/h	1376	1845	1568	1038	799	508	1660	3312	1482	746	3312	1482
Grp Volume(v), veh/h	13	22	0	33	0	18	340	624	0	20	545	0
Grp Sat Flow(s),veh/h/ln	1376	1845	1568	1038	0	1307	1660	1656	1482	746	1656	1482
Q Serve(g_s), s	0.9	1.1	0.0	3.0	0.0	1.3	19.9	5.1	0.0	1.4	10.0	0.0
Cycle Q Clear(g_c), s	2.1	1.1	0.0	4.1	0.0	1.3	19.9	5.1	0.0	1.4	10.0	0.0
Prop In Lane	1.00		1.00	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	179	168	142	155	0	119	378	2581	1154	439	1628	728
V/C Ratio(X)	0.07	0.13	0.00	0.21	0.00	0.15	0.90	0.24	0.00	0.05	0.33	0.00
Avail Cap(c_a), veh/h	412	480	408	330	0	340	481	2581	1154	439	1628	728
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.9	41.8	0.0	43.7	0.0	41.9	37.5	3.0	0.0	13.3	15.5	0.0
Incr Delay (d2), s/veh	0.2	0.4	0.0	0.7	0.0	0.6	16.9	0.2	0.0	0.2	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.6	0.0	0.9	0.0	0.5	10.8	2.3	0.0	0.3	4.7	0.0
LnGrp Delay(d),s/veh	43.1	42.2	0.0	44.4	0.0	42.5	54.4	3.2	0.0	13.5	16.0	0.0
LnGrp LOS	D	D		D		D	D	A		B	B	
Approach Vol, veh/h		35			51			964			565	
Approach Delay, s/veh		42.5			43.7			21.3			15.9	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		84.4		15.6	28.7	55.7		15.6
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		61.0		26.0	29.0	26.0		26.0
Max Q Clear Time (g_c+I1), s		7.1		4.1	21.9	12.0		6.1
Green Ext Time (p_c), s		12.8		0.4	0.9	7.4		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	42	213	356	925	604	41
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	48	0	409	1063	694	47
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	231	106	454	2712	1464	655
Arrive On Green	0.07	0.00	0.27	0.80	0.47	0.47
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	48	0	409	1063	694	47
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	1.4	0.0	23.1	9.2	15.2	1.9
Cycle Q Clear(g_c), s	1.4	0.0	23.1	9.2	15.2	1.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	231	106	454	2712	1464	655
V/C Ratio(X)	0.21	0.00	0.90	0.39	0.47	0.07
Avail Cap(c_a), veh/h	313	144	632	2712	1464	655
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.6	0.0	35.4	3.0	18.0	14.5
Incr Delay (d2), s/veh	0.4	0.0	12.6	0.4	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	12.5	4.4	6.7	0.7
LnGrp Delay(d),s/veh	44.0	0.0	48.0	3.4	19.2	14.7
LnGrp LOS	D		D	A	B	B
Approach Vol, veh/h	48			1472	741	
Approach Delay, s/veh	44.0			15.8	18.9	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		86.1		13.9	32.6	53.5		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	37.0	34.0		
Max Q Clear Time (g_c+I1), s		11.2		3.4	25.1	17.2		
Green Ext Time (p_c), s		26.0		0.1	1.5	12.0		

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	429	878	12	354	854	541	377	821	255	521	538	256
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	466	954	13	385	928	0	410	892	0	566	585	278
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	302	858	12	306	865	387	633	753	337	631	865	387
Arrive On Green	0.15	0.26	0.26	0.15	0.26	0.00	0.12	0.23	0.00	0.17	0.28	0.28
Sat Flow, veh/h	1630	3285	45	1660	3312	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	466	472	495	385	928	0	410	892	0	566	585	278
Grp Sat Flow(s),veh/h/ln	1630	1626	1704	1660	1656	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	19.0	33.0	33.0	19.0	33.0	0.0	12.1	29.0	0.0	18.1	21.0	22.6
Cycle Q Clear(g_c), s	19.0	33.0	33.0	19.0	33.0	0.0	12.1	29.0	0.0	18.1	21.0	22.6
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	302	425	445	306	865	387	633	753	337	631	865	387
V/C Ratio(X)	1.54	1.11	1.11	1.26	1.07	0.00	0.65	1.18	0.00	0.90	0.68	0.72
Avail Cap(c_a), veh/h	302	425	445	306	865	387	871	753	337	718	865	387
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.9	46.7	46.7	38.1	46.7	0.0	31.8	48.7	0.0	34.4	40.8	41.4
Incr Delay (d2), s/veh	260.3	77.8	76.9	139.1	52.2	0.0	1.1	96.4	0.0	13.0	2.1	6.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	32.3	23.9	24.9	22.5	21.3	0.0	5.3	23.1	0.0	10.7	9.4	9.4
LnGrp Delay(d),s/veh	298.2	124.5	123.6	177.3	99.0	0.0	32.9	145.1	0.0	47.4	42.9	47.7
LnGrp LOS	F	F	F	F	F		C	F		D	D	D
Approach Vol, veh/h		1433			1313			1302			1429	
Approach Delay, s/veh		180.7			121.9			109.8			45.6	
Approach LOS		F			F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	40.0	26.4	35.0	25.0	40.0	20.6	40.8
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	21.0	35.0	20.1	31.0	21.0	35.0	14.1	24.6
Green Ext Time (p_c), s	0.0	0.0	1.3	0.0	0.0	0.0	1.5	3.6

Intersection Summary	
HCM 2010 Ctrl Delay	114.5
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	14.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	17	99	252	23	84	6	89	111	26	6	51	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	22	129	327	30	109	8	116	144	34	8	66	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	537	495	71	706	483	161	75	0	0	178	0	0
Stage 1	86	86	-	392	392	-	-	-	-	-	-	-
Stage 2	451	409	-	314	91	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	452	473	986	348	480	879	1493	-	-	1318	-	-
Stage 1	917	820	-	629	603	-	-	-	-	-	-	-
Stage 2	584	593	-	693	816	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	337	429	986	167	436	879	1493	-	-	1318	-	-
Mov Cap-2 Maneuver	337	429	-	167	436	-	-	-	-	-	-	-
Stage 1	837	815	-	574	551	-	-	-	-	-	-	-
Stage 2	424	541	-	388	811	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.4	23.9	3	0.7
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1493	-	-	686	335	1318	-	-
HCM Lane V/C Ratio	0.077	-	-	0.697	0.438	0.006	-	-
HCM Control Delay (s)	7.6	0	-	21.4	23.9	7.7	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	5.7	2.1	0	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	13	149	249	199	329	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	12	12	10	10	3	3
Mvmt Flow	17	191	319	255	422	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1325	431	441	0	-	0
Stage 1	431	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Critical Hdwy	6.52	6.32	4.2	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	2.29	-	-	-
Pot Cap-1 Maneuver	164	604	1078	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	384	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	107	604	1078	-	-	-
Mov Cap-2 Maneuver	107	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	252	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.3	5.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1078	-	440	-	-
HCM Lane V/C Ratio	0.296	-	0.472	-	-
HCM Control Delay (s)	9.7	0	20.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	1.2	-	2.5	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	4	27	101	420	459	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	55	55	10	10	6	6
Mvmt Flow	5	33	125	519	567	26

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1348	580	593	0	-	0
Stage 1	580	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Critical Hdwy	6.95	6.75	4.2	-	-	-
Critical Hdwy Stg 1	5.95	-	-	-	-	-
Critical Hdwy Stg 2	5.95	-	-	-	-	-
Follow-up Hdwy	3.995	3.795	2.29	-	-	-
Pot Cap-1 Maneuver	129	427	945	-	-	-
Stage 1	469	-	-	-	-	-
Stage 2	376	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	105	427	945	-	-	-
Mov Cap-2 Maneuver	105	-	-	-	-	-
Stage 1	469	-	-	-	-	-
Stage 2	306	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.4	1.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	945	-	306	-	-
HCM Lane V/C Ratio	0.132	-	0.125	-	-
HCM Control Delay (s)	9.4	0	18.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.5	-	0.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	99	252	23	84	6	89	111	26	6	51	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1900	1900	1827	1900	1900	1776	1900	1900	1638	1900
Adj Flow Rate, veh/h	22	129	327	30	109	8	116	144	34	8	66	9
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	4	4	4	4	4	4	7	7	7	16	16	16
Cap, veh/h	107	193	446	187	566	37	258	238	48	114	366	46
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	31	480	1106	194	1406	92	486	880	179	53	1355	171
Grp Volume(v), veh/h	478	0	0	147	0	0	294	0	0	83	0	0
Grp Sat Flow(s),veh/h/ln	1617	0	0	1693	0	0	1544	0	0	1579	0	0
Q Serve(g_s), s	0.6	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.9	0.0	0.0	2.1	0.0	0.0	6.7	0.0	0.0	1.6	0.0	0.0
Prop In Lane	0.05		0.68	0.20		0.05	0.39		0.12	0.10		0.11
Lane Grp Cap(c), veh/h	746	0	0	791	0	0	543	0	0	526	0	0
V/C Ratio(X)	0.64	0.00	0.00	0.19	0.00	0.00	0.54	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	1129	0	0	1151	0	0	951	0	0	940	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.0	0.0	0.0	7.7	0.0	0.0	12.9	0.0	0.0	11.2	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.1	0.0	0.0	0.8	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	1.0	0.0	0.0	3.0	0.0	0.0	0.7	0.0	0.0
LnGrp Delay(d),s/veh	10.9	0.0	0.0	7.8	0.0	0.0	13.8	0.0	0.0	11.3	0.0	0.0
LnGrp LOS	B			A			B			B		
Approach Vol, veh/h		478			147			294			83	
Approach Delay, s/veh		10.9			7.8			13.8			11.3	
Approach LOS		B			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		17.2		22.5		17.2		22.5
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		21.5		25.5		21.5		25.5
Max Q Clear Time (g_c+I1), s		8.7		11.9		3.6		4.1
Green Ext Time (p_c), s		2.0		4.2		2.4		5.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	429	878	12	354	854	541	377	821	255	521	538	256
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	466	954	13	385	928	0	410	892	0	566	585	278
Adj No. of Lanes	2	3	0	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	560	1283	17	557	1285	400	627	853	382	541	879	393
Arrive On Green	0.10	0.27	0.27	0.10	0.27	0.00	0.11	0.26	0.00	0.13	0.28	0.28
Sat Flow, veh/h	3163	4751	65	3221	4759	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	466	625	342	385	928	0	410	892	0	566	585	278
Grp Sat Flow(s),veh/h/ln	1581	1558	1700	1610	1586	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	10.0	18.3	18.4	8.6	17.7	0.0	9.3	26.0	0.0	13.0	16.5	17.8
Cycle Q Clear(g_c), s	10.0	18.3	18.4	8.6	17.7	0.0	9.3	26.0	0.0	13.0	16.5	17.8
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	560	841	459	557	1285	400	627	853	382	541	879	393
V/C Ratio(X)	0.83	0.74	0.74	0.69	0.72	0.00	0.65	1.05	0.00	1.05	0.67	0.71
Avail Cap(c_a), veh/h	560	841	459	557	1285	400	627	853	382	541	879	393
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	33.3	33.3	25.2	33.1	0.0	24.4	37.0	0.0	26.2	31.9	32.3
Incr Delay (d2), s/veh	10.3	5.9	10.5	3.6	3.5	0.0	2.4	43.3	0.0	51.4	1.9	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	8.6	10.0	4.0	8.2	0.0	4.3	16.9	0.0	9.3	7.4	7.5
LnGrp Delay(d),s/veh	37.6	39.2	43.8	28.8	36.6	0.0	26.8	80.3	0.0	77.6	33.8	38.0
LnGrp LOS	D	D	D	C	D		C	F		F	C	D
Approach Vol, veh/h		1433			1313			1302			1429	
Approach Delay, s/veh		39.8			34.3			63.5			52.0	
Approach LOS		D			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	34.0	18.0	32.0	16.0	34.0	16.0	34.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	27.0	13.0	26.0	10.0	27.0	11.0	28.0
Max Q Clear Time (g_c+I1), s	10.6	20.4	15.0	28.0	12.0	19.7	11.3	19.8
Green Ext Time (p_c), s	0.0	5.6	0.0	0.0	0.0	6.1	0.0	6.4

Intersection Summary	
HCM 2010 Ctrl Delay	47.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	22	8	330	147	17	18	192	479	27	5	632	38
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	28	10	0	184	21	22	240	599	0	6	790	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	254	289	246	291	135	141	274	2264	1013	444	1612	721
Arrive On Green	0.16	0.16	0.00	0.16	0.16	0.16	0.17	0.71	0.00	0.48	0.48	0.00
Sat Flow, veh/h	1307	1792	1524	1399	834	874	1601	3195	1429	778	3374	1509
Grp Volume(v), veh/h	28	10	0	184	0	43	240	599	0	6	790	0
Grp Sat Flow(s),veh/h/ln	1307	1792	1524	1399	0	1708	1601	1597	1429	778	1687	1509
Q Serve(g_s), s	1.9	0.5	0.0	12.8	0.0	2.2	14.6	6.7	0.0	0.4	16.0	0.0
Cycle Q Clear(g_c), s	4.0	0.5	0.0	13.2	0.0	2.2	14.6	6.7	0.0	0.4	16.0	0.0
Prop In Lane	1.00		1.00	1.00		0.51	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	254	289	246	291	0	275	274	2264	1013	444	1612	721
V/C Ratio(X)	0.11	0.03	0.00	0.63	0.00	0.16	0.88	0.26	0.00	0.01	0.49	0.00
Avail Cap(c_a), veh/h	383	466	396	429	0	444	368	2264	1013	444	1612	721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.8	35.4	0.0	41.0	0.0	36.1	40.4	5.2	0.0	13.7	17.8	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.3	0.0	0.3	16.4	0.3	0.0	0.1	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.2	0.0	5.1	0.0	1.0	7.7	3.0	0.0	0.1	7.6	0.0
LnGrp Delay(d),s/veh	38.0	35.4	0.0	43.2	0.0	36.3	56.8	5.5	0.0	13.8	18.9	0.0
LnGrp LOS	D	D		D		D	E	A		B	B	
Approach Vol, veh/h		38			227			839			796	
Approach Delay, s/veh		37.3			41.9			20.2			18.8	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		77.4		22.6	23.1	54.3		22.6
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		61.0		26.0	23.0	32.0		26.0
Max Q Clear Time (g_c+I1), s		8.7		6.0	16.6	18.0		15.2
Green Ext Time (p_c), s		16.2		1.2	0.5	8.6		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	22.6
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	47	365	306	765	1275	75
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	52	0	340	850	1417	83
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	251	115	368	2558	1722	770
Arrive On Green	0.08	0.00	0.23	0.79	0.51	0.51
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	52	0	340	850	1417	83
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	1.5	0.0	20.6	7.4	35.2	2.8
Cycle Q Clear(g_c), s	1.5	0.0	20.6	7.4	35.2	2.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	251	115	368	2558	1722	770
V/C Ratio(X)	0.21	0.00	0.92	0.33	0.82	0.11
Avail Cap(c_a), veh/h	328	151	388	2558	1722	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.3	0.0	37.7	2.9	20.9	12.9
Incr Delay (d2), s/veh	0.4	0.0	26.7	0.3	4.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	11.9	3.3	17.6	1.3
LnGrp Delay(d),s/veh	43.7	0.0	64.4	3.2	25.5	13.2
LnGrp LOS	D		E	A	C	B
Approach Vol, veh/h	52			1190	1500	
Approach Delay, s/veh	43.7			20.7	24.8	
Approach LOS	D			C	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		85.9		14.1	28.8	57.1		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	24.0	47.0		
Max Q Clear Time (g_c+I1), s		9.4		3.5	22.6	37.2		
Green Ext Time (p_c), s		41.1		0.1	0.2	8.8		

Intersection Summary	
HCM 2010 Ctrl Delay	23.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	235	836	8	384	1041	343	516	447	417	382	739	273
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	255	909	9	417	1132	0	561	486	0	415	803	297
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	221	922	9	384	1324	592	489	908	406	590	751	336
Arrive On Green	0.08	0.28	0.28	0.19	0.39	0.00	0.12	0.27	0.00	0.08	0.23	0.23
Sat Flow, veh/h	1645	3329	33	1691	3374	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	255	448	470	417	1132	0	561	486	0	415	803	297
Grp Sat Flow(s),veh/h/ln	1645	1641	1721	1691	1687	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	10.0	35.3	35.3	25.0	39.9	0.0	15.0	16.0	0.0	10.0	30.0	25.6
Cycle Q Clear(g_c), s	10.0	35.3	35.3	25.0	39.9	0.0	15.0	16.0	0.0	10.0	30.0	25.6
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	221	454	477	384	1324	592	489	908	406	590	751	336
V/C Ratio(X)	1.15	0.99	0.99	1.09	0.86	0.00	1.15	0.54	0.00	0.70	1.07	0.88
Avail Cap(c_a), veh/h	221	454	477	384	1324	592	489	908	406	590	751	336
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.6	46.7	46.7	40.4	36.1	0.0	37.0	40.6	0.0	39.6	50.0	48.3
Incr Delay (d2), s/veh	108.0	38.9	37.9	71.2	7.2	0.0	87.6	0.6	0.0	3.8	53.2	23.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	20.8	21.7	21.3	19.9	0.0	14.7	7.5	0.0	6.0	19.0	12.5
LnGrp Delay(d),s/veh	148.5	85.6	84.6	111.6	43.4	0.0	124.6	41.2	0.0	43.4	103.2	71.6
LnGrp LOS	F	F	F	F	D		F	D		D	F	E
Approach Vol, veh/h		1173			1549			1047			1515	
Approach Delay, s/veh		98.9			61.7			85.9			80.6	
Approach LOS		F			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.0	43.0	15.0	41.0	16.0	58.0	20.0	36.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	25.0	36.0	10.0	35.0	10.0	51.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	27.0	37.3	12.0	18.0	12.0	41.9	17.0	32.0
Green Ext Time (p_c), s	0.0	0.0	0.0	10.3	0.0	7.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	80.2
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	34.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	11	51	242	12	108	0	335	75	54	12	172	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	12	55	260	13	116	0	360	81	58	13	185	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1118	1089	204	1217	1078	110	223	0	0	139	0	0
Stage 1	230	230	-	830	830	-	-	-	-	-	-	-
Stage 2	888	859	-	387	248	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	183	214	832	156	217	938	1317	-	-	1363	-	-
Stage 1	768	710	-	361	382	-	-	-	-	-	-	-
Stage 2	336	370	-	633	698	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	54	149	832	60	151	938	1317	-	-	1363	-	-
Mov Cap-2 Maneuver	54	149	-	60	151	-	-	-	-	-	-	-
Stage 1	539	702	-	253	268	-	-	-	-	-	-	-
Stage 2	134	260	-	397	690	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	59.8	139.5	6.3	0.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1317	-	-	363	131	1363	-	-
HCM Lane V/C Ratio	0.274	-	-	0.901	0.985	0.009	-	-
HCM Control Delay (s)	8.8	0	-	59.8	139.5	7.7	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	1.1	-	-	9	6.8	0	-	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	26	239	144	383	319	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	9	9	9	9	8	8
Mvmt Flow	30	278	167	445	371	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1159	379	387	0	-	0
Stage 1	379	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	210	653	1134	-	-	-
Stage 1	677	-	-	-	-	-
Stage 2	440	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	169	653	1134	-	-	-
Mov Cap-2 Maneuver	169	-	-	-	-	-
Stage 1	677	-	-	-	-	-
Stage 2	354	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.3	2.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1134	-	510	-	-
HCM Lane V/C Ratio	0.148	-	0.604	-	-
HCM Control Delay (s)	8.7	0	22.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.5	-	4	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	18	119	23	538	537	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	3	3	9	9	10	10
Mvmt Flow	22	143	28	648	647	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1353	649	652	0	-	0
Stage 1	649	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.19	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.281	-	-	-
Pot Cap-1 Maneuver	164	468	902	-	-	-
Stage 1	518	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	156	468	902	-	-	-
Mov Cap-2 Maneuver	156	-	-	-	-	-
Stage 1	518	-	-	-	-	-
Stage 2	465	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.3	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	902	-	371	-	-
HCM Lane V/C Ratio	0.031	-	0.445	-	-
HCM Control Delay (s)	9.1	0	22.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	2.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	11	51	242	12	108	0	335	75	54	12	172	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1900	1900	1827	1900	1900	1776	1900	1900	1638	1900
Adj Flow Rate, veh/h	12	55	260	13	116	0	360	81	58	13	185	38
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	4	4	4	7	7	7	16	16	16
Cap, veh/h	84	80	333	102	452	0	556	103	70	93	603	118
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.00	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	23	303	1266	71	1718	0	917	222	150	29	1298	255
Grp Volume(v), veh/h	327	0	0	129	0	0	499	0	0	236	0	0
Grp Sat Flow(s),veh/h/ln	1593	0	0	1790	0	0	1289	0	0	1582	0	0
Q Serve(g_s), s	1.5	0.0	0.0	0.0	0.0	0.0	11.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.0	0.0	0.0	2.7	0.0	0.0	15.5	0.0	0.0	4.4	0.0	0.0
Prop In Lane	0.04		0.80	0.10		0.00	0.72		0.12	0.06		0.16
Lane Grp Cap(c), veh/h	497	0	0	554	0	0	729	0	0	814	0	0
V/C Ratio(X)	0.66	0.00	0.00	0.23	0.00	0.00	0.68	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	628	0	0	694	0	0	940	0	0	1085	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.3	0.0	0.0	13.9	0.0	0.0	10.6	0.0	0.0	8.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	0.2	0.0	0.0	1.4	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	0.0	1.4	0.0	0.0	5.8	0.0	0.0	1.9	0.0	0.0
LnGrp Delay(d),s/veh	18.0	0.0	0.0	14.2	0.0	0.0	12.0	0.0	0.0	8.2	0.0	0.0
LnGrp LOS	B			B			B			A		
Approach Vol, veh/h		327			129			499			236	
Approach Delay, s/veh		18.0			14.2			12.0			8.2	
Approach LOS		B			B			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		28.7		19.1		28.7		19.1
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		30.5		16.5		30.5		16.5
Max Q Clear Time (g_c+I1), s		17.5		11.0		6.4		4.7
Green Ext Time (p_c), s		4.7		1.5		6.2		2.6

Intersection Summary	
HCM 2010 Ctrl Delay	13.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	235	836	8	384	1041	343	516	447	417	382	739	273
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	255	909	9	417	1132	0	561	486	0	415	803	297
Adj No. of Lanes	2	3	0	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	540	1230	12	617	1240	386	535	862	386	722	831	372
Arrive On Green	0.11	0.26	0.26	0.11	0.26	0.00	0.11	0.26	0.00	0.11	0.26	0.26
Sat Flow, veh/h	3191	4815	48	3281	4848	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	255	593	325	417	1132	0	561	486	0	415	803	297
Grp Sat Flow(s),veh/h/ln	1596	1572	1719	1640	1616	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	5.0	15.6	15.6	8.3	20.4	0.0	10.0	11.3	0.0	8.6	22.0	17.2
Cycle Q Clear(g_c), s	5.0	15.6	15.6	8.3	20.4	0.0	10.0	11.3	0.0	8.6	22.0	17.2
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	540	803	439	617	1240	386	535	862	386	722	831	372
V/C Ratio(X)	0.47	0.74	0.74	0.68	0.91	0.00	1.05	0.56	0.00	0.57	0.97	0.80
Avail Cap(c_a), veh/h	540	803	439	617	1240	386	535	862	386	722	831	372
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	30.7	30.7	22.8	32.5	0.0	25.9	29.1	0.0	21.7	33.1	31.3
Incr Delay (d2), s/veh	0.6	6.0	10.6	2.9	11.7	0.0	52.0	0.8	0.0	1.1	23.2	11.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	7.4	8.7	4.0	10.5	0.0	3.9	5.4	0.0	3.8	12.5	8.1
LnGrp Delay(d),s/veh	23.1	36.8	41.4	25.7	44.3	0.0	77.9	30.0	0.0	22.8	56.3	43.0
LnGrp LOS	C	D	D	C	D		F	C		C	E	D
Approach Vol, veh/h		1173			1549			1047			1515	
Approach Delay, s/veh		35.1			39.3			55.7			44.5	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	30.0	15.0	29.0	16.0	30.0	15.0	29.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	23.0	10.0	23.0	10.0	23.0	10.0	23.0
Max Q Clear Time (g_c+I1), s	10.3	17.6	10.6	13.3	7.0	22.4	12.0	24.0
Green Ext Time (p_c), s	0.0	4.8	0.0	6.8	0.3	0.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	43.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	21	81	48	9	11	198	381	179	34	320	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	12	25	0	58	11	13	239	459	0	41	386	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	180	178	151	159	56	67	277	2562	1146	548	1812	811
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.10	0.17	0.77	0.00	0.55	0.55	0.00
Sat Flow, veh/h	1368	1845	1568	1035	584	691	1660	3312	1482	869	3312	1482
Grp Volume(v), veh/h	12	25	0	58	0	24	239	459	0	41	386	0
Grp Sat Flow(s),veh/h/ln	1368	1845	1568	1035	0	1275	1660	1656	1482	869	1656	1482
Q Serve(g_s), s	0.8	1.2	0.0	5.4	0.0	1.7	14.0	3.6	0.0	2.2	6.0	0.0
Cycle Q Clear(g_c), s	2.5	1.2	0.0	6.7	0.0	1.7	14.0	3.6	0.0	2.2	6.0	0.0
Prop In Lane	1.00		1.00	1.00		0.54	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	180	178	151	159	0	123	277	2562	1146	548	1812	811
V/C Ratio(X)	0.07	0.14	0.00	0.37	0.00	0.20	0.86	0.18	0.00	0.07	0.21	0.00
Avail Cap(c_a), veh/h	411	489	416	333	0	338	432	2562	1146	548	1812	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.8	41.4	0.0	44.5	0.0	41.6	40.6	3.0	0.0	10.8	11.6	0.0
Incr Delay (d2), s/veh	0.2	0.4	0.0	1.4	0.0	0.8	10.6	0.2	0.0	0.3	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.6	0.0	1.6	0.0	0.6	7.3	1.7	0.0	0.6	2.8	0.0
LnGrp Delay(d),s/veh	42.9	41.7	0.0	45.9	0.0	42.4	51.2	3.1	0.0	11.0	11.9	0.0
LnGrp LOS	D	D		D		D	D	A		B	B	
Approach Vol, veh/h		37			82			698			427	
Approach Delay, s/veh		42.1			44.8			19.6			11.8	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		83.9		16.1	22.7	61.2		16.1
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		60.5		26.5	26.0	28.5		26.5
Max Q Clear Time (g_c+I1), s		5.6		4.5	16.0	8.0		8.7
Green Ext Time (p_c), s		8.4		0.6	0.7	6.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	44	150	249	753	452	33
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	51	0	286	866	520	38
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	237	109	330	2705	1684	753
Arrive On Green	0.08	0.00	0.19	0.79	0.54	0.54
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	51	0	286	866	520	38
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	1.5	0.0	16.2	7.0	9.2	1.3
Cycle Q Clear(g_c), s	1.5	0.0	16.2	7.0	9.2	1.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	237	109	330	2705	1684	753
V/C Ratio(X)	0.21	0.00	0.87	0.32	0.31	0.05
Avail Cap(c_a), veh/h	360	166	597	2705	1684	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	39.1	2.8	12.6	10.8
Incr Delay (d2), s/veh	0.4	0.0	6.9	0.3	0.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	8.3	3.4	4.0	0.5
LnGrp Delay(d),s/veh	43.9	0.0	46.0	3.2	13.1	11.0
LnGrp LOS	D		D	A	B	B
Approach Vol, veh/h	51			1152	558	
Approach Delay, s/veh	43.9			13.8	13.0	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		85.9		14.1	25.3	60.6		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		75.5		11.5	35.0	34.5		
Max Q Clear Time (g_c+I1), s		9.0		3.5	18.2	11.2		
Green Ext Time (p_c), s		17.3		0.1	1.1	12.0		

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	335	615	9	248	598	415	264	609	179	376	386	189
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	364	668	10	270	650	0	287	662	0	409	420	205
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	400	1011	15	377	929	416	631	739	330	554	815	365
Arrive On Green	0.16	0.31	0.31	0.13	0.28	0.00	0.09	0.23	0.00	0.13	0.26	0.26
Sat Flow, veh/h	1630	3280	49	1660	3312	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	364	331	347	270	650	0	287	662	0	409	420	205
Grp Sat Flow(s),veh/h/ln	1630	1626	1703	1660	1656	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	18.9	20.8	20.8	13.4	20.7	0.0	7.9	23.0	0.0	11.6	13.4	14.9
Cycle Q Clear(g_c), s	18.9	20.8	20.8	13.4	20.7	0.0	7.9	23.0	0.0	11.6	13.4	14.9
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	400	501	525	377	929	416	631	739	330	554	815	365
V/C Ratio(X)	0.91	0.66	0.66	0.72	0.70	0.00	0.45	0.90	0.00	0.74	0.52	0.56
Avail Cap(c_a), veh/h	400	501	525	423	929	416	1009	809	362	810	815	365
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	35.3	35.3	26.2	37.9	0.0	30.4	44.2	0.0	30.6	37.2	37.7
Incr Delay (d2), s/veh	24.5	6.7	6.4	5.0	4.4	0.0	0.5	12.0	0.0	2.0	0.6	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	10.2	10.7	6.6	10.0	0.0	3.5	11.6	0.0	5.0	5.9	6.0
LnGrp Delay(d),s/veh	51.4	42.0	41.7	31.2	42.2	0.0	30.9	56.2	0.0	32.6	37.8	39.7
LnGrp LOS	D	D	D	C	D		C	E		C	D	D
Approach Vol, veh/h		1042			920			949			1034	
Approach Delay, s/veh		45.2			39.0			48.6			36.1	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.7	43.3	20.1	32.5	25.0	40.0	16.1	36.5
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	15.4	22.8	13.6	25.0	20.9	22.7	9.9	16.9
Green Ext Time (p_c), s	0.4	6.3	1.5	1.4	0.0	6.4	1.2	6.8

Intersection Summary	
HCM 2010 Ctrl Delay	42.2
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	9.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	70	186	20	59	5	65	100	19	5	42	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	21	91	242	26	77	6	84	130	25	6	55	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	424	394	58	549	386	142	62	0	0	155	0	0
Stage 1	71	71	-	311	311	-	-	-	-	-	-	-
Stage 2	353	323	-	238	75	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	537	539	1002	443	545	900	1510	-	-	1344	-	-
Stage 1	934	832	-	695	655	-	-	-	-	-	-	-
Stage 2	660	647	-	761	829	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	448	504	1002	276	509	900	1510	-	-	1344	-	-
Mov Cap-2 Maneuver	448	504	-	276	509	-	-	-	-	-	-	-
Stage 1	877	828	-	653	615	-	-	-	-	-	-	-
Stage 2	539	608	-	512	825	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.9	16.1	2.7	0.7
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1510	-	-	755	433	1344	-	-
HCM Lane V/C Ratio	0.056	-	-	0.468	0.252	0.005	-	-
HCM Control Delay (s)	7.5	0	-	13.9	16.1	7.7	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.5	1	0	-	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	11	111	177	164	249	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	12	12	10	10	3	3
Mvmt Flow	14	142	227	210	319	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	990	326	333	0	-	0
Stage 1	326	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Critical Hdwy	6.52	6.32	4.2	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	2.29	-	-	-
Pot Cap-1 Maneuver	262	693	1183	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	205	693	1183	-	-	-
Mov Cap-2 Maneuver	205	-	-	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	387	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.7	4.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1183	-	571	-	-
HCM Lane V/C Ratio	0.192	-	0.274	-	-
HCM Control Delay (s)	8.8	0	13.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.7	-	1.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	4	20	71	320	346	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	55	55	10	10	6	6
Mvmt Flow	5	25	88	395	427	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1006	436	446	0	-	0
Stage 1	436	-	-	-	-	-
Stage 2	570	-	-	-	-	-
Critical Hdwy	6.95	6.75	4.2	-	-	-
Critical Hdwy Stg 1	5.95	-	-	-	-	-
Critical Hdwy Stg 2	5.95	-	-	-	-	-
Follow-up Hdwy	3.995	3.795	2.29	-	-	-
Pot Cap-1 Maneuver	214	522	1073	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	192	522	1073	-	-	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	424	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.6	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1073	-	406	-	-
HCM Lane V/C Ratio	0.082	-	0.073	-	-
HCM Control Delay (s)	8.7	0	14.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	9	231	195	19	33	135	344	51	11	472	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	20	11	0	244	24	41	169	430	0	14	590	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	294	368	313	352	127	217	201	2124	950	508	1616	723
Arrive On Green	0.21	0.21	0.00	0.21	0.21	0.21	0.13	0.66	0.00	0.48	0.48	0.00
Sat Flow, veh/h	1281	1792	1524	1398	619	1057	1601	3195	1429	909	3374	1509
Grp Volume(v), veh/h	20	11	0	244	0	65	169	430	0	14	590	0
Grp Sat Flow(s),veh/h/ln	1281	1792	1524	1398	0	1676	1601	1597	1429	909	1687	1509
Q Serve(g_s), s	1.3	0.5	0.0	16.9	0.0	3.2	10.3	5.2	0.0	0.8	11.0	0.0
Cycle Q Clear(g_c), s	4.5	0.5	0.0	17.4	0.0	3.2	10.3	5.2	0.0	0.8	11.0	0.0
Prop In Lane	1.00		1.00	1.00		0.63	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	294	368	313	352	0	344	201	2124	950	508	1616	723
V/C Ratio(X)	0.07	0.03	0.00	0.69	0.00	0.19	0.84	0.20	0.00	0.03	0.37	0.00
Avail Cap(c_a), veh/h	396	511	434	464	0	478	336	2124	950	508	1616	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.7	31.8	0.0	38.7	0.0	32.9	42.7	6.5	0.0	13.8	16.4	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	2.9	0.0	0.3	9.1	0.2	0.0	0.1	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	0.0	6.8	0.0	1.5	5.1	2.3	0.0	0.2	5.2	0.0
LnGrp Delay(d),s/veh	34.8	31.8	0.0	41.7	0.0	33.1	51.8	6.7	0.0	13.9	17.1	0.0
LnGrp LOS	C	C		D		C	D	A		B	B	
Approach Vol, veh/h		31			309			599			604	
Approach Delay, s/veh		33.8			39.9			19.4			17.0	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		73.0		27.0	18.6	54.4		27.0
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		58.5		28.5	21.0	31.5		28.5
Max Q Clear Time (g_c+I1), s		7.2		6.5	12.3	13.0		19.4
Green Ext Time (p_c), s		10.4		1.7	0.4	7.5		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	22.9
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	38	256	215	571	998	69
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	42	0	239	634	1109	77
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	226	104	275	2582	1945	870
Arrive On Green	0.07	0.00	0.17	0.80	0.57	0.57
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	42	0	239	634	1109	77
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	1.2	0.0	14.4	4.9	20.7	2.3
Cycle Q Clear(g_c), s	1.2	0.0	14.4	4.9	20.7	2.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	226	104	275	2582	1945	870
V/C Ratio(X)	0.19	0.00	0.87	0.25	0.57	0.09
Avail Cap(c_a), veh/h	328	151	404	2582	1945	870
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.9	0.0	40.4	2.5	13.6	9.7
Incr Delay (d2), s/veh	0.4	0.0	13.0	0.2	1.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	7.4	2.2	10.0	1.0
LnGrp Delay(d),s/veh	44.3	0.0	53.4	2.7	14.9	9.9
LnGrp LOS	D		D	A	B	A
Approach Vol, veh/h	42			873	1186	
Approach Delay, s/veh	44.3			16.6	14.5	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		86.6		13.4	23.0	63.6		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	25.0	46.0		
Max Q Clear Time (g_c+I1), s		6.9		3.2	16.4	22.7		
Green Ext Time (p_c), s		26.9		0.0	0.6	15.4		

Intersection Summary	
HCM 2010 Ctrl Delay	16.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	176	585	6	269	729	253	362	325	292	303	553	227
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	191	636	7	292	792	0	393	353	0	329	601	247
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	311	979	11	395	1123	502	592	828	371	753	754	337
Arrive On Green	0.10	0.29	0.29	0.14	0.33	0.00	0.12	0.25	0.00	0.11	0.23	0.23
Sat Flow, veh/h	1645	3325	37	1691	3374	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	191	314	329	292	792	0	393	353	0	329	601	247
Grp Sat Flow(s),veh/h/ln	1645	1641	1721	1691	1687	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	8.9	18.7	18.7	13.2	22.9	0.0	9.9	9.9	0.0	8.6	19.5	17.6
Cycle Q Clear(g_c), s	8.9	18.7	18.7	13.2	22.9	0.0	9.9	9.9	0.0	8.6	19.5	17.6
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	311	483	507	395	1123	502	592	828	371	753	754	337
V/C Ratio(X)	0.61	0.65	0.65	0.74	0.71	0.00	0.66	0.43	0.00	0.44	0.80	0.73
Avail Cap(c_a), veh/h	424	483	507	446	1123	502	929	873	391	1121	842	376
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.4	34.5	34.5	24.2	32.6	0.0	29.2	35.6	0.0	27.8	40.6	39.8
Incr Delay (d2), s/veh	2.0	6.6	6.3	5.6	3.7	0.0	1.3	0.3	0.0	0.4	4.9	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	9.3	9.8	6.7	11.3	0.0	4.5	4.6	0.0	3.7	9.3	7.7
LnGrp Delay(d),s/veh	27.4	41.1	40.8	29.8	36.3	0.0	30.5	36.0	0.0	28.2	45.5	46.2
LnGrp LOS	C	D	D	C	D		C	D		C	D	D
Approach Vol, veh/h		834			1084			746			1177	
Approach Delay, s/veh		37.9			34.6			33.1			40.8	
Approach LOS		D			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.6	40.0	16.9	33.5	17.3	44.3	18.5	32.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	19.0	33.0	25.0	29.0	19.0	33.0	25.0	29.0
Max Q Clear Time (g_c+I1), s	15.2	20.7	10.6	11.9	10.9	24.9	11.9	21.5
Green Ext Time (p_c), s	0.4	7.8	1.3	7.8	0.4	5.6	1.6	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	36.9
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	10.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	36	173	10	76	0	243	63	42	9	157	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	11	39	186	11	82	0	261	68	45	10	169	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	858	839	185	930	833	90	201	0	0	113	0	0
Stage 1	204	204	-	613	613	-	-	-	-	-	-	-
Stage 2	654	635	-	317	220	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	275	300	852	246	302	962	1342	-	-	1394	-	-
Stage 1	793	729	-	476	480	-	-	-	-	-	-	-
Stage 2	452	469	-	690	717	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	235	852	141	237	962	1342	-	-	1394	-	-
Mov Cap-2 Maneuver	170	235	-	141	237	-	-	-	-	-	-	-
Stage 1	627	723	-	377	380	-	-	-	-	-	-	-
Stage 2	281	371	-	506	711	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.2	32.7	5.8	0.3
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1342	-	-	528	220	1394	-	-
HCM Lane V/C Ratio	0.195	-	-	0.446	0.42	0.007	-	-
HCM Control Delay (s)	8.3	0	-	17.2	32.7	7.6	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.7	-	-	2.3	1.9	0	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	19	169	105	291	261	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	9	9	9	9	8	8
Mvmt Flow	22	197	122	338	303	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	894	311	319	0	-	0
Stage 1	311	-	-	-	-	-
Stage 2	583	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	303	713	1202	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	545	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	265	713	1202	-	-	-
Mov Cap-2 Maneuver	265	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	477	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	2.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1202	-	609	-	-
HCM Lane V/C Ratio	0.102	-	0.359	-	-
HCM Control Delay (s)	8.3	0	14.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.6	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	13	83	16	405	416	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	3	3	9	9	10	10
Mvmt Flow	16	100	19	488	501	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1031	504	506	0	-	0
Stage 1	504	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.19	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.281	-	-	-
Pot Cap-1 Maneuver	257	566	1024	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	251	566	1024	-	-	-
Mov Cap-2 Maneuver	251	-	-	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	575	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1024	-	484	-	-
HCM Lane V/C Ratio	0.019	-	0.239	-	-
HCM Control Delay (s)	8.6	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	38	28	87	40	10	10	212	857	166	34	441	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	46	34	0	48	12	12	255	1033	0	41	531	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	183	182	154	156	63	63	288	2555	1143	346	1781	797
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.10	0.17	0.77	0.00	0.54	0.54	0.00
Sat Flow, veh/h	1368	1845	1568	1027	642	642	1660	3312	1482	509	3312	1482
Grp Volume(v), veh/h	46	34	0	48	0	24	255	1033	0	41	531	0
Grp Sat Flow(s),veh/h/ln	1368	1845	1568	1027	0	1284	1660	1656	1482	509	1656	1482
Q Serve(g_s), s	3.2	1.7	0.0	4.5	0.0	1.7	15.0	10.4	0.0	4.0	8.8	0.0
Cycle Q Clear(g_c), s	4.9	1.7	0.0	6.2	0.0	1.7	15.0	10.4	0.0	4.0	8.8	0.0
Prop In Lane	1.00		1.00	1.00		0.50	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	183	182	154	156	0	126	288	2555	1143	346	1781	797
V/C Ratio(X)	0.25	0.19	0.00	0.31	0.00	0.19	0.88	0.40	0.00	0.12	0.30	0.00
Avail Cap(c_a), veh/h	404	480	408	322	0	334	349	2555	1143	346	1781	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.7	41.4	0.0	44.2	0.0	41.4	40.3	3.8	0.0	11.6	12.7	0.0
Incr Delay (d2), s/veh	0.7	0.5	0.0	1.1	0.0	0.7	20.0	0.5	0.0	0.7	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.9	0.0	1.3	0.0	0.6	8.5	4.8	0.0	0.6	4.1	0.0
LnGrp Delay(d),s/veh	44.4	41.9	0.0	45.3	0.0	42.1	60.4	4.3	0.0	12.3	13.1	0.0
LnGrp LOS	D	D		D		D	E	A		B	B	
Approach Vol, veh/h		80			72			1288			572	
Approach Delay, s/veh		43.3			44.3			15.4			13.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		83.6		16.4	23.4	60.3		16.4
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		61.0		26.0	21.0	34.0		26.0
Max Q Clear Time (g_c+I1), s		12.4		6.9	17.0	10.8		8.2
Green Ext Time (p_c), s		20.4		0.7	0.4	14.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	91	160	267	1186	563	44
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	105	0	307	1363	647	51
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	296	136	348	2641	1593	713
Arrive On Green	0.09	0.00	0.20	0.78	0.51	0.51
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	105	0	307	1363	647	51
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	3.1	0.0	17.5	15.0	12.8	1.9
Cycle Q Clear(g_c), s	3.1	0.0	17.5	15.0	12.8	1.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	296	136	348	2641	1593	713
V/C Ratio(X)	0.35	0.00	0.88	0.52	0.41	0.07
Avail Cap(c_a), veh/h	313	144	495	2641	1593	713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	0.0	38.7	4.2	15.0	12.4
Incr Delay (d2), s/veh	0.7	0.0	12.7	0.7	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	9.4	7.1	5.7	0.7
LnGrp Delay(d),s/veh	43.1	0.0	51.4	4.9	15.8	12.6
LnGrp LOS	D		D	A	B	B
Approach Vol, veh/h	105			1670	698	
Approach Delay, s/veh	43.1			13.5	15.6	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		84.0		16.0	26.4	57.7		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	29.0	42.0		
Max Q Clear Time (g_c+I1), s		17.0		5.1	19.5	14.8		
Green Ext Time (p_c), s		32.0		0.1	0.9	19.5		

Intersection Summary	
HCM 2010 Ctrl Delay	15.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	480	659	9	266	641	589	283	750	192	432	438	227
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	522	716	10	289	697	0	308	815	0	470	476	247
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	304	934	13	337	1099	492	614	855	383	533	982	439
Arrive On Green	0.09	0.28	0.28	0.13	0.33	0.00	0.08	0.26	0.00	0.13	0.31	0.31
Sat Flow, veh/h	1630	3284	46	1660	3312	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	522	354	372	289	697	0	308	815	0	470	476	247
Grp Sat Flow(s),veh/h/ln	1630	1626	1704	1660	1656	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	11.0	25.3	25.3	15.1	22.5	0.0	8.9	30.9	0.0	13.6	15.6	18.6
Cycle Q Clear(g_c), s	11.0	25.3	25.3	15.1	22.5	0.0	8.9	30.9	0.0	13.6	15.6	18.6
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	304	462	484	337	1099	492	614	855	383	533	982	439
V/C Ratio(X)	1.72	0.77	0.77	0.86	0.63	0.00	0.50	0.95	0.00	0.88	0.48	0.56
Avail Cap(c_a), veh/h	304	462	484	337	1099	492	614	855	383	615	1066	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.6	41.5	41.5	29.1	35.8	0.0	31.0	46.0	0.0	31.1	35.2	36.3
Incr Delay (d2), s/veh	337.0	11.5	11.1	19.1	2.8	0.0	0.6	20.2	0.0	12.8	0.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.4	12.8	13.4	8.6	10.7	0.0	3.9	16.4	0.0	6.6	6.8	7.4
LnGrp Delay(d),s/veh	377.5	53.0	52.5	48.2	38.6	0.0	31.6	66.2	0.0	43.9	35.6	37.6
LnGrp LOS	F	D	D	D	D		C	E		D	D	D
Approach Vol, veh/h		1248			986			1123			1193	
Approach Delay, s/veh		188.6			41.4			56.7			39.3	
Approach LOS		F			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	43.0	21.6	39.0	17.0	49.0	15.0	45.6
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	17.0	36.0	20.0	33.0	11.0	42.0	10.0	43.0
Max Q Clear Time (g_c+I1), s	17.1	27.3	15.6	32.9	13.0	24.5	10.9	20.6
Green Ext Time (p_c), s	0.0	5.9	1.0	0.1	0.0	9.7	0.0	12.0

Intersection Summary	
HCM 2010 Ctrl Delay	85.0
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	12

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	75	236	38	63	5	78	104	25	5	49	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	21	97	306	49	82	6	101	135	32	6	64	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	479	451	68	636	438	151	71	0	0	168	0	0
Stage 1	81	81	-	354	354	-	-	-	-	-	-	-
Stage 2	398	370	-	282	84	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	494	501	990	388	509	890	1498	-	-	1329	-	-
Stage 1	922	824	-	659	627	-	-	-	-	-	-	-
Stage 2	624	617	-	721	821	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	399	461	990	211	468	890	1498	-	-	1329	-	-
Mov Cap-2 Maneuver	399	461	-	211	468	-	-	-	-	-	-	-
Stage 1	853	820	-	610	580	-	-	-	-	-	-	-
Stage 2	492	571	-	436	817	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.2	23.4	2.9	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1498	-	-	741	331	1329	-	-
HCM Lane V/C Ratio	0.068	-	-	0.573	0.416	0.005	-	-
HCM Control Delay (s)	7.6	0	-	16.2	23.4	7.7	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	3.7	2	0	-	-

Intersection	
Int Delay, s/veh	46.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	11	35	112	54	8	6	187	179	243	28	298	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	92	92	92	78	78	78	78	78	78
Heavy Vehicles, %	12	12	12	10	10	10	10	10	10	3	3	3
Mvmt Flow	14	45	144	59	9	7	240	229	312	36	382	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1334	1483	390	1421	1334	385	397	0	0	541	0	0
Stage 1	462	462	-	865	865	-	-	-	-	-	-	-
Stage 2	872	1021	-	556	469	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.2	6.6	6.3	4.2	-	-	4.13	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.59	4.09	3.39	2.29	-	-	2.227	-	-
Pot Cap-1 Maneuver	125	119	637	109	148	645	1119	-	-	1023	-	-
Stage 1	561	548	-	337	360	-	-	-	-	-	-	-
Stage 2	332	301	-	501	547	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	84	77	637	~ 34	96	645	1119	-	-	1023	-	-
Mov Cap-2 Maneuver	84	77	-	~ 34	96	-	-	-	-	-	-	-
Stage 1	380	523	-	228	244	-	-	-	-	-	-	-
Stage 2	215	204	-	339	522	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	103.7	$ 619.3	2.8	0.7
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1119	-	-	208	40	1023	-	-
HCM Lane V/C Ratio	0.214	-	-	0.974	1.848	0.035	-	-
HCM Control Delay (s)	9.1	0	-	103.7	$ 619.3	8.6	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.8	-	-	8.4	7.8	0.1	-	-

Notes

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

Intersection	
Int Delay, s/veh	15.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	7	21	53	2	6	76	582	236	28	421	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	92	92	92	81	81	81	81	81	81
Heavy Vehicles, %	55	55	55	10	10	10	10	10	10	6	6	6
Mvmt Flow	5	9	26	58	2	7	94	719	291	35	520	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1655	1797	530	1668	1661	864	540	0	0	1010	0	0
Stage 1	599	599	-	1052	1052	-	-	-	-	-	-	-
Stage 2	1056	1198	-	616	609	-	-	-	-	-	-	-
Critical Hdwy	7.65	7.05	6.75	7.2	6.6	6.3	4.2	-	-	4.16	-	-
Critical Hdwy Stg 1	6.65	6.05	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.65	6.05	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.995	4.495	3.795	3.59	4.09	3.39	2.29	-	-	2.254	-	-
Pot Cap-1 Maneuver	58	60	458	73	93	342	989	-	-	671	-	-
Stage 1	408	416	-	265	294	-	-	-	-	-	-	-
Stage 2	218	206	-	465	473	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	43	43	458	~ 46	66	342	989	-	-	671	-	-
Mov Cap-2 Maneuver	43	43	-	~ 46	66	-	-	-	-	-	-	-
Stage 1	313	385	-	203	225	-	-	-	-	-	-	-
Stage 2	162	158	-	397	438	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	57.9	$ 357.2	0.8	0.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	989	-	-	106	51	671	-	-
HCM Lane V/C Ratio	0.095	-	-	0.373	1.3	0.052	-	-
HCM Control Delay (s)	9	0	-	57.9	$ 357.2	10.7	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.5	6	0.2	-	-

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	11	35	112	54	8	6	187	179	243	28	298	12
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1696	1900	1900	1727	1900	1900	1727	1900	1900	1845	1900
Adj Flow Rate, veh/h	14	45	144	59	9	7	240	229	312	36	382	15
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.78	0.78	0.78	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	12	12	12	10	10	10	10	10	10	3	3	3
Cap, veh/h	51	103	281	265	39	25	275	232	306	91	913	35
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	46	388	1060	758	147	93	376	384	505	86	1509	57
Grp Volume(v), veh/h	203	0	0	75	0	0	781	0	0	433	0	0
Grp Sat Flow(s),veh/h/ln	1494	0	0	999	0	0	1265	0	0	1652	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	48.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.4	0.0	0.0	7.8	0.0	0.0	60.5	0.0	0.0	12.2	0.0	0.0
Prop In Lane	0.07		0.71	0.79		0.09	0.31		0.40	0.08		0.03
Lane Grp Cap(c), veh/h	434	0	0	329	0	0	812	0	0	1039	0	0
V/C Ratio(X)	0.47	0.00	0.00	0.23	0.00	0.00	0.96	0.00	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	434	0	0	329	0	0	812	0	0	1039	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	31.2	0.0	0.0	29.6	0.0	0.0	20.7	0.0	0.0	10.2	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0	1.6	0.0	0.0	23.5	0.0	0.0	1.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	0.0	1.8	0.0	0.0	26.8	0.0	0.0	6.5	0.0	0.0
LnGrp Delay(d),s/veh	34.8	0.0	0.0	31.2	0.0	0.0	44.1	0.0	0.0	11.4	0.0	0.0
LnGrp LOS	C			C			D			B		
Approach Vol, veh/h		203			75			781			433	
Approach Delay, s/veh		34.8			31.2			44.1			11.4	
Approach LOS		C			C			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		67.0		33.0		67.0		33.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		60.5		26.5		60.5		26.5
Max Q Clear Time (g_c+I1), s		62.5		13.4		14.2		9.8
Green Ext Time (p_c), s		0.0		1.6		15.6		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	32.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	7	21	53	2	6	76	582	236	28	421	16
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1226	1900	1900	1727	1900	1727	1727	1900	1900	1792	1900
Adj Flow Rate, veh/h	5	9	26	58	2	7	94	719	291	35	520	20
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.92	0.92	0.92	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	55	55	55	10	10	10	10	10	10	6	6	6
Cap, veh/h	56	70	158	324	14	32	172	755	305	46	554	20
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.64	0.64	0.64	0.64	0.64	0.64
Sat Flow, veh/h	68	309	702	1143	60	140	799	1170	474	12	859	31
Grp Volume(v), veh/h	40	0	0	67	0	0	94	0	1010	575	0	0
Grp Sat Flow(s),veh/h/ln	1079	0	0	1344	0	0	799	0	1644	902	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	56.6	7.9	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	3.4	0.0	0.0	54.1	0.0	56.6	64.5	0.0	0.0
Prop In Lane	0.12		0.65	0.87		0.10	1.00		0.29	0.06		0.03
Lane Grp Cap(c), veh/h	283	0	0	370	0	0	172	0	1060	620	0	0
V/C Ratio(X)	0.14	0.00	0.00	0.18	0.00	0.00	0.55	0.00	0.95	0.93	0.00	0.00
Avail Cap(c_a), veh/h	283	0	0	370	0	0	172	0	1060	620	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	31.2	0.0	0.0	31.3	0.0	0.0	15.9	0.0	16.3	21.4	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.0	1.1	0.0	0.0	11.8	0.0	18.4	22.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	1.6	0.0	0.0	2.9	0.0	30.7	14.6	0.0	0.0
LnGrp Delay(d),s/veh	32.2	0.0	0.0	32.4	0.0	0.0	27.7	0.0	34.7	43.6	0.0	0.0
LnGrp LOS	C			C			C		C	D		
Approach Vol, veh/h		40			67			1104			575	
Approach Delay, s/veh		32.2			32.4			34.1			43.6	
Approach LOS		C			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		71.0		29.0		71.0		29.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		64.5		22.5		64.5		22.5
Max Q Clear Time (g_c+I1), s		58.6		4.9		66.5		5.4
Green Ext Time (p_c), s		5.0		0.5		0.0		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	37.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	38	28	87	40	10	10	212	857	166	34	441	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	46	34	0	48	12	12	255	1033	0	41	531	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	183	182	154	156	63	63	292	2555	1143	345	1774	794
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.10	0.18	0.77	0.00	0.54	0.54	0.00
Sat Flow, veh/h	1368	1845	1568	1027	642	642	1660	3312	1482	509	3312	1482
Grp Volume(v), veh/h	46	34	0	48	0	24	255	1033	0	41	531	0
Grp Sat Flow(s),veh/h/ln	1368	1845	1568	1027	0	1284	1660	1656	1482	509	1656	1482
Q Serve(g_s), s	3.2	1.7	0.0	4.5	0.0	1.7	15.0	10.4	0.0	4.1	8.9	0.0
Cycle Q Clear(g_c), s	4.9	1.7	0.0	6.2	0.0	1.7	15.0	10.4	0.0	4.1	8.9	0.0
Prop In Lane	1.00		1.00	1.00		0.50	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	183	182	154	156	0	126	292	2555	1143	345	1774	794
V/C Ratio(X)	0.25	0.19	0.00	0.31	0.00	0.19	0.87	0.40	0.00	0.12	0.30	0.00
Avail Cap(c_a), veh/h	404	480	408	322	0	334	415	2555	1143	345	1774	794
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.7	41.4	0.0	44.2	0.0	41.4	40.1	3.8	0.0	11.7	12.8	0.0
Incr Delay (d2), s/veh	0.7	0.5	0.0	1.1	0.0	0.7	13.6	0.5	0.0	0.7	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.9	0.0	1.3	0.0	0.6	8.0	4.8	0.0	0.6	4.2	0.0
LnGrp Delay(d),s/veh	44.4	41.9	0.0	45.3	0.0	42.1	53.8	4.3	0.0	12.4	13.3	0.0
LnGrp LOS	D	D		D		D	D	A		B	B	
Approach Vol, veh/h		80			72			1288			572	
Approach Delay, s/veh		43.3			44.3			14.1			13.2	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		83.6		16.4	23.6	60.1		16.4
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		61.0		26.0	25.0	30.0		26.0
Max Q Clear Time (g_c+I1), s		12.4		6.9	17.0	10.9		8.2
Green Ext Time (p_c), s		20.4		0.7	0.6	12.3		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	16.1
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	91	160	267	1186	563	44
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	105	0	307	1363	647	51
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	296	136	348	2641	1593	713
Arrive On Green	0.09	0.00	0.20	0.78	0.51	0.51
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	105	0	307	1363	647	51
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	3.1	0.0	17.5	15.0	12.8	1.9
Cycle Q Clear(g_c), s	3.1	0.0	17.5	15.0	12.8	1.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	296	136	348	2641	1593	713
V/C Ratio(X)	0.35	0.00	0.88	0.52	0.41	0.07
Avail Cap(c_a), veh/h	313	144	495	2641	1593	713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	0.0	38.7	4.2	15.0	12.4
Incr Delay (d2), s/veh	0.7	0.0	12.7	0.7	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	9.4	7.1	5.7	0.7
LnGrp Delay(d),s/veh	43.1	0.0	51.4	4.9	15.8	12.6
LnGrp LOS	D		D	A	B	B
Approach Vol, veh/h	105			1670	698	
Approach Delay, s/veh	43.1			13.5	15.6	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		84.0		16.0	26.4	57.7		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	29.0	42.0		
Max Q Clear Time (g_c+I1), s		17.0		5.1	19.5	14.8		
Green Ext Time (p_c), s		32.0		0.1	0.9	19.5		

Intersection Summary	
HCM 2010 Ctrl Delay	15.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	480	659	9	266	641	589	283	750	192	432	438	227
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	522	716	10	289	697	0	308	815	0	470	476	247
Adj No. of Lanes	2	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	588	929	13	335	1093	489	618	872	390	534	993	444
Arrive On Green	0.09	0.28	0.28	0.13	0.33	0.00	0.08	0.27	0.00	0.13	0.32	0.32
Sat Flow, veh/h	3163	3284	46	1660	3312	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	522	354	372	289	697	0	308	815	0	470	476	247
Grp Sat Flow(s),veh/h/ln	1581	1626	1704	1660	1656	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	11.0	25.4	25.4	15.2	22.7	0.0	8.9	30.9	0.0	13.6	15.6	18.6
Cycle Q Clear(g_c), s	11.0	25.4	25.4	15.2	22.7	0.0	8.9	30.9	0.0	13.6	15.6	18.6
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	588	460	482	335	1093	489	618	872	390	534	993	444
V/C Ratio(X)	0.89	0.77	0.77	0.86	0.64	0.00	0.50	0.93	0.00	0.88	0.48	0.56
Avail Cap(c_a), veh/h	588	460	482	335	1093	489	618	877	392	596	1061	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.2	41.8	41.8	29.5	36.2	0.0	30.7	45.6	0.0	31.1	35.1	36.1
Incr Delay (d2), s/veh	15.3	11.8	11.3	20.1	2.8	0.0	0.6	16.7	0.0	13.3	0.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	12.9	13.5	8.8	10.8	0.0	4.0	16.1	0.0	6.7	6.8	7.4
LnGrp Delay(d),s/veh	53.5	53.6	53.1	49.6	39.0	0.0	31.3	62.4	0.0	44.4	35.4	37.3
LnGrp LOS	D	D	D	D	D		C	E		D	D	D
Approach Vol, veh/h		1248			986			1123			1193	
Approach Delay, s/veh		53.4			42.1			53.8			39.4	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	43.0	21.4	39.8	17.0	49.0	15.0	46.2
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	17.0	36.0	19.0	34.0	11.0	42.0	10.0	43.0
Max Q Clear Time (g_c+I1), s	17.2	27.4	15.6	32.9	13.0	24.7	10.9	20.6
Green Ext Time (p_c), s	0.0	5.8	0.8	0.9	0.0	9.7	0.0	12.0

Intersection Summary	
HCM 2010 Ctrl Delay	47.4
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	11.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	75	236	38	63	5	78	104	25	5	49	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	750	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	21	97	306	49	82	6	101	135	32	6	64	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	479	451	68	636	438	151	71	0	0	168	0	0
Stage 1	81	81	-	354	354	-	-	-	-	-	-	-
Stage 2	398	370	-	282	84	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	494	501	990	388	509	890	1498	-	-	1329	-	-
Stage 1	922	824	-	659	627	-	-	-	-	-	-	-
Stage 2	624	617	-	721	821	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	399	461	990	211	468	890	1498	-	-	1329	-	-
Mov Cap-2 Maneuver	399	461	-	211	468	-	-	-	-	-	-	-
Stage 1	853	820	-	610	580	-	-	-	-	-	-	-
Stage 2	492	571	-	436	817	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.2	18.8	2.9	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1498	-	-	741	211	485	1329	-	-
HCM Lane V/C Ratio	0.068	-	-	0.573	0.234	0.182	0.005	-	-
HCM Control Delay (s)	7.6	0	-	16.2	27.2	14.1	7.7	0	-
HCM Lane LOS	A	A	-	C	D	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	3.7	0.9	0.7	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	9	248	186	25	33	144	477	42	9	904	56
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	29	11	0	232	31	41	180	596	0	11	1130	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	273	347	295	336	141	187	211	2160	966	450	1634	731
Arrive On Green	0.19	0.19	0.00	0.19	0.19	0.19	0.13	0.68	0.00	0.48	0.48	0.00
Sat Flow, veh/h	1273	1792	1524	1398	729	964	1601	3195	1429	780	3374	1509
Grp Volume(v), veh/h	29	11	0	232	0	72	180	596	0	11	1130	0
Grp Sat Flow(s),veh/h/ln	1273	1792	1524	1398	0	1693	1601	1597	1429	780	1687	1509
Q Serve(g_s), s	2.0	0.5	0.0	16.1	0.0	3.6	11.0	7.4	0.0	0.7	26.0	0.0
Cycle Q Clear(g_c), s	5.5	0.5	0.0	16.6	0.0	3.6	11.0	7.4	0.0	0.7	26.0	0.0
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	273	347	295	336	0	328	211	2160	966	450	1634	731
V/C Ratio(X)	0.11	0.03	0.00	0.69	0.00	0.22	0.85	0.28	0.00	0.02	0.69	0.00
Avail Cap(c_a), veh/h	326	421	358	394	0	398	288	2160	966	450	1634	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.3	32.7	0.0	39.5	0.0	33.9	42.5	6.4	0.0	13.5	20.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	4.1	0.0	0.3	16.3	0.3	0.0	0.1	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.3	0.0	6.6	0.0	1.7	5.8	3.3	0.0	0.2	12.6	0.0
LnGrp Delay(d),s/veh	36.4	32.7	0.0	43.6	0.0	34.3	58.8	6.8	0.0	13.6	22.4	0.0
LnGrp LOS	D	C		D		C	E	A		B	C	
Approach Vol, veh/h		40			304			776			1141	
Approach Delay, s/veh		35.4			41.4			18.8			22.3	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		74.1		25.9	19.2	54.9		25.9
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		63.5		23.5	18.0	39.5		23.5
Max Q Clear Time (g_c+I1), s		9.4		7.5	13.0	28.0		18.6
Green Ext Time (p_c), s		23.5		1.5	0.3	8.8		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	23.9
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	274	230	697	1406	112
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	57	0	256	774	1562	124
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	261	120	289	2548	1879	841
Arrive On Green	0.08	0.00	0.18	0.79	0.55	0.55
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	57	0	256	774	1562	124
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	1.6	0.0	15.5	6.6	38.0	4.0
Cycle Q Clear(g_c), s	1.6	0.0	15.5	6.6	38.0	4.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	261	120	289	2548	1879	841
V/C Ratio(X)	0.22	0.00	0.89	0.30	0.83	0.15
Avail Cap(c_a), veh/h	328	151	355	2548	1879	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.1	0.0	40.1	2.9	18.5	10.9
Incr Delay (d2), s/veh	0.4	0.0	19.8	0.3	4.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	8.5	3.0	19.0	1.7
LnGrp Delay(d),s/veh	43.5	0.0	59.8	3.2	23.0	11.3
LnGrp LOS	D		E	A	C	B
Approach Vol, veh/h	57			1030	1686	
Approach Delay, s/veh	43.5			17.3	22.1	
Approach LOS	D			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		85.6		14.4	23.9	61.7		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	22.0	49.0		
Max Q Clear Time (g_c+I1), s		8.6		3.6	17.5	40.0		
Green Ext Time (p_c), s		44.3		0.1	0.4	8.3		

Intersection Summary	
HCM 2010 Ctrl Delay	20.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	216	627	6	288	781	303	387	374	313	452	694	350
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	235	682	7	313	849	0	421	407	0	491	754	380
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	282	1042	11	391	1272	569	490	882	395	705	826	369
Arrive On Green	0.08	0.31	0.31	0.14	0.38	0.00	0.11	0.26	0.00	0.10	0.25	0.25
Sat Flow, veh/h	1645	3328	34	1691	3374	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	235	336	353	313	849	0	421	407	0	491	754	380
Grp Sat Flow(s),veh/h/ln	1645	1641	1721	1691	1687	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	10.0	23.0	23.0	15.7	27.2	0.0	12.2	13.2	0.0	13.0	29.3	33.0
Cycle Q Clear(g_c), s	10.0	23.0	23.0	15.7	27.2	0.0	12.2	13.2	0.0	13.0	29.3	33.0
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	282	514	539	391	1272	569	490	882	395	705	826	369
V/C Ratio(X)	0.83	0.65	0.65	0.80	0.67	0.00	0.86	0.46	0.00	0.70	0.91	1.03
Avail Cap(c_a), veh/h	282	514	539	452	1272	569	490	882	395	705	826	369
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	38.6	38.6	26.7	33.7	0.0	34.5	40.3	0.0	34.8	47.1	48.5
Incr Delay (d2), s/veh	18.7	6.4	6.1	8.7	2.8	0.0	14.2	0.4	0.0	3.0	14.5	54.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	11.4	11.9	8.3	13.1	0.0	6.5	6.2	0.0	6.8	14.8	18.8
LnGrp Delay(d),s/veh	54.5	44.9	44.7	35.5	36.5	0.0	48.7	40.7	0.0	37.8	61.6	102.9
LnGrp LOS	D	D	D	D	D		D	D		D	E	F
Approach Vol, veh/h		924			1162			828			1625	
Approach Delay, s/veh		47.3			36.2			44.7			64.1	
Approach LOS		D			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.3	47.7	18.0	40.0	16.0	56.0	19.0	39.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	23.0	36.0	13.0	34.0	10.0	49.0	14.0	33.0
Max Q Clear Time (g_c+I1), s	17.7	25.0	15.0	15.2	12.0	29.2	14.2	35.0
Green Ext Time (p_c), s	0.6	7.5	0.0	10.6	0.0	11.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.0
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	14.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	39	194	14	81	0	295	70	60	9	161	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	11	42	209	15	87	0	317	75	65	10	173	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	994	983	190	1076	968	108	206	0	0	140	0	0
Stage 1	209	209	-	742	742	-	-	-	-	-	-	-
Stage 2	785	774	-	334	226	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	222	247	847	195	252	940	1336	-	-	1362	-	-
Stage 1	788	725	-	404	419	-	-	-	-	-	-	-
Stage 2	383	405	-	676	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	114	182	847	97	185	940	1336	-	-	1362	-	-
Mov Cap-2 Maneuver	114	182	-	97	185	-	-	-	-	-	-	-
Stage 1	584	719	-	299	310	-	-	-	-	-	-	-
Stage 2	204	300	-	476	707	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.8	58.3	5.9	0.3
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1336	-	-	458	163	1362	-	-
HCM Lane V/C Ratio	0.237	-	-	0.571	0.627	0.007	-	-
HCM Control Delay (s)	8.5	0	-	22.8	58.3	7.7	0	-
HCM Lane LOS	A	A	-	C	F	A	A	-
HCM 95th %tile Q(veh)	0.9	-	-	3.5	3.5	0	-	-

Intersection	
Int Delay, s/veh	159.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	20	9	179	218	31	25	106	338	60	7	279	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	92	92	92	86	86	86	86	86	86
Heavy Vehicles, %	9	9	9	10	10	10	9	9	9	8	8	8
Mvmt Flow	23	10	208	237	34	27	123	393	70	8	324	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1053	1057	332	1132	1030	428	340	0	0	463	0	0
Stage 1	348	348	-	674	674	-	-	-	-	-	-	-
Stage 2	705	709	-	458	356	-	-	-	-	-	-	-
Critical Hdwy	7.19	6.59	6.29	7.2	6.6	6.3	4.19	-	-	4.18	-	-
Critical Hdwy Stg 1	6.19	5.59	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.19	5.59	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.581	4.081	3.381	3.59	4.09	3.39	2.281	-	-	2.272	-	-
Pot Cap-1 Maneuver	198	219	694	~ 174	226	610	1181	-	-	1067	-	-
Stage 1	654	622	-	431	442	-	-	-	-	-	-	-
Stage 2	416	427	-	568	615	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	145	186	694	~ 103	192	610	1181	-	-	1067	-	-
Mov Cap-2 Maneuver	145	186	-	~ 103	192	-	-	-	-	-	-	-
Stage 1	561	616	-	370	379	-	-	-	-	-	-	-
Stage 2	311	366	-	387	609	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.6	$ 768.6	1.8	0.2
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1181	-	-	468	118	1067	-	-
HCM Lane V/C Ratio	0.104	-	-	0.517	2.524	0.008	-	-
HCM Control Delay (s)	8.4	0	-	20.6	$ 768.6	8.4	0	-
HCM Lane LOS	A	A	-	C	F	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	2.9	26.7	0	-	-

Notes

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

Intersection	
Int Delay, s/veh	193.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	2	89	212	6	25	17	489	58	7	653	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	92	83	92	92	92	83	83	92	92	83	83
Heavy Vehicles, %	3	3	3	10	10	10	9	9	9	10	10	10
Mvmt Flow	17	2	107	230	7	27	20	589	63	8	787	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1482	1497	789	1521	1469	621	792	0	0	652	0	0
Stage 1	804	804	-	662	662	-	-	-	-	-	-	-
Stage 2	678	693	-	859	807	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.2	6.6	6.3	4.19	-	-	4.2	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.59	4.09	3.39	2.281	-	-	2.29	-	-
Pot Cap-1 Maneuver	103	122	389	~ 93	122	473	798	-	-	898	-	-
Stage 1	375	394	-	438	447	-	-	-	-	-	-	-
Stage 2	440	443	-	340	383	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	89	115	389	~ 64	115	473	798	-	-	898	-	-
Mov Cap-2 Maneuver	89	115	-	~ 64	115	-	-	-	-	-	-	-
Stage 1	360	388	-	420	429	-	-	-	-	-	-	-
Stage 2	392	425	-	241	377	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.1	$ 1345.6	0.3	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	798	-	-	261	71	898	-	-
HCM Lane V/C Ratio	0.026	-	-	0.484	3.72	0.008	-	-
HCM Control Delay (s)	9.6	0	-	31.3	$ 1345.6	9	0	-
HCM Lane LOS	A	A	-	D	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.5	27.7	0	-	-

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	9	179	218	31	25	106	338	60	7	279	13
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1743	1900	1900	1727	1900	1900	1743	1900	1900	1759	1900
Adj Flow Rate, veh/h	23	10	208	237	34	27	123	393	70	8	324	15
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	9	9	9	10	10	10	9	9	9	8	8	8
Cap, veh/h	71	47	496	355	45	33	181	526	90	43	828	38
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	87	128	1352	791	122	91	273	1046	179	13	1645	75
Grp Volume(v), veh/h	241	0	0	298	0	0	586	0	0	347	0	0
Grp Sat Flow(s),veh/h/ln	1567	0	0	1003	0	0	1498	0	0	1733	0	0
Q Serve(g_s), s	0.0	0.0	0.0	16.5	0.0	0.0	18.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	0.0	0.0	28.5	0.0	0.0	31.3	0.0	0.0	12.3	0.0	0.0
Prop In Lane	0.10		0.86	0.80		0.09	0.21		0.12	0.02		0.04
Lane Grp Cap(c), veh/h	614	0	0	433	0	0	797	0	0	909	0	0
V/C Ratio(X)	0.39	0.00	0.00	0.69	0.00	0.00	0.74	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	614	0	0	433	0	0	797	0	0	909	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.8	0.0	0.0	30.5	0.0	0.0	19.8	0.0	0.0	15.4	0.0	0.0
Incr Delay (d2), s/veh	1.9	0.0	0.0	8.7	0.0	0.0	6.0	0.0	0.0	1.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	0.0	0.0	8.6	0.0	0.0	14.3	0.0	0.0	6.2	0.0	0.0
LnGrp Delay(d),s/veh	25.7	0.0	0.0	39.2	0.0	0.0	25.8	0.0	0.0	16.6	0.0	0.0
LnGrp LOS	C			D			C			B		
Approach Vol, veh/h		241			298			586			347	
Approach Delay, s/veh		25.7			39.2			25.8			16.6	
Approach LOS		C			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		56.8		43.2		56.8		43.2
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		50.3		36.7		50.3		36.7
Max Q Clear Time (g_c+I1), s		33.3		14.0		14.3		30.5
Green Ext Time (p_c), s		6.7		4.4		8.9		2.1

Intersection Summary	
HCM 2010 Ctrl Delay	26.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	2	89	212	6	25	17	489	58	7	653	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1727	1900	1743	1743	1900	1900	1727	1900
Adj Flow Rate, veh/h	17	2	107	230	7	27	20	589	63	8	787	5
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.83	0.92	0.83	0.92	0.92	0.92	0.83	0.83	0.92	0.92	0.83	0.83
Percent Heavy Veh, %	3	3	3	10	10	10	9	9	9	10	10	10
Cap, veh/h	82	32	412	377	9	36	270	890	95	39	978	6
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.57	0.57	0.57	0.57	0.57	0.57
Sat Flow, veh/h	139	109	1396	1049	32	123	638	1548	166	5	1702	11
Grp Volume(v), veh/h	126	0	0	264	0	0	20	0	652	800	0	0
Grp Sat Flow(s),veh/h/ln	1644	0	0	1204	0	0	638	0	1714	1718	0	0
Q Serve(g_s), s	0.0	0.0	0.0	14.0	0.0	0.0	0.0	0.0	26.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	6.0	0.0	0.0	20.0	0.0	0.0	5.4	0.0	26.1	36.7	0.0	0.0
Prop In Lane	0.13		0.85	0.87		0.10	1.00		0.10	0.01		0.01
Lane Grp Cap(c), veh/h	526	0	0	422	0	0	270	0	985	1024	0	0
V/C Ratio(X)	0.24	0.00	0.00	0.62	0.00	0.00	0.07	0.00	0.66	0.78	0.00	0.00
Avail Cap(c_a), veh/h	526	0	0	422	0	0	270	0	985	1024	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	27.0	0.0	0.0	32.0	0.0	0.0	10.2	0.0	14.6	16.8	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	6.8	0.0	0.0	0.5	0.0	3.5	5.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	7.4	0.0	0.0	0.3	0.0	13.1	19.0	0.0	0.0
LnGrp Delay(d),s/veh	28.0	0.0	0.0	38.8	0.0	0.0	10.7	0.0	18.1	22.8	0.0	0.0
LnGrp LOS	C			D			B		B	C		
Approach Vol, veh/h		126			264			672			800	
Approach Delay, s/veh		28.0			38.8			17.8			22.8	
Approach LOS		C			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		64.0		36.0		64.0		36.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		57.5		29.5		57.5		29.5
Max Q Clear Time (g_c+I1), s		28.1		8.0		38.7		22.0
Green Ext Time (p_c), s		15.0		2.9		11.4		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	9	248	186	25	33	144	477	42	9	904	56
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	29	11	0	232	31	41	180	596	0	11	1130	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	273	347	295	336	141	187	211	2160	966	450	1634	731
Arrive On Green	0.19	0.19	0.00	0.19	0.19	0.19	0.13	0.68	0.00	0.48	0.48	0.00
Sat Flow, veh/h	1273	1792	1524	1398	729	964	1601	3195	1429	780	3374	1509
Grp Volume(v), veh/h	29	11	0	232	0	72	180	596	0	11	1130	0
Grp Sat Flow(s),veh/h/ln	1273	1792	1524	1398	0	1693	1601	1597	1429	780	1687	1509
Q Serve(g_s), s	2.0	0.5	0.0	16.1	0.0	3.6	11.0	7.4	0.0	0.7	26.0	0.0
Cycle Q Clear(g_c), s	5.5	0.5	0.0	16.6	0.0	3.6	11.0	7.4	0.0	0.7	26.0	0.0
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	273	347	295	336	0	328	211	2160	966	450	1634	731
V/C Ratio(X)	0.11	0.03	0.00	0.69	0.00	0.22	0.85	0.28	0.00	0.02	0.69	0.00
Avail Cap(c_a), veh/h	326	421	358	394	0	398	288	2160	966	450	1634	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.3	32.7	0.0	39.5	0.0	33.9	42.5	6.4	0.0	13.5	20.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	4.1	0.0	0.3	16.3	0.3	0.0	0.1	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.3	0.0	6.6	0.0	1.7	5.8	3.3	0.0	0.2	12.6	0.0
LnGrp Delay(d),s/veh	36.4	32.7	0.0	43.6	0.0	34.3	58.8	6.8	0.0	13.6	22.4	0.0
LnGrp LOS	D	C		D		C	E	A		B	C	
Approach Vol, veh/h		40			304			776			1141	
Approach Delay, s/veh		35.4			41.4			18.8			22.3	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		74.1		25.9	19.2	54.9		25.9
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		63.5		23.5	18.0	39.5		23.5
Max Q Clear Time (g_c+I1), s		9.4		7.5	13.0	28.0		18.6
Green Ext Time (p_c), s		23.5		1.5	0.3	8.8		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	23.9
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	274	230	697	1406	112
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	57	0	256	774	1562	124
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	261	120	289	2548	1879	841
Arrive On Green	0.08	0.00	0.18	0.79	0.55	0.55
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	57	0	256	774	1562	124
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	1.6	0.0	15.5	6.6	38.0	4.0
Cycle Q Clear(g_c), s	1.6	0.0	15.5	6.6	38.0	4.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	261	120	289	2548	1879	841
V/C Ratio(X)	0.22	0.00	0.89	0.30	0.83	0.15
Avail Cap(c_a), veh/h	328	151	355	2548	1879	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.1	0.0	40.1	2.9	18.5	10.9
Incr Delay (d2), s/veh	0.4	0.0	19.8	0.3	4.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	8.5	3.0	19.0	1.7
LnGrp Delay(d),s/veh	43.5	0.0	59.8	3.2	23.0	11.3
LnGrp LOS	D		E	A	C	B
Approach Vol, veh/h	57			1030	1686	
Approach Delay, s/veh	43.5			17.3	22.1	
Approach LOS	D			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		85.6		14.4	23.9	61.7		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	22.0	49.0		
Max Q Clear Time (g_c+I1), s		8.6		3.6	17.5	40.0		
Green Ext Time (p_c), s		44.3		0.1	0.4	8.3		

Intersection Summary	
HCM 2010 Ctrl Delay	20.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	216	627	6	288	781	303	387	374	313	452	694	350
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	235	682	7	313	849	0	421	407	0	491	754	380
Adj No. of Lanes	2	2	0	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	527	981	10	380	1220	546	508	907	406	745	876	392
Arrive On Green	0.08	0.29	0.29	0.14	0.36	0.00	0.11	0.27	0.00	0.11	0.27	0.27
Sat Flow, veh/h	3191	3328	34	1691	3374	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	235	336	353	313	849	0	421	407	0	491	754	380
Grp Sat Flow(s),veh/h/ln	1596	1641	1721	1691	1687	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	6.5	23.6	23.6	16.1	27.9	0.0	11.9	13.0	0.0	14.0	28.7	33.6
Cycle Q Clear(g_c), s	6.5	23.6	23.6	16.1	27.9	0.0	11.9	13.0	0.0	14.0	28.7	33.6
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	527	484	507	380	1220	546	508	907	406	745	876	392
V/C Ratio(X)	0.45	0.70	0.70	0.82	0.70	0.00	0.83	0.45	0.00	0.66	0.86	0.97
Avail Cap(c_a), veh/h	527	484	507	436	1220	546	509	909	407	745	876	392
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	40.6	40.7	28.1	35.4	0.0	33.4	39.5	0.0	31.5	45.2	46.9
Incr Delay (d2), s/veh	0.6	8.0	7.7	10.9	3.3	0.0	11.0	0.3	0.0	2.2	8.7	37.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	11.8	12.4	8.6	13.5	0.0	6.1	6.1	0.0	6.6	13.9	17.6
LnGrp Delay(d),s/veh	30.1	48.7	48.3	39.1	38.7	0.0	44.4	39.8	0.0	33.6	53.9	84.3
LnGrp LOS	C	D	D	D	D		D	D		C	D	F
Approach Vol, veh/h		924			1162			828			1625	
Approach Delay, s/veh		43.8			38.8			42.1			54.9	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.7	45.3	19.0	40.9	16.0	54.0	18.9	41.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	23.0	34.0	14.0	35.0	10.0	47.0	14.0	35.0
Max Q Clear Time (g_c+I1), s	18.1	25.6	16.0	15.0	8.5	29.9	13.9	35.6
Green Ext Time (p_c), s	0.6	6.0	0.0	10.9	0.2	10.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.2
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	12.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	39	194	14	81	0	295	70	60	9	161	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	750	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	11	42	209	15	87	0	317	75	65	10	173	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	994	983	190	1076	968	108	206	0	0	140	0	0
Stage 1	209	209	-	742	742	-	-	-	-	-	-	-
Stage 2	785	774	-	334	226	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	222	247	847	195	252	940	1336	-	-	1362	-	-
Stage 1	788	725	-	404	419	-	-	-	-	-	-	-
Stage 2	383	405	-	676	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	114	182	847	97	185	940	1336	-	-	1362	-	-
Mov Cap-2 Maneuver	114	182	-	97	185	-	-	-	-	-	-	-
Stage 1	584	719	-	299	310	-	-	-	-	-	-	-
Stage 2	204	300	-	476	707	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.8	41.9	5.9	0.3
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1336	-	-	458	97	185	1362	-	-
HCM Lane V/C Ratio	0.237	-	-	0.571	0.155	0.471	0.007	-	-
HCM Control Delay (s)	8.5	0	-	22.8	48.8	40.7	7.7	0	-
HCM Lane LOS	A	A	-	C	E	E	A	A	-
HCM 95th %tile Q(veh)	0.9	-	-	3.5	0.5	2.3	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	35	149	54	8	6	249	212	243	28	376	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1696	1900	1900	1727	1900	1900	1727	1900	1900	1845	1900
Adj Flow Rate, veh/h	17	45	191	59	9	7	319	272	312	36	482	19
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.78	0.78	0.78	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	12	12	12	10	10	10	10	10	10	3	3	3
Cap, veh/h	52	90	319	253	37	23	272	191	219	78	931	36
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	48	315	1119	662	130	82	382	326	374	67	1591	61
Grp Volume(v), veh/h	253	0	0	75	0	0	903	0	0	537	0	0
Grp Sat Flow(s),veh/h/ln	1483	0	0	874	0	0	1083	0	0	1719	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	41.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.5	0.0	0.0	9.5	0.0	0.0	58.5	0.0	0.0	17.2	0.0	0.0
Prop In Lane	0.07		0.75	0.79		0.09	0.35		0.35	0.07		0.04
Lane Grp Cap(c), veh/h	461	0	0	314	0	0	682	0	0	1044	0	0
V/C Ratio(X)	0.55	0.00	0.00	0.24	0.00	0.00	1.32	0.00	0.00	0.51	0.00	0.00
Avail Cap(c_a), veh/h	461	0	0	314	0	0	682	0	0	1044	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.8	0.0	0.0	28.6	0.0	0.0	24.9	0.0	0.0	12.2	0.0	0.0
Incr Delay (d2), s/veh	4.6	0.0	0.0	1.8	0.0	0.0	155.9	0.0	0.0	1.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	0.0	1.8	0.0	0.0	48.3	0.0	0.0	9.2	0.0	0.0
LnGrp Delay(d),s/veh	35.4	0.0	0.0	30.4	0.0	0.0	180.8	0.0	0.0	14.0	0.0	0.0
LnGrp LOS	D			C			F			B		
Approach Vol, veh/h		253			75			903			537	
Approach Delay, s/veh		35.4			30.4			180.8			14.0	
Approach LOS		D			C			F			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		65.0		35.0		65.0		35.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		58.5		28.5		58.5		28.5
Max Q Clear Time (g_c+I1), s		60.5		16.5		19.2		11.5
Green Ext Time (p_c), s		0.0		1.8		20.0		2.2

Intersection Summary	
HCM 2010 Ctrl Delay	102.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	7	27	53	2	6	101	670	236	28	532	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1226	1900	1900	1727	1900	1727	1727	1900	1900	1792	1900
Adj Flow Rate, veh/h	5	9	33	58	2	7	125	827	291	35	657	26
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.92	0.92	0.92	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	55	55	55	10	10	10	10	10	10	6	6	6
Cap, veh/h	52	60	170	325	14	32	164	788	277	38	441	17
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.64	0.64	0.64	0.64	0.64	0.64
Sat Flow, veh/h	52	268	755	1146	60	141	700	1222	430	0	684	26
Grp Volume(v), veh/h	47	0	0	67	0	0	125	0	1118	718	0	0
Grp Sat Flow(s),veh/h/ln	1075	0	0	1347	0	0	700	0	1651	710	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	0.0	3.3	0.0	0.0	64.5	0.0	64.5	64.5	0.0	0.0
Prop In Lane	0.11		0.70	0.87		0.10	1.00		0.26	0.05		0.04
Lane Grp Cap(c), veh/h	282	0	0	370	0	0	164	0	1065	496	0	0
V/C Ratio(X)	0.17	0.00	0.00	0.18	0.00	0.00	0.76	0.00	1.05	1.45	0.00	0.00
Avail Cap(c_a), veh/h	282	0	0	370	0	0	164	0	1065	496	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	31.4	0.0	0.0	31.3	0.0	0.0	26.3	0.0	17.8	33.5	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	0.0	1.1	0.0	0.0	28.0	0.0	41.5	213.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	1.6	0.0	0.0	4.7	0.0	41.3	41.9	0.0	0.0
LnGrp Delay(d),s/veh	32.7	0.0	0.0	32.4	0.0	0.0	54.3	0.0	59.3	246.4	0.0	0.0
LnGrp LOS	C			C			D		F	F		
Approach Vol, veh/h		47			67			1243			718	
Approach Delay, s/veh		32.7			32.4			58.8			246.4	
Approach LOS		C			C			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		71.0		29.0		71.0		29.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		64.5		22.5		64.5		22.5
Max Q Clear Time (g_c+I1), s		66.5		5.5		66.5		5.3
Green Ext Time (p_c), s		0.0		0.5		0.0		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	122.3
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	39	32	116	46	12	11	282	971	193	38	551	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	47	39	0	55	14	13	340	1170	0	46	664	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	181	183	155	153	66	61	349	2553	1142	296	1659	742
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.10	0.21	0.77	0.00	0.50	0.50	0.00
Sat Flow, veh/h	1364	1845	1568	1022	668	620	1660	3312	1482	447	3312	1482
Grp Volume(v), veh/h	47	39	0	55	0	27	340	1170	0	46	664	0
Grp Sat Flow(s),veh/h/ln	1364	1845	1568	1022	0	1288	1660	1656	1482	447	1656	1482
Q Serve(g_s), s	3.3	1.9	0.0	5.2	0.0	1.9	20.3	12.5	0.0	5.7	12.5	0.0
Cycle Q Clear(g_c), s	5.2	1.9	0.0	7.2	0.0	1.9	20.3	12.5	0.0	5.7	12.5	0.0
Prop In Lane	1.00		1.00	1.00		0.48	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	181	183	155	153	0	128	349	2553	1142	296	1659	742
V/C Ratio(X)	0.26	0.21	0.00	0.36	0.00	0.21	0.98	0.46	0.00	0.16	0.40	0.00
Avail Cap(c_a), veh/h	400	480	408	318	0	335	349	2553	1142	296	1659	742
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.9	41.5	0.0	44.8	0.0	41.5	39.2	4.1	0.0	13.9	15.6	0.0
Incr Delay (d2), s/veh	0.8	0.6	0.0	1.4	0.0	0.8	41.4	0.6	0.0	1.1	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.0	0.0	1.5	0.0	0.7	13.4	5.9	0.0	0.8	5.9	0.0
LnGrp Delay(d),s/veh	44.6	42.0	0.0	46.2	0.0	42.3	80.7	4.7	0.0	15.0	16.3	0.0
LnGrp LOS	D	D		D		D	F	A		B	B	
Approach Vol, veh/h		86			82			1510			710	
Approach Delay, s/veh		43.4			44.9			21.8			16.2	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		83.6		16.4	27.0	56.6		16.4
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		61.0		26.0	21.0	34.0		26.0
Max Q Clear Time (g_c+I1), s		14.5		7.2	22.3	14.5		9.2
Green Ext Time (p_c), s		25.3		0.8	0.0	14.3		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	98	213	356	1405	711	53
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	113	0	409	1615	817	61
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	300	138	444	2637	1414	633
Arrive On Green	0.10	0.00	0.26	0.77	0.45	0.45
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	113	0	409	1615	817	61
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	3.4	0.0	23.3	20.4	19.4	2.5
Cycle Q Clear(g_c), s	3.4	0.0	23.3	20.4	19.4	2.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	300	138	444	2637	1414	633
V/C Ratio(X)	0.38	0.00	0.92	0.61	0.58	0.10
Avail Cap(c_a), veh/h	313	144	495	2637	1414	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	0.0	36.0	4.8	20.2	15.6
Incr Delay (d2), s/veh	0.8	0.0	21.6	1.1	1.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	13.7	9.8	8.6	1.0
LnGrp Delay(d),s/veh	43.2	0.0	57.6	5.9	21.9	15.9
LnGrp LOS	D		E	A	C	B
Approach Vol, veh/h	113			2024	878	
Approach Delay, s/veh	43.2			16.4	21.5	
Approach LOS	D			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		83.9		16.1	32.0	51.9		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	29.0	42.0		
Max Q Clear Time (g_c+I1), s		22.4		5.4	25.3	21.4		
Green Ext Time (p_c), s		39.3		0.2	0.7	17.8		

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	582	878	12	354	854	722	377	967	255	561	571	290
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	633	954	13	385	928	0	410	1051	0	610	621	315
Adj No. of Lanes	2	3	0	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	549	1453	20	577	1537	479	534	833	373	580	1038	465
Arrive On Green	0.08	0.31	0.31	0.10	0.32	0.00	0.08	0.25	0.00	0.15	0.33	0.33
Sat Flow, veh/h	3163	4751	65	3221	4759	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	633	625	342	385	928	0	410	1051	0	610	621	315
Grp Sat Flow(s),veh/h/ln	1581	1558	1700	1610	1586	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	11.0	22.7	22.7	10.5	21.3	0.0	10.0	33.0	0.0	20.0	21.5	25.2
Cycle Q Clear(g_c), s	11.0	22.7	22.7	10.5	21.3	0.0	10.0	33.0	0.0	20.0	21.5	25.2
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	549	953	520	577	1537	479	534	833	373	580	1038	465
V/C Ratio(X)	1.15	0.66	0.66	0.67	0.60	0.00	0.77	1.26	0.00	1.05	0.60	0.68
Avail Cap(c_a), veh/h	549	953	520	670	1537	479	534	833	373	580	1038	465
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.7	39.2	39.2	29.0	37.0	0.0	37.6	48.5	0.0	38.8	36.3	37.5
Incr Delay (d2), s/veh	88.4	3.5	6.4	2.1	1.8	0.0	6.7	127.3	0.0	51.5	0.9	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.8	10.2	11.5	4.8	9.6	0.0	3.2	29.7	0.0	14.5	9.5	10.2
LnGrp Delay(d),s/veh	128.2	42.7	45.6	31.1	38.8	0.0	44.3	175.8	0.0	90.2	37.2	41.5
LnGrp LOS	F	D	D	C	D		D	F		F	D	D
Approach Vol, veh/h		1600			1313			1461			1546	
Approach Delay, s/veh		77.1			36.5			138.9			59.0	
Approach LOS		E			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.2	46.8	25.0	39.0	17.0	49.0	15.0	49.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	17.0	36.0	20.0	33.0	11.0	42.0	10.0	43.0
Max Q Clear Time (g_c+I1), s	12.5	24.7	22.0	35.0	13.0	23.3	12.0	27.2
Green Ext Time (p_c), s	0.8	8.9	0.0	0.0	0.0	13.2	0.0	11.9

Intersection Summary	
HCM 2010 Ctrl Delay	78.6
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	18.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	17	99	299	44	84	6	100	113	31	6	58	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	22	129	388	57	109	8	130	147	40	8	75	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	580	542	80	781	527	167	84	0	0	187	0	0
Stage 1	95	95	-	427	427	-	-	-	-	-	-	-
Stage 2	485	447	-	354	100	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	423	445	975	310	453	872	1482	-	-	1307	-	-
Stage 1	907	812	-	602	582	-	-	-	-	-	-	-
Stage 2	560	570	-	659	808	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	307	399	975	130	406	872	1482	-	-	1307	-	-
Mov Cap-2 Maneuver	307	399	-	130	406	-	-	-	-	-	-	-
Stage 1	818	807	-	543	525	-	-	-	-	-	-	-
Stage 2	397	514	-	331	803	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.4	28.6	3.1	0.7
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1482	-	-	680	130	421	1307	-	-
HCM Lane V/C Ratio	0.088	-	-	0.793	0.44	0.278	0.006	-	-
HCM Control Delay (s)	7.7	0	-	27.4	52.8	16.8	7.8	0	-
HCM Lane LOS	A	A	-	D	F	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	7.9	1.9	1.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	99	299	44	84	6	100	113	31	6	58	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1900	1900	1827	1900	1900	1776	1900	1900	1638	1900
Adj Flow Rate, veh/h	22	129	388	57	109	8	130	147	40	8	75	9
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	4	4	4	4	4	4	7	7	7	16	16	16
Cap, veh/h	85	148	405	191	319	20	304	316	75	97	538	60
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	29	421	1158	271	912	57	520	810	192	49	1379	155
Grp Volume(v), veh/h	539	0	0	174	0	0	317	0	0	92	0	0
Grp Sat Flow(s),veh/h/ln	1609	0	0	1240	0	0	1522	0	0	1583	0	0
Q Serve(g_s), s	6.7	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.4	0.0	0.0	3.5	0.0	0.0	7.7	0.0	0.0	1.8	0.0	0.0
Prop In Lane	0.04		0.72	0.33		0.05	0.41		0.13	0.09		0.10
Lane Grp Cap(c), veh/h	638	0	0	530	0	0	695	0	0	696	0	0
V/C Ratio(X)	0.84	0.00	0.00	0.33	0.00	0.00	0.46	0.00	0.00	0.13	0.00	0.00
Avail Cap(c_a), veh/h	638	0	0	530	0	0	695	0	0	696	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.8	0.0	0.0	11.7	0.0	0.0	11.5	0.0	0.0	9.9	0.0	0.0
Incr Delay (d2), s/veh	10.1	0.0	0.0	0.4	0.0	0.0	2.2	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	0.0	0.0	1.7	0.0	0.0	3.7	0.0	0.0	0.9	0.0	0.0
LnGrp Delay(d),s/veh	26.0	0.0	0.0	12.0	0.0	0.0	13.7	0.0	0.0	10.3	0.0	0.0
LnGrp LOS	C			B			B			B		
Approach Vol, veh/h		539			174			317			92	
Approach Delay, s/veh		26.0			12.0			13.7			10.3	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		26.0		24.0		26.0		24.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		19.5		17.5		19.5		17.5
Max Q Clear Time (g_c+I1), s		9.7		18.4		3.8		5.5
Green Ext Time (p_c), s		1.9		0.0		2.5		4.5

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	35	149	54	8	6	249	212	243	28	376	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1696	1900	1900	1727	1900	1727	1727	1900	1900	1845	1900
Adj Flow Rate, veh/h	17	45	191	59	9	7	319	272	312	36	482	19
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.78	0.78	0.78	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	12	12	12	10	10	10	10	10	10	3	3	3
Cap, veh/h	49	60	217	154	22	12	594	500	574	87	1097	42
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.68	0.68	0.68	0.68	0.68	0.68
Sat Flow, veh/h	54	318	1144	476	117	61	829	735	843	71	1611	62
Grp Volume(v), veh/h	253	0	0	75	0	0	319	0	584	537	0	0
Grp Sat Flow(s),veh/h/ln	1516	0	0	654	0	0	829	0	1578	1744	0	0
Q Serve(g_s), s	4.2	0.0	0.0	0.0	0.0	0.0	14.9	0.0	18.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.1	0.0	0.0	12.0	0.0	0.0	28.1	0.0	18.8	13.2	0.0	0.0
Prop In Lane	0.07		0.75	0.79		0.09	1.00		0.53	0.07		0.04
Lane Grp Cap(c), veh/h	325	0	0	188	0	0	594	0	1074	1226	0	0
V/C Ratio(X)	0.78	0.00	0.00	0.40	0.00	0.00	0.54	0.00	0.54	0.44	0.00	0.00
Avail Cap(c_a), veh/h	370	0	0	223	0	0	594	0	1074	1226	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	39.4	0.0	0.0	37.2	0.0	0.0	10.6	0.0	8.1	7.2	0.0	0.0
Incr Delay (d2), s/veh	8.9	0.0	0.0	1.4	0.0	0.0	3.4	0.0	2.0	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	0.0	2.0	0.0	0.0	5.8	0.0	8.7	7.0	0.0	0.0
LnGrp Delay(d),s/veh	48.4	0.0	0.0	38.6	0.0	0.0	14.0	0.0	10.1	8.4	0.0	0.0
LnGrp LOS	D			D			B		B	A		
Approach Vol, veh/h		253			75			903			537	
Approach Delay, s/veh		48.4			38.6			11.5			8.4	
Approach LOS		D			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		74.6		25.4		74.6		25.4
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		65.0		22.0		65.0		22.0
Max Q Clear Time (g_c+I1), s		30.1		18.1		15.2		14.0
Green Ext Time (p_c), s		15.6		0.8		17.8		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	7	27	53	2	6	101	670	236	28	532	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1226	1900	1900	1727	1900	1727	1727	1900	1900	1792	1900
Adj Flow Rate, veh/h	5	9	33	58	2	7	125	827	291	35	657	26
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.92	0.92	0.92	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	55	55	55	10	10	10	10	10	10	6	6	6
Cap, veh/h	44	18	52	151	4	10	377	981	345	68	1120	43
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.80	0.80	0.80	0.80	0.80	0.80
Sat Flow, veh/h	61	266	769	1253	66	154	700	1222	430	37	1394	54
Grp Volume(v), veh/h	47	0	0	67	0	0	125	0	1118	718	0	0
Grp Sat Flow(s),veh/h/ln	1095	0	0	1472	0	0	700	0	1651	1485	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	41.3	7.4	0.0	0.0
Cycle Q Clear(g_c), s	4.1	0.0	0.0	4.1	0.0	0.0	49.0	0.0	41.3	48.7	0.0	0.0
Prop In Lane	0.11		0.70	0.87		0.10	1.00		0.26	0.05		0.04
Lane Grp Cap(c), veh/h	113	0	0	166	0	0	377	0	1326	1230	0	0
V/C Ratio(X)	0.42	0.00	0.00	0.40	0.00	0.00	0.33	0.00	0.84	0.58	0.00	0.00
Avail Cap(c_a), veh/h	502	0	0	640	0	0	377	0	1326	1230	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.5	0.0	0.0	45.4	0.0	0.0	7.1	0.0	6.0	4.0	0.0	0.0
Incr Delay (d2), s/veh	2.4	0.0	0.0	1.6	0.0	0.0	2.4	0.0	6.7	2.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	1.9	0.0	0.0	2.6	0.0	20.8	7.1	0.0	0.0
LnGrp Delay(d),s/veh	47.9	0.0	0.0	47.0	0.0	0.0	9.5	0.0	12.7	6.0	0.0	0.0
LnGrp LOS	D			D			A		B	A		
Approach Vol, veh/h		47			67			1243			718	
Approach Delay, s/veh		47.9			47.0			12.4			6.0	
Approach LOS		D			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		86.8		13.2		86.8		13.2
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		43.5		43.5		43.5		43.5
Max Q Clear Time (g_c+I1), s		51.0		6.1		50.7		6.1
Green Ext Time (p_c), s		0.0		0.8		0.0		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	39	32	116	46	12	11	282	971	193	38	551	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1397	1397	1900	1743	1743	1743	1743	1743	1743
Adj Flow Rate, veh/h	47	39	0	55	14	13	340	1170	0	46	664	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	36	36	36	9	9	9	9	9	9
Cap, veh/h	181	183	155	153	66	61	374	2553	1142	289	1609	720
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.10	0.23	0.77	0.00	0.49	0.49	0.00
Sat Flow, veh/h	1364	1845	1568	1022	668	620	1660	3312	1482	447	3312	1482
Grp Volume(v), veh/h	47	39	0	55	0	27	340	1170	0	46	664	0
Grp Sat Flow(s),veh/h/ln	1364	1845	1568	1022	0	1288	1660	1656	1482	447	1656	1482
Q Serve(g_s), s	3.3	1.9	0.0	5.2	0.0	1.9	20.0	12.5	0.0	5.9	12.9	0.0
Cycle Q Clear(g_c), s	5.2	1.9	0.0	7.2	0.0	1.9	20.0	12.5	0.0	5.9	12.9	0.0
Prop In Lane	1.00		1.00	1.00		0.48	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	181	183	155	153	0	128	374	2553	1142	289	1609	720
V/C Ratio(X)	0.26	0.21	0.00	0.36	0.00	0.21	0.91	0.46	0.00	0.16	0.41	0.00
Avail Cap(c_a), veh/h	400	480	408	318	0	335	432	2553	1142	289	1609	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.9	41.5	0.0	44.8	0.0	41.5	37.7	4.1	0.0	14.7	16.5	0.0
Incr Delay (d2), s/veh	0.8	0.6	0.0	1.4	0.0	0.8	21.2	0.6	0.0	1.2	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.0	0.0	1.5	0.0	0.7	11.4	5.9	0.0	0.8	6.1	0.0
LnGrp Delay(d),s/veh	44.6	42.0	0.0	46.2	0.0	42.3	59.0	4.7	0.0	15.9	17.3	0.0
LnGrp LOS	D	D		D		D	E	A		B	B	
Approach Vol, veh/h		86			82			1510			710	
Approach Delay, s/veh		43.4			44.9			16.9			17.2	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		83.6		16.4	28.5	55.1		16.4
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		61.0		26.0	26.0	29.0		26.0
Max Q Clear Time (g_c+I1), s		14.5		7.2	22.0	14.9		9.2
Green Ext Time (p_c), s		25.3		0.8	0.6	11.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	98	213	356	1405	711	53
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1696	1696	1792	1792	1638	1638
Adj Flow Rate, veh/h	113	0	409	1615	817	61
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	12	12	6	6	16	16
Cap, veh/h	398	183	449	2341	1054	471
Arrive On Green	0.13	0.00	0.26	0.69	0.34	0.34
Sat Flow, veh/h	3134	1442	1707	3495	3194	1392
Grp Volume(v), veh/h	113	0	409	1615	817	61
Grp Sat Flow(s),veh/h/ln	1567	1442	1707	1703	1556	1392
Q Serve(g_s), s	2.3	0.0	16.3	19.7	16.5	2.1
Cycle Q Clear(g_c), s	2.3	0.0	16.3	19.7	16.5	2.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	398	183	449	2341	1054	471
V/C Ratio(X)	0.28	0.00	0.91	0.69	0.78	0.13
Avail Cap(c_a), veh/h	448	206	463	2341	1054	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.7	0.0	25.0	6.5	20.8	16.0
Incr Delay (d2), s/veh	0.4	0.0	21.7	1.7	5.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	10.3	9.5	7.9	0.9
LnGrp Delay(d),s/veh	28.1	0.0	46.7	8.2	26.3	16.6
LnGrp LOS	C		D	A	C	B
Approach Vol, veh/h	113			2024	878	
Approach Delay, s/veh	28.1			16.0	25.7	
Approach LOS	C			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		54.6		15.4	24.4	30.2		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		47.0		10.0	19.0	22.0		
Max Q Clear Time (g_c+I1), s		21.7		4.3	18.3	18.5		
Green Ext Time (p_c), s		21.3		0.2	0.2	3.4		

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	582	878	12	354	854	722	377	967	255	561	571	290
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	1712	1900	1743	1743	1743	1727	1727	1727	1652	1652	1652
Adj Flow Rate, veh/h	633	954	13	385	928	0	410	1051	0	610	621	315
Adj No. of Lanes	2	3	0	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	9	9	9	10	10	10	15	15	15
Cap, veh/h	473	1227	17	519	1354	422	647	1085	486	501	1096	490
Arrive On Green	0.08	0.26	0.26	0.10	0.28	0.00	0.10	0.33	0.00	0.12	0.35	0.35
Sat Flow, veh/h	3163	4751	65	3221	4759	1482	3191	3282	1468	3053	3139	1404
Grp Volume(v), veh/h	633	625	342	385	928	0	410	1051	0	610	621	315
Grp Sat Flow(s),veh/h/ln	1581	1558	1700	1610	1586	1482	1596	1641	1468	1526	1570	1404
Q Serve(g_s), s	10.0	24.2	24.2	11.3	22.5	0.0	10.8	41.0	0.0	16.0	20.9	24.5
Cycle Q Clear(g_c), s	10.0	24.2	24.2	11.3	22.5	0.0	10.8	41.0	0.0	16.0	20.9	24.5
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	473	805	439	519	1354	422	647	1085	486	501	1096	490
V/C Ratio(X)	1.34	0.78	0.78	0.74	0.69	0.00	0.63	0.97	0.00	1.22	0.57	0.64
Avail Cap(c_a), veh/h	473	805	439	533	1354	422	730	1086	486	501	1096	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.3	44.7	44.7	33.5	41.3	0.0	25.9	42.8	0.0	37.3	34.3	35.5
Incr Delay (d2), s/veh	165.8	7.3	12.7	5.4	2.8	0.0	1.5	20.0	0.0	115.3	0.7	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.0	11.2	12.9	5.4	10.2	0.0	4.9	21.6	0.0	17.0	9.2	9.9
LnGrp Delay(d),s/veh	209.1	52.0	57.5	38.9	44.2	0.0	27.4	62.8	0.0	152.6	35.0	38.3
LnGrp LOS	F	D	E	D	D		C	E		F	D	D
Approach Vol, veh/h		1600			1313			1461			1546	
Approach Delay, s/veh		115.3			42.6			52.9			82.1	
Approach LOS		F			D			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.4	40.6	21.0	49.0	16.0	44.0	18.6	51.4
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	33.0	16.0	43.0	10.0	37.0	17.0	42.0
Max Q Clear Time (g_c+I1), s	13.3	26.2	18.0	43.0	12.0	24.5	12.8	26.5
Green Ext Time (p_c), s	0.2	5.6	0.0	0.0	0.0	9.6	0.8	11.7

Intersection Summary	
HCM 2010 Ctrl Delay	75.1
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	9	239	218	31	25	141	426	60	7	331	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1743	1900	1900	1727	1900	1900	1743	1900	1900	1759	1900
Adj Flow Rate, veh/h	30	10	278	237	34	27	164	495	70	8	385	16
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	9	9	9	10	10	10	9	9	9	8	8	8
Cap, veh/h	67	31	405	226	23	18	217	588	81	43	970	40
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	97	107	1422	568	81	65	295	1005	138	11	1658	68
Grp Volume(v), veh/h	318	0	0	298	0	0	729	0	0	409	0	0
Grp Sat Flow(s),veh/h/ln	1626	0	0	714	0	0	1438	0	0	1737	0	0
Q Serve(g_s), s	0.0	0.0	0.0	10.5	0.0	0.0	29.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	18.0	0.0	0.0	28.5	0.0	0.0	42.4	0.0	0.0	12.7	0.0	0.0
Prop In Lane	0.09		0.87	0.80		0.09	0.22		0.10	0.02		0.04
Lane Grp Cap(c), veh/h	503	0	0	268	0	0	885	0	0	1053	0	0
V/C Ratio(X)	0.63	0.00	0.00	1.11	0.00	0.00	0.82	0.00	0.00	0.39	0.00	0.00
Avail Cap(c_a), veh/h	503	0	0	268	0	0	885	0	0	1053	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.2	0.0	0.0	41.3	0.0	0.0	17.2	0.0	0.0	11.2	0.0	0.0
Incr Delay (d2), s/veh	5.9	0.0	0.0	88.2	0.0	0.0	8.6	0.0	0.0	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	0.0	13.9	0.0	0.0	18.7	0.0	0.0	6.3	0.0	0.0
LnGrp Delay(d),s/veh	38.2	0.0	0.0	129.5	0.0	0.0	25.8	0.0	0.0	12.3	0.0	0.0
LnGrp LOS	D			F			C			B		
Approach Vol, veh/h		318			298			729			409	
Approach Delay, s/veh		38.2			129.5			25.8			12.3	
Approach LOS		D			F			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		65.0		35.0		65.0		35.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		58.5		28.5		58.5		28.5
Max Q Clear Time (g_c+I1), s		44.4		20.0		14.7		30.5
Green Ext Time (p_c), s		7.6		3.1		12.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	42.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	2	119	212	6	25	23	616	58	7	760	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1727	1900	1743	1743	1900	1900	1727	1900
Adj Flow Rate, veh/h	22	2	143	230	7	27	28	742	63	8	916	5
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.83	0.92	0.83	0.92	0.92	0.92	0.83	0.83	0.92	0.92	0.83	0.83
Percent Heavy Veh, %	3	3	3	10	10	10	9	9	9	10	10	10
Cap, veh/h	71	26	331	271	6	24	268	1022	87	39	1099	6
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.64	0.64	0.64	0.64	0.64	0.64
Sat Flow, veh/h	133	114	1471	906	28	106	566	1585	135	5	1704	9
Grp Volume(v), veh/h	167	0	0	264	0	0	28	0	805	929	0	0
Grp Sat Flow(s),veh/h/ln	1718	0	0	1040	0	0	566	0	1719	1718	0	0
Q Serve(g_s), s	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0	31.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.0	0.0	0.0	22.5	0.0	0.0	7.6	0.0	31.3	41.4	0.0	0.0
Prop In Lane	0.13		0.86	0.87		0.10	1.00		0.08	0.01		0.01
Lane Grp Cap(c), veh/h	427	0	0	301	0	0	268	0	1109	1144	0	0
V/C Ratio(X)	0.39	0.00	0.00	0.88	0.00	0.00	0.10	0.00	0.73	0.81	0.00	0.00
Avail Cap(c_a), veh/h	427	0	0	301	0	0	268	0	1109	1144	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.5	0.0	0.0	40.9	0.0	0.0	7.7	0.0	11.8	13.6	0.0	0.0
Incr Delay (d2), s/veh	2.7	0.0	0.0	28.1	0.0	0.0	0.8	0.0	4.2	6.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.0	9.6	0.0	0.0	0.4	0.0	15.8	21.4	0.0	0.0
LnGrp Delay(d),s/veh	36.2	0.0	0.0	69.0	0.0	0.0	8.4	0.0	16.0	20.0	0.0	0.0
LnGrp LOS	D			E			A		B	B		
Approach Vol, veh/h		167			264			833			929	
Approach Delay, s/veh		36.2			69.0			15.8			20.0	
Approach LOS		D			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		71.0		29.0		71.0		29.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		64.5		22.5		64.5		22.5
Max Q Clear Time (g_c+I1), s		33.3		11.0		43.4		24.5
Green Ext Time (p_c), s		19.9		2.5		15.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	28	11	330	222	29	37	192	590	48	10	1037	63
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	35	14	0	278	36	46	240	738	0	12	1296	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	305	402	341	376	167	213	269	2064	923	358	1411	631
Arrive On Green	0.22	0.22	0.00	0.22	0.22	0.22	0.17	0.65	0.00	0.42	0.42	0.00
Sat Flow, veh/h	1261	1792	1524	1394	744	951	1601	3195	1429	684	3374	1509
Grp Volume(v), veh/h	35	14	0	278	0	82	240	738	0	12	1296	0
Grp Sat Flow(s),veh/h/ln	1261	1792	1524	1394	0	1695	1601	1597	1429	684	1687	1509
Q Serve(g_s), s	2.3	0.6	0.0	19.5	0.0	3.9	14.7	10.6	0.0	1.0	36.3	0.0
Cycle Q Clear(g_c), s	6.3	0.6	0.0	20.1	0.0	3.9	14.7	10.6	0.0	1.0	36.3	0.0
Prop In Lane	1.00		1.00	1.00		0.56	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	305	402	341	376	0	380	269	2064	923	358	1411	631
V/C Ratio(X)	0.11	0.03	0.00	0.74	0.00	0.22	0.89	0.36	0.00	0.03	0.92	0.00
Avail Cap(c_a), veh/h	319	421	358	391	0	398	288	2064	923	358	1411	631
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.2	30.3	0.0	38.2	0.0	31.6	40.7	8.2	0.0	17.2	27.5	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	7.0	0.0	0.3	26.6	0.5	0.0	0.2	11.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.3	0.0	8.2	0.0	1.9	8.5	4.8	0.0	0.2	18.9	0.0
LnGrp Delay(d),s/veh	34.4	30.4	0.0	45.2	0.0	31.9	67.3	8.6	0.0	17.4	38.6	0.0
LnGrp LOS	C	C		D		C	E	A		B	D	
Approach Vol, veh/h		49			360			978			1308	
Approach Delay, s/veh		33.2			42.2			23.0			38.4	
Approach LOS		C			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		71.1		28.9	22.8	48.3		28.9
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		63.5		23.5	18.0	39.5		23.5
Max Q Clear Time (g_c+I1), s		12.6		8.3	16.7	38.3		22.1
Green Ext Time (p_c), s		29.3		1.8	0.1	1.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	33.2
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	61	365	306	883	1705	125
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	68	0	340	981	1894	139
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	278	128	355	2531	1720	770
Arrive On Green	0.08	0.00	0.22	0.79	0.51	0.51
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	68	0	340	981	1894	139
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	1.9	0.0	20.8	9.4	50.5	5.0
Cycle Q Clear(g_c), s	1.9	0.0	20.8	9.4	50.5	5.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	278	128	355	2531	1720	770
V/C Ratio(X)	0.24	0.00	0.96	0.39	1.10	0.18
Avail Cap(c_a), veh/h	328	151	355	2531	1720	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	0.0	38.5	3.3	24.7	13.5
Incr Delay (d2), s/veh	0.5	0.0	36.3	0.4	54.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	12.8	4.2	36.8	2.2
LnGrp Delay(d),s/veh	43.2	0.0	74.9	3.8	79.6	14.0
LnGrp LOS	D		E	A	F	B
Approach Vol, veh/h	68			1321	2033	
Approach Delay, s/veh	43.2			22.1	75.1	
Approach LOS	D			C	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		85.0		15.0	28.0	57.0		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		77.0		10.0	22.0	49.0		
Max Q Clear Time (g_c+I1), s		11.4		3.9	22.8	52.5		
Green Ext Time (p_c), s		54.6		0.1	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	54.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	273	836	8	384	1041	387	516	483	417	544	870	410
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	297	909	9	417	1132	0	561	525	0	591	946	446
Adj No. of Lanes	2	3	0	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	426	1195	12	550	1321	411	613	1150	514	821	1009	451
Arrive On Green	0.08	0.25	0.25	0.11	0.27	0.00	0.15	0.34	0.00	0.12	0.31	0.31
Sat Flow, veh/h	3191	4815	48	3281	4848	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	297	593	325	417	1132	0	561	525	0	591	946	446
Grp Sat Flow(s),veh/h/ln	1596	1572	1719	1640	1616	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	8.8	22.6	22.6	12.1	28.6	0.0	16.5	15.7	0.0	15.0	36.5	39.3
Cycle Q Clear(g_c), s	8.8	22.6	22.6	12.1	28.6	0.0	16.5	15.7	0.0	15.0	36.5	39.3
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	426	780	427	550	1321	411	613	1150	514	821	1009	451
V/C Ratio(X)	0.70	0.76	0.76	0.76	0.86	0.00	0.91	0.46	0.00	0.72	0.94	0.99
Avail Cap(c_a), veh/h	429	780	427	550	1321	411	640	1177	527	821	1009	451
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	44.9	44.9	33.6	44.5	0.0	35.8	33.2	0.0	28.3	43.3	44.2
Incr Delay (d2), s/veh	4.9	6.9	12.1	6.1	7.3	0.0	17.4	0.3	0.0	3.1	15.6	39.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	10.6	12.2	5.8	13.7	0.0	11.3	7.3	0.0	3.0	18.6	20.6
LnGrp Delay(d),s/veh	40.0	51.8	57.0	39.7	51.9	0.0	53.2	33.5	0.0	31.4	58.9	83.4
LnGrp LOS	D	D	E	D	D		D	C		C	E	F
Approach Vol, veh/h		1215			1549			1086			1983	
Approach Delay, s/veh		50.3			48.6			43.7			56.2	
Approach LOS		D			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	39.0	20.0	50.0	16.9	42.1	24.0	46.0
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	32.0	15.0	45.0	11.0	35.0	20.0	40.0
Max Q Clear Time (g_c+I1), s	14.1	24.6	17.0	17.7	10.8	30.6	18.5	41.3
Green Ext Time (p_c), s	0.0	6.4	0.0	16.7	0.0	3.9	0.5	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.6
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	110.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	11	51	254	17	108	0	379	81	73	12	174	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	16	16	16
Mvmt Flow	12	55	273	18	116	0	408	87	78	13	187	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1231	1213	206	1337	1192	126	225	0	0	166	0	0
Stage 1	232	232	-	941	941	-	-	-	-	-	-	-
Stage 2	999	981	-	396	251	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.17	-	-	4.26	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.263	-	-	2.344	-	-
Pot Cap-1 Maneuver	153	180	829	129	185	919	1315	-	-	1331	-	-
Stage 1	766	709	-	313	339	-	-	-	-	-	-	-
Stage 2	291	325	-	625	695	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	14	117	829	41	120	919	1315	-	-	1331	-	-
Mov Cap-2 Maneuver	14	117	-	41	120	-	-	-	-	-	-	-
Stage 1	502	701	-	205	222	-	-	-	-	-	-	-
Stage 2	91	213	-	382	687	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 350.2	143.4	6.4	0.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1315	-	-	207	41	120	1331	-	-
HCM Lane V/C Ratio	0.31	-	-	1.641	0.446	0.968	0.01	-	-
HCM Control Delay (s)	9	0	-	$ 350.2	150.2	142.3	7.7	0	-
HCM Lane LOS	A	A	-	F	F	F	A	A	-
HCM 95th %tile Q(veh)	1.3	-	-	22.3	1.6	6.4	0	-	-

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	11	51	254	17	108	0	379	81	73	12	174	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1900	1900	1827	1900	1900	1776	1900	1900	1638	1900
Adj Flow Rate, veh/h	12	55	273	18	116	0	408	87	78	13	187	38
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	4	4	4	7	7	7	16	16	16
Cap, veh/h	80	79	345	110	452	0	547	90	81	90	616	120
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.00	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	22	292	1278	104	1674	0	901	192	172	30	1312	255
Grp Volume(v), veh/h	340	0	0	134	0	0	573	0	0	238	0	0
Grp Sat Flow(s),veh/h/ln	1591	0	0	1778	0	0	1265	0	0	1596	0	0
Q Serve(g_s), s	1.6	0.0	0.0	0.0	0.0	0.0	17.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.9	0.0	0.0	2.9	0.0	0.0	21.8	0.0	0.0	4.7	0.0	0.0
Prop In Lane	0.04		0.80	0.13		0.00	0.71		0.14	0.05		0.16
Lane Grp Cap(c), veh/h	505	0	0	562	0	0	718	0	0	826	0	0
V/C Ratio(X)	0.67	0.00	0.00	0.24	0.00	0.00	0.80	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	630	0	0	694	0	0	718	0	0	826	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.9	0.0	0.0	14.4	0.0	0.0	12.4	0.0	0.0	8.3	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	0.2	0.0	0.0	9.0	0.0	0.0	0.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	1.5	0.0	0.0	9.3	0.0	0.0	2.3	0.0	0.0
LnGrp Delay(d),s/veh	18.9	0.0	0.0	14.6	0.0	0.0	21.5	0.0	0.0	9.1	0.0	0.0
LnGrp LOS	B			B			C			A		
Approach Vol, veh/h		340			134			573			238	
Approach Delay, s/veh		18.9			14.6			21.5			9.1	
Approach LOS		B			B			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		30.0		20.0		30.0		20.0
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		19.5		17.5		19.5		17.5
Max Q Clear Time (g_c+I1), s		23.8		11.9		6.7		4.9
Green Ext Time (p_c), s		0.0		1.7		5.2		2.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	9	239	218	31	25	141	426	60	7	331	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1743	1900	1900	1727	1900	1743	1743	1900	1900	1759	1900
Adj Flow Rate, veh/h	30	10	278	237	34	27	164	495	70	8	385	16
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	9	9	9	10	10	10	9	9	9	8	8	8
Cap, veh/h	75	42	539	328	43	30	434	721	102	42	799	33
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	91	109	1392	679	110	79	917	1494	211	11	1655	68
Grp Volume(v), veh/h	318	0	0	298	0	0	164	0	565	409	0	0
Grp Sat Flow(s),veh/h/ln	1593	0	0	868	0	0	917	0	1706	1734	0	0
Q Serve(g_s), s	0.0	0.0	0.0	17.6	0.0	0.0	6.1	0.0	25.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.3	0.0	0.0	33.9	0.0	0.0	21.9	0.0	25.6	15.8	0.0	0.0
Prop In Lane	0.09		0.87	0.80		0.09	1.00		0.12	0.02		0.04
Lane Grp Cap(c), veh/h	656	0	0	401	0	0	434	0	823	874	0	0
V/C Ratio(X)	0.48	0.00	0.00	0.74	0.00	0.00	0.38	0.00	0.69	0.47	0.00	0.00
Avail Cap(c_a), veh/h	726	0	0	453	0	0	434	0	823	874	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.8	0.0	0.0	31.6	0.0	0.0	20.5	0.0	20.0	17.5	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	5.7	0.0	0.0	2.5	0.0	4.6	1.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	0.0	0.0	8.4	0.0	0.0	3.6	0.0	13.0	8.0	0.0	0.0
LnGrp Delay(d),s/veh	24.3	0.0	0.0	37.3	0.0	0.0	23.0	0.0	24.6	19.3	0.0	0.0
LnGrp LOS	C			D			C		C	B		
Approach Vol, veh/h		318			298			729			409	
Approach Delay, s/veh		24.3			37.3			24.3			19.3	
Approach LOS		C			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		54.8		45.2		54.8		45.2
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		43.5		43.5		43.5		43.5
Max Q Clear Time (g_c+I1), s		27.6		18.3		17.8		35.9
Green Ext Time (p_c), s		7.5		5.5		9.6		2.8

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	2	119	212	6	25	23	616	58	7	760	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1727	1900	1743	1743	1900	1900	1727	1900
Adj Flow Rate, veh/h	22	2	143	230	7	27	28	742	63	8	916	5
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.83	0.92	0.83	0.92	0.92	0.92	0.83	0.83	0.92	0.92	0.83	0.83
Percent Heavy Veh, %	3	3	3	10	10	10	9	9	9	10	10	10
Cap, veh/h	79	30	408	338	8	32	195	928	79	39	998	5
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.59	0.59	0.59	0.59	0.59	0.59
Sat Flow, veh/h	136	105	1437	953	29	112	566	1585	135	5	1704	9
Grp Volume(v), veh/h	167	0	0	264	0	0	28	0	805	929	0	0
Grp Sat Flow(s),veh/h/ln	1678	0	0	1094	0	0	566	0	1719	1717	0	0
Q Serve(g_s), s	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	36.5	8.6	0.0	0.0
Cycle Q Clear(g_c), s	8.3	0.0	0.0	23.3	0.0	0.0	10.7	0.0	36.5	48.6	0.0	0.0
Prop In Lane	0.13		0.86	0.87		0.10	1.00		0.08	0.01		0.01
Lane Grp Cap(c), veh/h	518	0	0	378	0	0	195	0	1007	1042	0	0
V/C Ratio(X)	0.32	0.00	0.00	0.70	0.00	0.00	0.14	0.00	0.80	0.89	0.00	0.00
Avail Cap(c_a), veh/h	750	0	0	557	0	0	195	0	1007	1042	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.6	0.0	0.0	34.7	0.0	0.0	10.8	0.0	16.1	18.6	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	2.3	0.0	0.0	1.5	0.0	6.6	11.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.0	7.1	0.0	0.0	0.5	0.0	19.1	26.0	0.0	0.0
LnGrp Delay(d),s/veh	29.0	0.0	0.0	37.0	0.0	0.0	12.3	0.0	22.7	30.0	0.0	0.0
LnGrp LOS	C			D			B		C	C		
Approach Vol, veh/h		167			264			833			929	
Approach Delay, s/veh		29.0			37.0			22.4			30.0	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		65.1		34.9		65.1		34.9
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		43.5		43.5		43.5		43.5
Max Q Clear Time (g_c+I1), s		38.5		10.3		50.6		25.3
Green Ext Time (p_c), s		4.4		3.7		0.0		3.1

Intersection Summary	
HCM 2010 Ctrl Delay	27.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	28	11	330	222	29	37	192	590	48	10	1037	63
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1863	1863	1900	1681	1681	1681	1776	1776	1776
Adj Flow Rate, veh/h	35	14	0	278	36	46	240	738	0	12	1296	0
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	6	6	6	2	2	2	13	13	13	7	7	7
Cap, veh/h	310	408	347	381	170	217	240	2052	918	368	1458	652
Arrive On Green	0.23	0.23	0.00	0.23	0.23	0.23	0.15	0.64	0.00	0.43	0.43	0.00
Sat Flow, veh/h	1261	1792	1524	1394	744	951	1601	3195	1429	684	3374	1509
Grp Volume(v), veh/h	35	14	0	278	0	82	240	738	0	12	1296	0
Grp Sat Flow(s),veh/h/ln	1261	1792	1524	1394	0	1695	1601	1597	1429	684	1687	1509
Q Serve(g_s), s	2.3	0.6	0.0	19.4	0.0	3.9	15.0	10.7	0.0	1.0	35.4	0.0
Cycle Q Clear(g_c), s	6.2	0.6	0.0	20.0	0.0	3.9	15.0	10.7	0.0	1.0	35.4	0.0
Prop In Lane	1.00		1.00	1.00		0.56	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	310	408	347	381	0	386	240	2052	918	368	1458	652
V/C Ratio(X)	0.11	0.03	0.00	0.73	0.00	0.21	1.00	0.36	0.00	0.03	0.89	0.00
Avail Cap(c_a), veh/h	350	466	396	426	0	441	240	2052	918	368	1458	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.9	30.0	0.0	37.8	0.0	31.3	42.5	8.3	0.0	16.4	26.2	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	5.5	0.0	0.3	57.8	0.5	0.0	0.2	8.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.3	0.0	8.1	0.0	1.9	10.5	4.9	0.0	0.2	18.1	0.0
LnGrp Delay(d),s/veh	34.0	30.1	0.0	43.4	0.0	31.6	100.3	8.8	0.0	16.6	34.6	0.0
LnGrp LOS	C	C		D		C	F	A		B	C	
Approach Vol, veh/h		49			360			978			1308	
Approach Delay, s/veh		32.9			40.7			31.3			34.4	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		70.7		29.3	21.0	49.7		29.3
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		6.5
Max Green Setting (Gmax), s		61.0		26.0	15.0	40.0		26.0
Max Q Clear Time (g_c+I1), s		12.7		8.2	17.0	37.4		22.0
Green Ext Time (p_c), s		28.4		1.9	0.0	2.4		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	34.1
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	61	365	306	883	1705	125
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1696	1696	1792	1792
Adj Flow Rate, veh/h	68	0	340	981	1894	139
Adj No. of Lanes	2	1	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	12	12	6	6
Cap, veh/h	245	113	337	2633	1903	851
Arrive On Green	0.07	0.00	0.21	0.82	0.56	0.56
Sat Flow, veh/h	3281	1509	1616	3308	3495	1524
Grp Volume(v), veh/h	68	0	340	981	1894	139
Grp Sat Flow(s),veh/h/ln	1640	1509	1616	1612	1703	1524
Q Serve(g_s), s	2.4	0.0	25.0	9.6	66.4	5.3
Cycle Q Clear(g_c), s	2.4	0.0	25.0	9.6	66.4	5.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	245	113	337	2633	1903	851
V/C Ratio(X)	0.28	0.00	1.01	0.37	1.00	0.16
Avail Cap(c_a), veh/h	273	126	337	2633	1903	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	0.0	47.5	2.9	26.3	12.9
Incr Delay (d2), s/veh	0.6	0.0	51.6	0.4	19.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.1	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	16.0	4.4	36.2	2.3
LnGrp Delay(d),s/veh	53.1	0.0	99.2	3.3	45.9	13.3
LnGrp LOS	D		F	A	D	B
Approach Vol, veh/h	68			1321	2033	
Approach Delay, s/veh	53.1			28.0	43.7	
Approach LOS	D			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		104.5		15.5	31.0	73.5		
Change Period (Y+Rc), s		6.5		6.5	6.0	6.5		
Max Green Setting (Gmax), s		97.0		10.0	25.0	66.0		
Max Q Clear Time (g_c+I1), s		11.6		4.4	27.0	68.4		
Green Ext Time (p_c), s		67.6		0.1	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	37.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	273	836	8	384	1041	387	516	483	417	544	870	410
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1900	1776	1776	1776	1776	1776	1776	1712	1712	1712
Adj Flow Rate, veh/h	297	909	9	417	1132	0	561	525	0	591	946	446
Adj No. of Lanes	2	3	0	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	7	7	7	7	7	7	11	11	11
Cap, veh/h	398	1127	11	533	1286	400	618	1137	508	866	1061	474
Arrive On Green	0.08	0.23	0.23	0.11	0.27	0.00	0.14	0.34	0.00	0.13	0.33	0.33
Sat Flow, veh/h	3191	4815	48	3281	4848	1509	3281	3374	1509	3163	3252	1455
Grp Volume(v), veh/h	297	593	325	417	1132	0	561	525	0	591	946	446
Grp Sat Flow(s),veh/h/ln	1596	1572	1719	1640	1616	1509	1640	1687	1509	1581	1626	1455
Q Serve(g_s), s	9.0	22.8	22.9	12.3	28.7	0.0	15.7	15.7	0.0	15.9	35.4	38.2
Cycle Q Clear(g_c), s	9.0	22.8	22.9	12.3	28.7	0.0	15.7	15.7	0.0	15.9	35.4	38.2
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	398	736	402	533	1286	400	618	1137	508	866	1061	474
V/C Ratio(X)	0.75	0.81	0.81	0.78	0.88	0.00	0.91	0.46	0.00	0.68	0.89	0.94
Avail Cap(c_a), veh/h	398	736	402	533	1286	400	660	1184	530	866	1066	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.6	46.4	46.4	34.6	45.1	0.0	33.6	33.4	0.0	24.4	41.0	42.0
Incr Delay (d2), s/veh	7.5	9.2	15.8	7.4	8.8	0.0	15.8	0.3	0.0	2.2	9.6	26.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	10.8	12.6	6.1	13.8	0.0	11.1	7.3	0.0	7.2	17.3	18.8
LnGrp Delay(d),s/veh	44.1	55.6	62.2	42.1	54.0	0.0	49.4	33.7	0.0	26.6	50.7	68.8
LnGrp LOS	D	E	E	D	D		D	C		C	D	E
Approach Vol, veh/h		1215			1549			1086			1983	
Approach Delay, s/veh		54.5			50.8			41.8			47.6	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	37.0	22.0	49.2	16.0	41.0	23.4	47.8
Change Period (Y+Rc), s	6.0	7.0	5.0	6.0	6.0	7.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	30.0	17.0	45.0	10.0	34.0	20.0	42.0
Max Q Clear Time (g_c+I1), s	14.3	24.9	17.9	17.7	11.0	30.7	17.7	40.2
Green Ext Time (p_c), s	0.0	4.5	0.0	16.7	0.0	3.0	0.7	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	48.8
HCM 2010 LOS	D

Appendix D

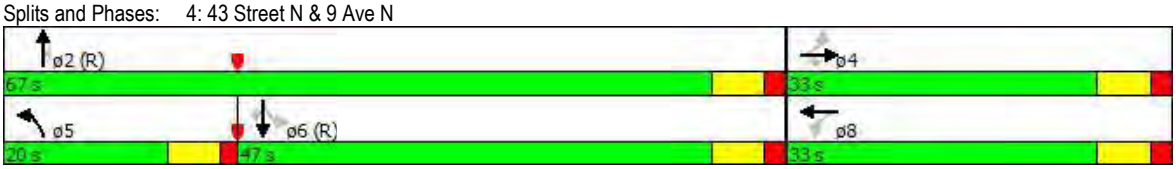
Synchro Capacity Analysis Results Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	12	77	18	6	4	188	305	73	11	293	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.937				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1309	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.750			0.748			0.950			0.533		
Satd. Flow (perm)	1383	1845	1568	1045	1309	0	1656	3312	1482	929	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104		5				88			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	4	14	93	22	7	5	227	367	88	13	353	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	14	93	22	12	0	227	367	88	13	353	14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0		20.0	67.0	67.0	47.0	47.0	47.0
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%		20.0%	67.0%	67.0%	47.0%	47.0%	47.0%
Maximum Green (s)	26.5	26.5	26.5	26.5	26.5		14.0	60.5	60.5	40.5	40.5	40.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	10.2	10.2	10.2	10.2	10.2		21.6	81.4	81.4	52.6	52.6	52.6
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10		0.22	0.81	0.81	0.53	0.53	0.53
v/c Ratio	0.03	0.07	0.37	0.21	0.09		0.64	0.14	0.07	0.03	0.20	0.02
Control Delay	40.7	41.6	11.4	46.2	33.4		41.8	1.7	0.2	14.6	14.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	41.6	11.4	46.2	33.4		41.8	1.7	0.2	14.6	14.5	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	B	B	A
Approach Delay		16.3			41.7			14.9			14.0	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	0.8	2.6	0.0	4.2	1.3		42.7	9.4	0.6	1.3	20.6	0.0
Queue Length 95th (m)	3.8	7.9	9.9	11.0	6.3		59.6	2.2	0.0	4.7	29.4	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	366	488	491	276	350		357	2696	1223	488	1740	828
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.03	0.19	0.08	0.03		0.64	0.14	0.07	0.03	0.20	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 15.5		Intersection LOS: B	
Intersection Capacity Utilization 49.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: 43 Street N & 9 Ave N

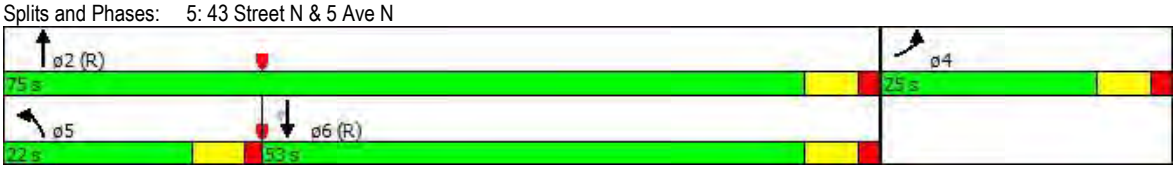


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	19	142	237	585	396	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		163				30
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	22	163	272	672	455	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	163	272	672	455	30
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	25.0		22.0	75.0	53.0	53.0
Total Split (%)	25.0%		22.0%	75.0%	53.0%	53.0%
Maximum Green (s)	18.5		16.0	68.5	46.5	46.5
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	23.5	90.8	57.4	57.4
Actuated g/C Ratio	0.10	1.00	0.24	0.91	0.57	0.57
v/c Ratio	0.07	0.11	0.68	0.22	0.25	0.04
Control Delay	41.5	0.2	44.3	1.8	6.7	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	0.2	44.3	1.8	6.7	1.6

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	A	A
Approach Delay	5.1			14.1	6.3	
Approach LOS	A			B	A	
Queue Length 50th (m)	2.1	0.0	50.3	0.0	8.3	0.2
Queue Length 95th (m)	5.7	0.0	75.1	21.1	15.8	0.0
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	578	1442	399	3092	1787	812
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.11	0.68	0.22	0.25	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 10.7		Intersection LOS: B	
Intersection Capacity Utilization 49.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: 43 Street N & 5 Ave N

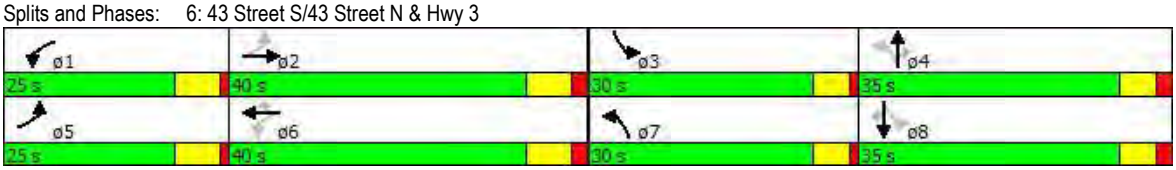


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	585	8	236	569	355	251	534	170	346	356	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	3246	0	1656	3312	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.261			0.290			0.478			0.193		
Satd. Flow (perm)	447	3246	0	506	3312	1482	1602	3282	1468	619	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				386			185			183
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	297	636	9	257	618	386	273	580	185	376	387	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	297	645	0	257	618	386	273	580	185	376	387	183
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	54.3	35.3		50.1	33.2	33.2	38.2	25.0	25.0	44.1	27.9	27.9
Actuated g/C Ratio	0.47	0.31		0.43	0.29	0.29	0.33	0.22	0.22	0.38	0.24	0.24
v/c Ratio	0.76	0.65		0.68	0.65	0.55	0.39	0.82	0.40	0.68	0.51	0.38
Control Delay	33.0	40.1		28.4	41.1	6.8	24.6	53.8	8.2	30.1	40.5	7.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	40.1		28.4	41.1	6.8	24.6	53.8	8.2	30.1	40.5	7.5
LOS	C	D		C	D	A	C	D	A	C	D	A
Approach Delay		37.9			28.0			38.0			30.0	
Approach LOS		D			C			D			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	42.8	72.6		35.8	70.1	0.0	21.9	70.2	0.0	31.4	42.4	0.0
Queue Length 95th (m)	#83.6	102.9		60.6	97.5	26.2	31.3	95.4	19.1	43.1	59.8	18.2
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	407	992		423	951	701	984	829	509	775	838	509
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.65		0.61	0.65	0.55	0.28	0.70	0.36	0.49	0.46	0.36

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 115.5			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 33.1		Intersection LOS: C	
Intersection Capacity Utilization 76.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



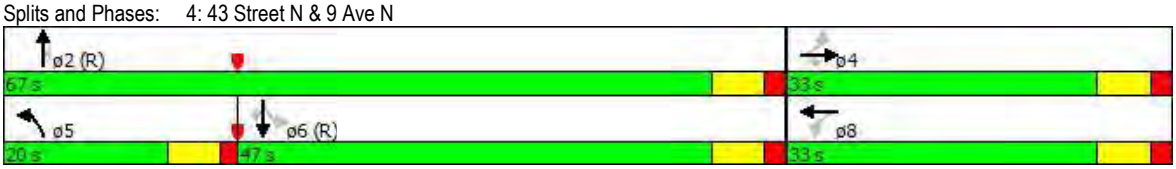
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	5	220	98	11	12	128	301	18	3	355	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.922				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1717	0	1597	3195	1429	1687	3374	1509
Flt Permitted	0.738			0.754			0.950			0.529		
Satd. Flow (perm)	1323	1792	1524	1405	1717	0	1597	3195	1429	939	3374	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			275		15				38			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	13%	13%	13%	7%	7%	7%
Adj. Flow (vph)	16	6	275	122	14	15	160	376	22	4	444	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	6	275	122	29	0	160	376	22	4	444	24
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0		20.0	67.0	67.0	47.0	47.0	47.0
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%		20.0%	67.0%	67.0%	47.0%	47.0%	47.0%
Maximum Green (s)	26.5	26.5	26.5	26.5	26.5		14.0	60.5	60.5	40.5	40.5	40.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	14.4	14.4	14.4	14.4	14.4		15.5	72.6	72.6	51.1	51.1	51.1
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14		0.16	0.73	0.73	0.51	0.51	0.51
v/c Ratio	0.08	0.02	0.61	0.61	0.11		0.65	0.16	0.02	0.01	0.26	0.03
Control Delay	35.8	34.2	10.6	52.2	22.8		48.4	3.5	1.1	16.3	15.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	34.2	10.6	52.2	22.8		48.4	3.5	1.1	16.3	15.7	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C	B	D	C		D	A	A	B	B	A
Approach Delay		12.4			46.6			16.3			15.0	
Approach LOS		B			D			B			B	
90th %ile Green (s)	19.9	19.9	19.9	19.9	19.9		20.6	67.1	67.1	40.5	40.5	40.5
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Max	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	16.5	16.5	16.5	16.5	16.5		18.1	70.5	70.5	46.4	46.4	46.4
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	14.0	14.0	14.0	14.0	14.0		15.7	73.0	73.0	51.3	51.3	51.3
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	11.5	11.5	11.5	11.5	11.5		13.3	75.5	75.5	56.2	56.2	56.2
30th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		9.8	77.0	77.0	61.2	61.2	61.2
10th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	14	6	28	89	13		117	98	3	2	199	0
Fuel Used(l)	2	1	18	12	2		18	27	1	0	29	1
CO Emissions (g/hr)	30	12	337	223	39		341	503	28	5	545	19
NOx Emissions (g/hr)	6	2	65	43	8		66	97	5	1	105	4
VOC Emissions (g/hr)	7	3	78	51	9		79	116	6	1	126	4
Dilemma Vehicles (#)	0	0	0	0	0		0	10	0	0	18	0
Queue Length 50th (m)	2.9	1.1	0.0	23.8	2.5		31.3	2.7	0.2	0.4	25.5	0.0
Queue Length 95th (m)	7.5	4.0	13.2	35.1	8.7		43.9	18.7	1.5	2.3	38.6	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	350	474	605	372	466		263	2320	1048	479	1724	822
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.01	0.45	0.33	0.06		0.61	0.16	0.02	0.01	0.26	0.03

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 18.2 Intersection LOS: B
Intersection Capacity Utilization 53.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



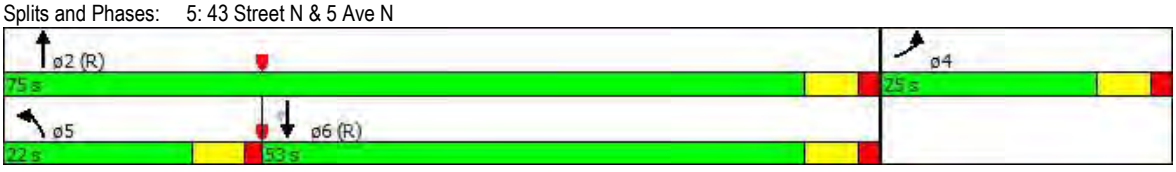
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	27	243	204	496	798	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3273	1509	1612	3223	3406	1524
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3273	1509	1612	3223	3406	1524
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		270				40
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			240.1	882.4	
Travel Time (s)	52.4			14.4	52.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	12%	12%	6%	6%
Adj. Flow (vph)	30	270	227	551	887	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	30	270	227	551	887	40
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	25.0		22.0	75.0	53.0	53.0
Total Split (%)	25.0%		22.0%	75.0%	53.0%	53.0%
Maximum Green (s)	18.5		16.0	68.5	46.5	46.5
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	20.3	86.2	57.3	57.3
Actuated g/C Ratio	0.10	1.00	0.20	0.86	0.57	0.57
v/c Ratio	0.09	0.18	0.69	0.20	0.45	0.04
Control Delay	41.7	0.3	48.1	2.4	13.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	0.3	48.1	2.4	13.4	4.4

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	B	A
Approach Delay	4.4			15.8	13.0	
Approach LOS	A			B	B	
90th %ile Green (s)	10.0		24.5	77.0	46.5	46.5
90th %ile Term Code	Min		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		23.0	77.0	48.0	48.0
70th %ile Term Code	Min		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		21.1	77.0	49.9	49.9
50th %ile Term Code	Min		Gap	Coord	Coord	Coord
30th %ile Green (s)	0.0		18.5	93.5	69.0	69.0
30th %ile Term Code	Skip		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		14.4	93.5	73.1	73.1
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	25	0	184	86	458	5
Fuel Used(l)	3	17	25	31	84	3
CO Emissions (g/hr)	61	314	462	583	1565	57
NOx Emissions (g/hr)	12	61	89	113	302	11
VOC Emissions (g/hr)	14	72	107	134	361	13
Dilemma Vehicles (#)	0	0	0	17	33	0
Queue Length 50th (m)	2.9	0.0	42.8	13.2	68.9	0.2
Queue Length 95th (m)	7.5	0.0	66.1	17.9	53.4	m4.0
Internal Link Dist (m)	704.0			216.1	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	605	1509	332	2778	1951	890
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.18	0.68	0.20	0.45	0.04

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 12.8 Intersection LOS: B
Intersection Capacity Utilization 57.5% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 43 Street N & 5 Ave N

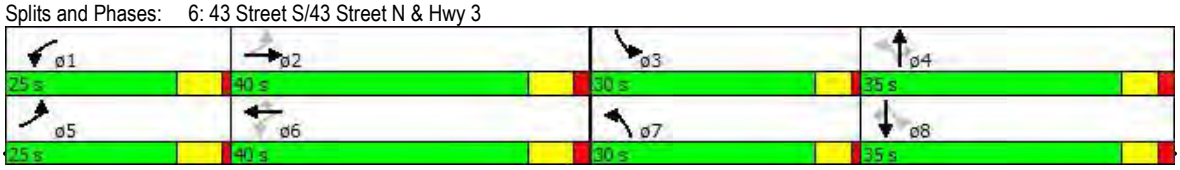


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	151	557	5	256	694	226	344	292	278	245	470	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.999				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3279	0	1687	3374	1509	3273	3374	1509	3155	3252	1455
Flt Permitted	0.242			0.269			0.228			0.560		
Satd. Flow (perm)	418	3279	0	478	3374	1509	785	3374	1509	1860	3252	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				246			302			176
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			401.6	
Travel Time (s)		20.2			35.0			27.3			24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	7%	7%	7%	7%	7%	7%	11%	11%	11%
Adj. Flow (vph)	164	605	5	278	754	246	374	317	302	266	511	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	610	0	278	754	246	374	317	302	266	511	176
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	47.2	33.3		53.4	36.4	36.4	43.3	26.5	26.5	35.6	22.6	22.6
Actuated g/C Ratio	0.42	0.30		0.48	0.32	0.32	0.39	0.24	0.24	0.32	0.20	0.20
v/c Ratio	0.52	0.63		0.69	0.69	0.38	0.57	0.40	0.51	0.36	0.78	0.41
Control Delay	23.6	39.1		28.2	38.5	6.0	26.5	37.7	7.3	24.0	51.8	8.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	39.1		28.2	38.5	6.0	26.5	37.7	7.3	24.0	51.8	8.7
LOS	C	D		C	D	A	C	D	A	C	D	A
Approach Delay		35.8			30.0			24.2			36.1	
Approach LOS		D			C			C			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	18.8	33.0		19.0	33.2	33.2	20.4	34.5	34.5	14.9	29.0	29.0
90th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Max	Max
70th %ile Green (s)	14.6	33.0		19.0	37.4	37.4	18.0	31.6	31.6	13.1	26.7	26.7
70th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	11.9	33.0		17.3	38.4	38.4	16.1	27.2	27.2	11.7	22.8	22.8
50th %ile Term Code	Gap	MaxR		Gap	Hold	Hold	Gap	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	10.1	33.0		14.4	37.3	37.3	14.1	23.6	23.6	10.4	19.9	19.9
30th %ile Term Code	Gap	MaxR		Gap	Hold	Hold	Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	10.0	33.0		11.1	34.1	34.1	11.4	17.3	17.3	10.0	15.9	15.9
10th %ile Term Code	Min	MaxR		Gap	Hold	Hold	Gap	Hold	Hold	Min	Gap	Gap
Stops (vph)	89	472		151	575	23	221	232	27	166	430	20
Fuel Used(l)	13	64		30	96	16	28	27	13	24	59	11
CO Emissions (g/hr)	245	1186		556	1786	301	516	511	249	438	1094	200
NOx Emissions (g/hr)	47	229		107	345	58	100	99	48	85	211	39
VOC Emissions (g/hr)	57	274		128	412	69	119	118	57	101	252	46
Dilemma Vehicles (#)	0	25		0	30	0	0	13	0	0	20	0
Queue Length 50th (m)	20.2	64.8		36.9	78.2	0.0	30.1	32.7	0.0	20.7	59.8	0.0
Queue Length 95th (m)	39.4	97.3		66.6	#123.5	20.6	42.2	48.5	22.5	30.6	84.1	18.8
Internal Link Dist (m)		425.3			752.8			430.3			377.6	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	407	975		441	1096	656	872	926	633	1029	850	510
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.63		0.63	0.69	0.38	0.43	0.34	0.48	0.26	0.60	0.35

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 112			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 31.2		Intersection LOS: C	
Intersection Capacity Utilization 73.7%		ICU Level of Service D	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 125.4			
70th %ile Actuated Cycle: 120.7			
50th %ile Actuated Cycle: 113.2			
30th %ile Actuated Cycle: 105.4			
10th %ile Actuated Cycle: 95.4			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3

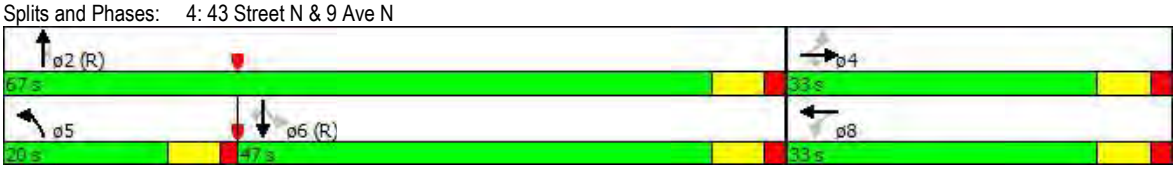


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	13	81	19	7	5	198	381	77	12	320	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.936				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1308	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.748			0.747			0.950			0.488		
Satd. Flow (perm)	1380	1845	1568	1044	1308	0	1656	3312	1482	851	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104		6				93			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	12	16	98	23	8	6	239	459	93	14	386	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	16	98	23	14	0	239	459	93	14	386	17
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0		20.0	67.0	67.0	47.0	47.0	47.0
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%		20.0%	67.0%	67.0%	47.0%	47.0%	47.0%
Maximum Green (s)	26.5	26.5	26.5	26.5	26.5		14.0	60.5	60.5	40.5	40.5	40.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	10.2	10.2	10.2	10.2	10.2		23.2	81.4	81.4	50.9	50.9	50.9
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10		0.23	0.81	0.81	0.51	0.51	0.51
v/c Ratio	0.09	0.09	0.39	0.22	0.10		0.62	0.17	0.08	0.03	0.23	0.02
Control Delay	42.0	41.7	12.4	46.4	32.7		39.1	1.4	0.2	15.3	15.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	41.7	12.4	46.4	32.7		39.1	1.4	0.2	15.3	15.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	B	B	A
Approach Delay		19.0			41.2			12.7			14.8	
Approach LOS		B			D			B			B	
90th %ile Green (s)	11.1	11.1	11.1	11.1	11.1		25.5	75.9	75.9	44.4	44.4	44.4
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		23.8	77.0	77.0	47.2	47.2	47.2
70th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		22.9	77.0	77.0	48.1	48.1	48.1
50th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		22.2	77.0	77.0	48.8	48.8	48.8
30th %ile Term Code	Min	Min	Min	Hold	Hold		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	0.0	0.0	0.0	0.0	0.0		21.6	93.5	93.5	65.9	65.9	65.9
10th %ile Term Code	Skip	Skip	Skip	Skip	Skip		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	11	14	14	19	10		176	40	0	8	177	0
Fuel Used(l)	1	2	7	2	1		27	31	6	1	26	1
CO Emissions (g/hr)	24	31	128	42	24		499	575	110	19	489	14
NOx Emissions (g/hr)	5	6	25	8	5		96	111	21	4	94	3
VOC Emissions (g/hr)	6	7	29	10	5		115	133	25	4	113	3
Dilemma Vehicles (#)	0	0	0	0	0		0	11	0	0	16	0
Queue Length 50th (m)	2.3	3.0	0.0	4.4	1.5		39.0	3.0	0.0	1.5	23.4	0.0
Queue Length 95th (m)	7.2	8.7	11.3	11.3	6.8		62.1	3.6	0.2	4.9	32.6	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	365	488	491	276	351		384	2695	1223	432	1685	805
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.03	0.20	0.08	0.04		0.62	0.17	0.08	0.03	0.23	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 49.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: 43 Street N & 9 Ave N



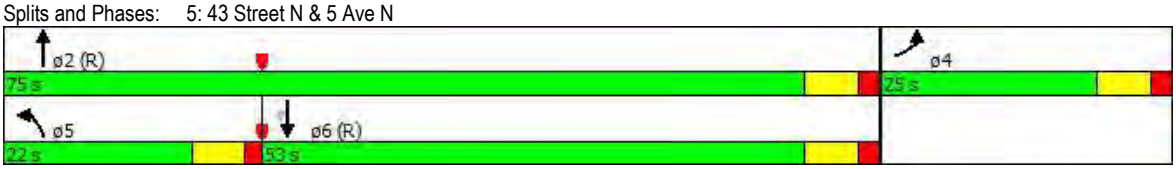
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	33	150	249	662	426	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		172				34
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	38	172	286	761	490	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	172	286	761	490	34
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	25.0		22.0	75.0	53.0	53.0
Total Split (%)	25.0%		22.0%	75.0%	53.0%	53.0%
Maximum Green (s)	18.5		16.0	68.5	46.5	46.5
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	24.8	86.2	52.8	52.8
Actuated g/C Ratio	0.10	1.00	0.25	0.86	0.53	0.53
v/c Ratio	0.12	0.12	0.68	0.26	0.30	0.05
Control Delay	42.1	0.2	43.4	2.6	7.4	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	0.2	43.4	2.6	7.4	1.4

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	A	A
Approach Delay	7.8			13.8	7.0	
Approach LOS	A			B	A	
90th %ile Green (s)	10.0		24.5	77.0	46.5	46.5
90th %ile Term Code	Min		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		24.5	77.0	46.5	46.5
70th %ile Term Code	Min		Max	Coord	Coord	Coord
50th %ile Green (s)	10.0		24.5	77.0	46.5	46.5
50th %ile Term Code	Min		Max	Coord	Coord	Coord
30th %ile Green (s)	0.0		25.1	93.5	62.4	62.4
30th %ile Term Code	Skip		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		25.2	93.5	62.3	62.3
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	30	0	223	121	89	1
Fuel Used(l)	4	10	29	42	38	2
CO Emissions (g/hr)	75	193	547	784	706	44
NOx Emissions (g/hr)	14	37	106	151	136	8
VOC Emissions (g/hr)	17	45	126	181	163	10
Dilemma Vehicles (#)	0	0	0	22	20	0
Queue Length 50th (m)	3.7	0.0	53.1	19.5	11.0	0.2
Queue Length 95th (m)	8.5	0.0	79.2	24.3	16.6	0.0
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	578	1442	421	2936	1644	751
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.12	0.68	0.26	0.30	0.05

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 11.1 — Intersection LOS: B
Intersection Capacity Utilization 50.5% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 5: 43 Street N & 5 Ave N

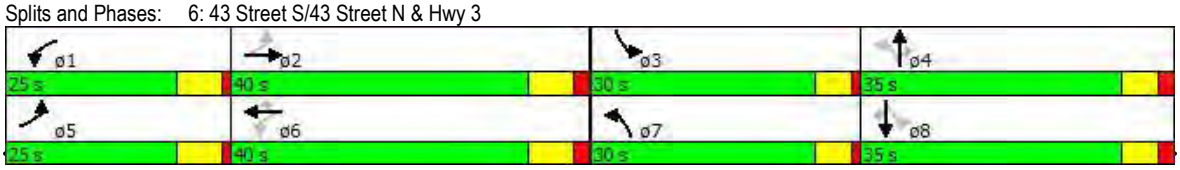


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	306	615	9	248	598	381	264	581	179	366	378	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	3246	0	1656	3312	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.229			0.256			0.459			0.163		
Satd. Flow (perm)	392	3246	0	446	3312	1482	1538	3282	1468	522	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				414			195			197
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	333	668	10	270	650	414	287	632	195	398	411	197
Shared Lane Traffic (%)												
Lane Group Flow (vph)	333	678	0	270	650	414	287	632	195	398	411	197
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	55.0	35.2		51.0	33.1	33.1	40.4	26.8	26.8	47.3	30.3	30.3
Actuated g/C Ratio	0.46	0.30		0.43	0.28	0.28	0.34	0.23	0.23	0.40	0.25	0.25
v/c Ratio	0.88	0.71		0.74	0.71	0.58	0.41	0.85	0.41	0.73	0.52	0.39
Control Delay	48.4	43.5		33.2	44.3	7.1	24.7	56.7	8.0	32.3	40.7	7.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	43.5		33.2	44.3	7.1	24.7	56.7	8.0	32.3	40.7	7.2
LOS	D	D		C	D	A	C	E	A	C	D	A
Approach Delay		45.1			30.5			40.0			30.8	
Approach LOS		D			C			D			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	15.7	29.0	29.0	20.3	33.6	33.6
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
70th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	13.7	29.0	29.0	17.7	33.0	33.0
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
50th %ile Green (s)	19.0	33.1		18.9	33.0	33.0	12.4	29.0	29.0	16.0	32.6	32.6
50th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
30th %ile Green (s)	19.0	35.9		16.1	33.0	33.0	11.3	26.5	26.5	14.3	29.5	29.5
30th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Gap	Gap	Gap	Gap	Hold	Hold
10th %ile Green (s)	19.0	39.9		12.1	33.0	33.0	10.0	21.1	21.1	12.1	23.2	23.2
10th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Min	Gap	Gap	Gap	Hold	Hold
Stops (vph)	181	544		156	526	37	176	532	21	239	312	20
Fuel Used(l)	33	74		30	87	28	21	65	9	37	43	12
CO Emissions (g/hr)	606	1379		566	1621	512	393	1217	165	692	799	218
NOx Emissions (g/hr)	117	266		109	313	99	76	235	32	134	154	42
VOC Emissions (g/hr)	140	318		131	374	118	91	281	38	160	184	50
Dilemma Vehicles (#)	0	26		0	25	0	0	24	0	0	16	0
Queue Length 50th (m)	52.1	81.9		40.2	77.5	0.0	23.1	78.7	0.0	33.6	45.5	0.0
Queue Length 95th (m)	#116.0	110.1		#64.8	104.3	27.4	32.7	#107.8	19.5	45.7	64.0	18.8
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	378	960		392	920	710	976	801	506	745	831	516
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.71		0.69	0.71	0.58	0.29	0.79	0.39	0.53	0.49	0.38

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 119			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 36.2		Intersection LOS: D	
Intersection Capacity Utilization 80.1%		ICU Level of Service D	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 125.3			
70th %ile Actuated Cycle: 122.7			
50th %ile Actuated Cycle: 121			
30th %ile Actuated Cycle: 116.8			
10th %ile Actuated Cycle: 109.2			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



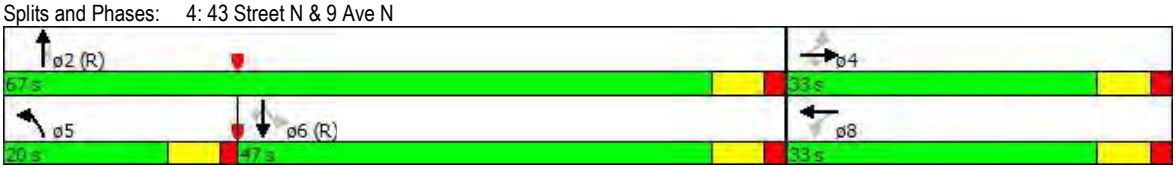
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	6	231	103	12	13	135	344	19	4	472	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.923				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1719	0	1597	3195	1429	1687	3374	1509
Flt Permitted	0.737			0.752			0.950			0.502		
Satd. Flow (perm)	1321	1792	1524	1401	1719	0	1597	3195	1429	891	3374	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			289		16				38			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	13%	13%	13%	7%	7%	7%
Adj. Flow (vph)	20	8	289	129	15	16	169	430	24	5	590	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	8	289	129	31	0	169	430	24	5	590	36
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		12.0	22.5	22.5	22.5	22.5	22.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0		20.0	67.0	67.0	47.0	47.0	47.0
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%		20.0%	67.0%	67.0%	47.0%	47.0%	47.0%
Maximum Green (s)	26.5	26.5	26.5	26.5	26.5		14.0	60.5	60.5	40.5	40.5	40.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0			11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	14.8	14.8	14.8	14.8	14.8		15.9	72.2	72.2	50.3	50.3	50.3
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.16	0.72	0.72	0.50	0.50	0.50
v/c Ratio	0.10	0.03	0.61	0.62	0.12		0.67	0.19	0.02	0.01	0.35	0.04
Control Delay	35.7	33.7	10.4	52.4	22.4		49.1	4.0	1.2	16.5	17.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	33.7	10.4	52.4	22.4		49.1	4.0	1.2	16.5	17.2	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C	B	D	C		D	A	A	B	B	A
Approach Delay		12.5			46.6			16.1			16.2	
Approach LOS		B			D			B			B	
90th %ile Green (s)	20.6	20.6	20.6	20.6	20.6		19.9	66.4	66.4	40.5	40.5	40.5
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Max	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	17.1	17.1	17.1	17.1	17.1		18.8	69.9	69.9	45.1	45.1	45.1
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	14.5	14.5	14.5	14.5	14.5		16.4	72.5	72.5	50.1	50.1	50.1
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	12.0	12.0	12.0	12.0	12.0		14.0	75.0	75.0	55.0	55.0	55.0
30th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		10.4	77.0	77.0	60.6	60.6	60.6
10th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	15	7	29	94	14		125	118	3	3	281	0
Fuel Used(l)	2	1	19	13	2		19	31	2	0	40	2
CO Emissions (g/hr)	36	14	353	235	43		362	581	29	7	745	28
NOx Emissions (g/hr)	7	3	68	45	8		70	112	6	1	144	5
VOC Emissions (g/hr)	8	3	81	54	10		84	134	7	2	172	7
Dilemma Vehicles (#)	0	0	0	0	0		0	12	0	0	24	0
Queue Length 50th (m)	3.6	1.4	0.0	25.1	2.7		33.0	3.5	0.2	0.5	36.6	0.0
Queue Length 95th (m)	8.7	4.8	13.2	36.5	8.9		46.5	22.3	1.8	2.7	51.7	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	350	474	616	371	467		265	2305	1041	447	1695	810
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.02	0.47	0.35	0.07		0.64	0.19	0.02	0.01	0.35	0.04

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 18.3 — Intersection LOS: B
Intersection Capacity Utilization 53.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



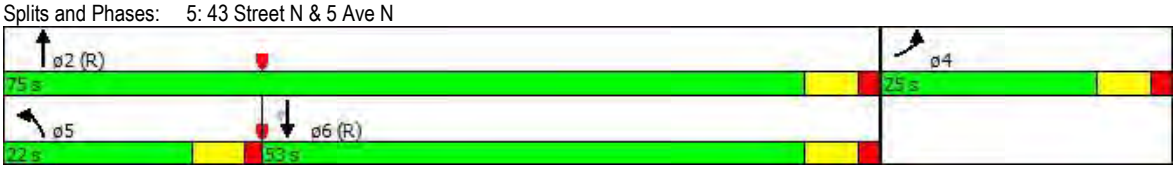
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	35	256	215	542	916	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3273	1509	1612	3223	3406	1524
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3273	1509	1612	3223	3406	1524
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		284				66
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			240.1	882.4	
Travel Time (s)	52.4			14.4	52.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	12%	12%	6%	6%
Adj. Flow (vph)	39	284	239	602	1018	66
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	284	239	602	1018	66
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	25.0		22.0	75.0	53.0	53.0
Total Split (%)	25.0%		22.0%	75.0%	53.0%	53.0%
Maximum Green (s)	18.5		16.0	68.5	46.5	46.5
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	21.5	86.2	56.1	56.1
Actuated g/C Ratio	0.10	1.00	0.22	0.86	0.56	0.56
v/c Ratio	0.12	0.19	0.69	0.22	0.53	0.07
Control Delay	42.0	0.3	46.7	2.5	13.2	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	0.3	46.7	2.5	13.2	2.8

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	B	A
Approach Delay	5.3			15.1	12.6	
Approach LOS	A			B	B	
90th %ile Green (s)	10.0		24.5	77.0	46.5	46.5
90th %ile Term Code	Min		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		24.3	77.0	46.7	46.7
70th %ile Term Code	Min		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		22.4	77.0	48.6	48.6
50th %ile Term Code	Min		Gap	Coord	Coord	Coord
30th %ile Green (s)	0.0		20.3	93.5	67.2	67.2
30th %ile Term Code	Skip		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		16.2	93.5	71.3	71.3
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	32	0	193	96	462	6
Fuel Used(l)	4	18	26	34	94	5
CO Emissions (g/hr)	79	330	482	639	1756	90
NOx Emissions (g/hr)	15	64	93	123	339	17
VOC Emissions (g/hr)	18	76	111	147	405	21
Dilemma Vehicles (#)	0	0	0	19	39	0
Queue Length 50th (m)	3.8	0.0	44.7	14.7	83.8	0.3
Queue Length 95th (m)	9.0	0.0	69.8	19.7	53.9	3.6
Internal Link Dist (m)	704.0			216.1	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	605	1509	347	2778	1909	883
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.19	0.69	0.22	0.53	0.07

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 12.5 — Intersection LOS: B
Intersection Capacity Utilization 61.4% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 5: 43 Street N & 5 Ave N

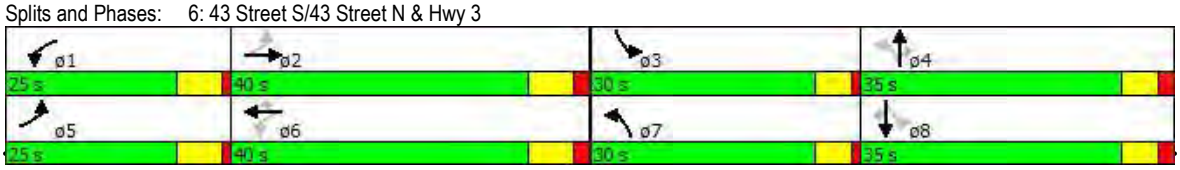


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	585	6	269	729	242	362	316	292	272	528	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3275	0	1687	3374	1509	3273	3374	1509	3155	3252	1455
Flt Permitted	0.206			0.237			0.190			0.546		
Satd. Flow (perm)	356	3275	0	421	3374	1509	655	3374	1509	1813	3252	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				263			317			218
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			401.6	
Travel Time (s)		20.2			35.0			27.3			24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	7%	7%	7%	7%	7%	7%	11%	11%	11%
Adj. Flow (vph)	182	636	7	292	792	263	393	343	317	296	574	218
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	643	0	292	792	263	393	343	317	296	574	218
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	48.3	33.3		54.5	36.4	36.4	46.3	28.7	28.7	38.6	24.9	24.9
Actuated g/C Ratio	0.42	0.29		0.47	0.31	0.31	0.40	0.25	0.25	0.33	0.21	0.21
v/c Ratio	0.60	0.68		0.76	0.75	0.40	0.62	0.41	0.52	0.40	0.82	0.45
Control Delay	27.4	42.6		34.0	42.7	6.2	27.4	38.3	7.1	24.2	54.7	8.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	42.6		34.0	42.7	6.2	27.4	38.3	7.1	24.2	54.7	8.3
LOS	C	D		C	D	A	C	D	A	C	D	A
Approach Delay		39.2			33.7			24.9			37.1	
Approach LOS		D			C			C			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	20.8	33.8	33.8	16.0	29.0	29.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Hold	Hold	Gap	Max	Max
70th %ile Green (s)	16.8	33.0		19.0	35.2	35.2	18.6	33.6	33.6	14.0	29.0	29.0
70th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Max	Max
50th %ile Green (s)	14.0	33.0		19.0	38.0	38.0	17.1	31.0	31.0	12.7	26.6	26.6
50th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	11.1	33.0		16.4	38.3	38.3	15.0	26.4	26.4	11.2	22.6	22.6
30th %ile Term Code	Gap	MaxR		Gap	Hold	Hold	Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	10.0	33.0		12.7	35.7	35.7	12.0	20.0	20.0	10.0	18.0	18.0
10th %ile Term Code	Min	MaxR		Gap	Hold	Hold	Gap	Hold	Hold	Min	Gap	Gap
Stops (vph)	103	513		158	617	25	230	252	28	182	488	23
Fuel Used(l)	15	70		33	104	17	29	30	14	26	67	13
CO Emissions (g/hr)	285	1297		605	1933	323	546	556	261	486	1254	246
NOx Emissions (g/hr)	55	250		117	373	62	105	107	50	94	242	47
VOC Emissions (g/hr)	66	299		140	446	75	126	128	60	112	289	57
Dilemma Vehicles (#)	0	25		0	30	0	0	13	0	0	22	0
Queue Length 50th (m)	24.9	75.4		43.0	91.6	0.0	32.7	36.9	0.0	23.9	71.0	0.0
Queue Length 95th (m)	43.9	103.7		#83.7	#140.6	21.3	44.3	52.9	23.5	33.7	95.8	20.8
Internal Link Dist (m)		425.3			752.8			430.3			377.6	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	375	939		409	1058	653	836	912	639	1031	819	529
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.68		0.71	0.75	0.40	0.47	0.38	0.50	0.29	0.70	0.41

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 116			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 33.5		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 125.8			
70th %ile Actuated Cycle: 123.6			
50th %ile Actuated Cycle: 119.7			
30th %ile Actuated Cycle: 111			
10th %ile Actuated Cycle: 99.7			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



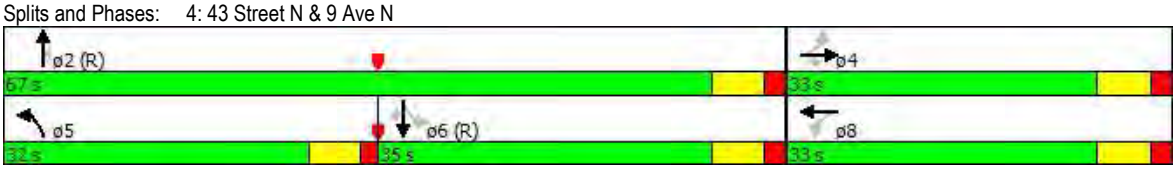
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	14	87	21	7	5	212	404	83	13	342	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.936				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1308	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.748			0.746			0.950			0.475		
Satd. Flow (perm)	1380	1845	1568	1042	1308	0	1656	3312	1482	828	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105		6				100			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	12	17	105	25	8	6	255	487	100	16	412	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	17	105	25	14	0	255	487	100	16	412	18
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0		32.0	67.0	67.0	35.0	35.0	35.0
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%		32.0%	67.0%	67.0%	35.0%	35.0%	35.0%
Maximum Green (s)	26.5	26.5	26.5	26.5	26.5		26.0	60.5	60.5	28.5	28.5	28.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	10.3	10.3	10.3	10.3	10.3		20.5	81.3	81.3	53.5	53.5	53.5
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10		0.20	0.81	0.81	0.54	0.54	0.54
v/c Ratio	0.08	0.09	0.41	0.23	0.10		0.75	0.18	0.08	0.04	0.23	0.02
Control Delay	41.9	41.6	13.6	46.9	32.5		47.6	1.4	0.3	15.8	14.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	41.6	13.6	46.9	32.5		47.6	1.4	0.3	15.8	14.9	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	B	B	A
Approach Delay		19.7			41.7			15.3			14.3	
Approach LOS		B			D			B			B	
90th %ile Green (s)	11.4	11.4	11.4	11.4	11.4		27.5	75.6	75.6	42.1	42.1	42.1
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		23.5	77.0	77.0	47.5	47.5	47.5
70th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		20.6	77.0	77.0	50.4	50.4	50.4
50th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		17.6	77.0	77.0	53.4	53.4	53.4
30th %ile Term Code	Min	Min	Min	Hold	Hold		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	0.0	0.0	0.0	0.0	0.0		13.3	93.5	93.5	74.2	74.2	74.2
10th %ile Term Code	Skip	Skip	Skip	Skip	Skip		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	11	15	17	20	10		194	56	1	8	183	0
Fuel Used(l)	1	2	7	3	1		30	33	6	1	28	1
CO Emissions (g/hr)	24	33	139	47	24		563	618	119	20	516	15
NOx Emissions (g/hr)	5	6	27	9	5		109	119	23	4	100	3
VOC Emissions (g/hr)	5	8	32	11	5		130	142	27	5	119	3
Dilemma Vehicles (#)	0	0	0	0	0		0	8	0	0	17	0
Queue Length 50th (m)	2.3	3.2	0.0	4.8	1.5		49.7	2.7	0.1	1.6	24.0	0.0
Queue Length 95th (m)	7.2	9.0	12.7	11.9	6.8		64.7	3.2	0.0	5.6	36.3	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	365	488	492	276	351		435	2693	1224	443	1772	841
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.03	0.21	0.09	0.04		0.59	0.18	0.08	0.04	0.23	0.02

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 16.1 Intersection LOS: B
Intersection Capacity Utilization 49.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



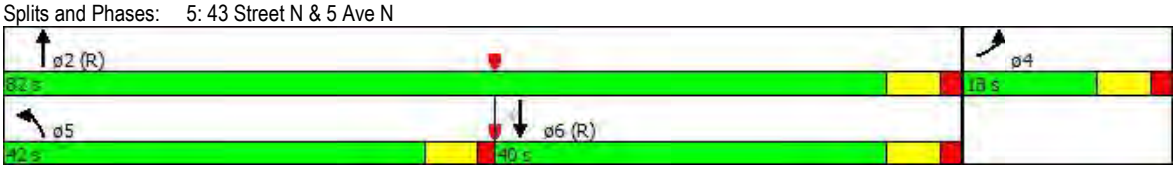
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	35	160	267	706	456	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		184				37
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	40	184	307	811	524	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	184	307	811	524	37
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	18.0		42.0	82.0	40.0	40.0
Total Split (%)	18.0%		42.0%	82.0%	40.0%	40.0%
Maximum Green (s)	11.5		36.0	75.5	33.5	33.5
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	23.5	86.2	54.1	54.1
Actuated g/C Ratio	0.10	1.00	0.24	0.86	0.54	0.54
v/c Ratio	0.13	0.13	0.77	0.28	0.31	0.05
Control Delay	42.2	0.2	48.1	2.7	8.7	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	0.2	48.1	2.7	8.7	1.5

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	A	A
Approach Delay	7.7			15.2	8.2	
Approach LOS	A			B	A	
90th %ile Green (s)	10.0		31.3	77.0	39.7	39.7
90th %ile Term Code	Min		Gap	Coord	Coord	Coord
70th %ile Green (s)	10.0		26.8	77.0	44.2	44.2
70th %ile Term Code	Min		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		23.6	77.0	47.4	47.4
50th %ile Term Code	Min		Gap	Coord	Coord	Coord
30th %ile Green (s)	0.0		20.3	93.5	67.2	67.2
30th %ile Term Code	Skip		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		15.5	93.5	72.0	72.0
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	33	0	241	131	112	1
Fuel Used(l)	4	11	33	45	42	3
CO Emissions (g/hr)	80	206	605	838	774	47
NOx Emissions (g/hr)	15	40	117	162	149	9
VOC Emissions (g/hr)	18	48	140	193	178	11
Dilemma Vehicles (#)	0	0	0	24	21	0
Queue Length 50th (m)	3.9	0.0	58.6	21.2	12.3	0.2
Queue Length 95th (m)	8.8	0.0	77.2	26.1	19.3	0.0
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	359	1442	613	2936	1683	769
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.13	0.50	0.28	0.31	0.05

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 12.2 — Intersection LOS: B
Intersection Capacity Utilization 51.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 5: 43 Street N & 5 Ave N

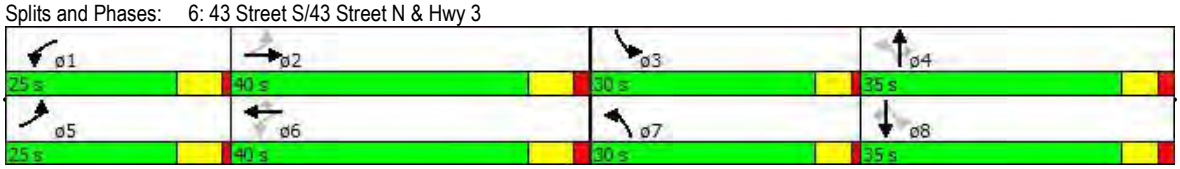


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	327	659	9	266	641	408	283	621	192	392	405	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	3246	0	1656	3312	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.200			0.193			0.446			0.135		
Satd. Flow (perm)	342	3246	0	336	3312	1482	1495	3282	1468	433	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				408			209			210
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	355	716	10	289	697	443	308	675	209	426	440	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	355	726	0	289	697	443	308	675	209	426	440	210
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	53.8	33.7		52.4	33.1	33.1	42.0	28.0	28.0	50.3	32.3	32.3
Actuated g/C Ratio	0.44	0.28		0.43	0.27	0.27	0.35	0.23	0.23	0.41	0.27	0.27
v/c Ratio	1.01	0.81		0.84	0.77	0.63	0.44	0.89	0.42	0.77	0.53	0.40
Control Delay	78.8	49.7		46.4	48.3	9.9	24.8	61.2	8.0	36.0	40.8	7.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.8	49.7		46.4	48.3	9.9	24.8	61.2	8.0	36.0	40.8	7.0
LOS	E	D		D	D	A	C	E	A	D	D	A
Approach Delay		59.3			36.0			42.5			32.3	
Approach LOS		E			D			D			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	16.5	29.0	29.0	23.3	35.8	35.8
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
70th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	14.4	29.0	29.0	19.5	34.1	34.1
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
50th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	13.0	29.0	29.0	17.0	33.0	33.0
50th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
30th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	11.7	29.0	29.0	15.1	32.4	32.4
30th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
10th %ile Green (s)	19.0	36.1		15.9	33.0	33.0	10.0	23.9	23.9	12.7	26.6	26.6
10th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Min	Gap	Gap	Gap	Hold	Hold
Stops (vph)	198	593		168	573	58	189	563	22	264	334	20
Fuel Used(l)	43	83		35	96	31	23	72	9	41	46	12
CO Emissions (g/hr)	795	1547		658	1784	583	421	1337	176	767	857	231
NOx Emissions (g/hr)	153	299		127	344	113	81	258	34	148	165	45
VOC Emissions (g/hr)	183	357		152	411	135	97	308	41	177	198	53
Dilemma Vehicles (#)	0	27		0	26	0	0	25	0	0	16	0
Queue Length 50th (m)	~67.2	90.7		44.7	85.7	6.6	25.0	86.4	0.0	36.5	49.6	0.0
Queue Length 95th (m)	#141.9	#130.1		#100.0	116.4	40.9	34.9	#128.0	20.8	54.1	69.1	19.0
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	352	901		353	901	700	972	784	510	721	847	532
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.81		0.82	0.77	0.63	0.32	0.86	0.41	0.59	0.52	0.39

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 121.5			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 42.0		Intersection LOS: D	
Intersection Capacity Utilization 84.2%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 128.3			
70th %ile Actuated Cycle: 124.5			
50th %ile Actuated Cycle: 122			
30th %ile Actuated Cycle: 120.1			
10th %ile Actuated Cycle: 112.6			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	6	248	111	13	14	144	366	21	4	499	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.921				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1716	0	1597	3195	1429	1687	3374	1509
Flt Permitted	0.735			0.752			0.950			0.488		
Satd. Flow (perm)	1317	1792	1524	1401	1716	0	1597	3195	1429	867	3374	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			310		18				38			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	13%	13%	13%	7%	7%	7%
Adj. Flow (vph)	21	8	310	139	16	18	180	458	26	5	624	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	8	310	139	34	0	180	458	26	5	624	39
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		12.0	22.5	22.5	22.5	22.5	22.5
Total Split (s)	31.0	31.0	31.0	31.0	31.0		29.0	69.0	69.0	40.0	40.0	40.0
Total Split (%)	31.0%	31.0%	31.0%	31.0%	31.0%		29.0%	69.0%	69.0%	40.0%	40.0%	40.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5		23.0	62.5	62.5	33.5	33.5	33.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0			11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	15.4	15.4	15.4	15.4	15.4		16.5	71.6	71.6	49.1	49.1	49.1
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.16	0.72	0.72	0.49	0.49	0.49
v/c Ratio	0.10	0.03	0.62	0.64	0.12		0.69	0.20	0.03	0.01	0.38	0.05
Control Delay	35.1	33.0	10.1	52.8	21.3		48.9	4.0	0.5	18.0	18.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	33.0	10.1	52.8	21.3		48.9	4.0	0.5	18.0	18.5	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C	B	D	C		D	A	A	B	B	A
Approach Delay		12.2			46.6			16.0			17.4	
Approach LOS		B			D			B			B	
90th %ile Green (s)	21.5	21.5	21.5	21.5	21.5		22.7	65.5	65.5	36.8	36.8	36.8
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	17.8	17.8	17.8	17.8	17.8		19.0	69.2	69.2	44.2	44.2	44.2
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	15.2	15.2	15.2	15.2	15.2		16.5	71.8	71.8	49.3	49.3	49.3
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	12.6	12.6	12.6	12.6	12.6		13.9	74.4	74.4	54.5	54.5	54.5
30th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		10.2	77.0	77.0	60.8	60.8	60.8
10th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	15	7	30	102	15		131	113	1	3	310	0
Fuel Used(l)	2	1	20	14	2		21	33	2	0	43	2
CO Emissions (g/hr)	37	14	377	254	46		385	611	31	7	804	30
NOx Emissions (g/hr)	7	3	73	49	9		74	118	6	1	155	6
VOC Emissions (g/hr)	9	3	87	59	11		89	141	7	2	186	7
Dilemma Vehicles (#)	0	0	0	0	0		0	17	0	0	25	0
Queue Length 50th (m)	3.7	1.4	0.0	27.0	2.8		25.7	6.4	0.2	0.5	40.1	0.0
Queue Length 95th (m)	8.9	4.8	13.1	38.5	9.3		47.6	14.4	0.3	2.9	58.8	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	322	439	607	343	434		367	2287	1033	426	1657	794
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.02	0.51	0.41	0.08		0.49	0.20	0.03	0.01	0.38	0.05

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 18.7 Intersection LOS: B
Intersection Capacity Utilization 54.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



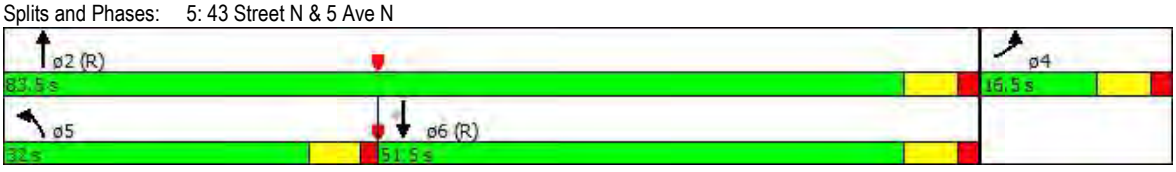
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	37	274	230	579	976	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3273	1509	1612	3223	3406	1524
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3273	1509	1612	3223	3406	1524
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		304				69
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			240.1	882.4	
Travel Time (s)	52.4			14.4	52.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	12%	12%	6%	6%
Adj. Flow (vph)	41	304	256	643	1084	69
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	304	256	643	1084	69
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		32.0	83.5	51.5	51.5
Total Split (%)	16.5%		32.0%	83.5%	51.5%	51.5%
Maximum Green (s)	10.0		26.0	77.0	45.0	45.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	20.5	86.2	57.1	57.1
Actuated g/C Ratio	0.10	1.00	0.20	0.86	0.57	0.57
v/c Ratio	0.13	0.20	0.78	0.23	0.56	0.08
Control Delay	42.1	0.3	53.1	2.5	13.8	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	0.3	53.1	2.5	13.8	2.9

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	B	A
Approach Delay	5.3			17.0	13.1	
Approach LOS	A			B	B	
90th %ile Green (s)	10.0		26.0	77.0	45.0	45.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
70th %ile Term Code	Max		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		21.0	77.0	50.0	50.0
50th %ile Term Code	Max		Gap	Coord	Coord	Coord
30th %ile Green (s)	0.0		18.0	93.5	69.5	69.5
30th %ile Term Code	Skip		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		13.6	93.5	73.9	73.9
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	34	0	210	103	610	6
Fuel Used(l)	5	19	29	37	105	5
CO Emissions (g/hr)	84	354	539	683	1950	95
NOx Emissions (g/hr)	16	68	104	132	376	18
VOC Emissions (g/hr)	19	82	124	158	450	22
Dilemma Vehicles (#)	0	0	0	20	22	0
Queue Length 50th (m)	4.0	0.0	49.4	16.0	90.0	0.3
Queue Length 95th (m)	9.3	0.0	73.3	21.3	53.8	m3.7
Internal Link Dist (m)	704.0			216.1	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	327	1509	419	2778	1944	899
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.20	0.61	0.23	0.56	0.08

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 13.4 Intersection LOS: B
Intersection Capacity Utilization 63.9% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 43 Street N & 5 Ave N

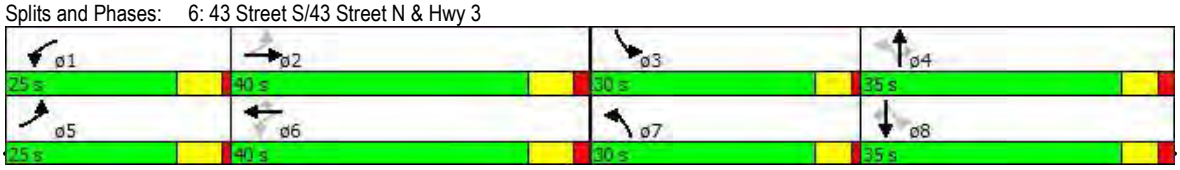


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	178	627	6	288	781	259	387	338	313	290	563	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3275	0	1687	3374	1509	3273	3374	1509	3155	3252	1455
Flt Permitted	0.169			0.192			0.165			0.527		
Satd. Flow (perm)	292	3275	0	341	3374	1509	568	3374	1509	1750	3252	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				282			340			232
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			401.6	
Travel Time (s)		20.2			35.0			27.3			24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	7%	7%	7%	7%	7%	7%	11%	11%	11%
Adj. Flow (vph)	193	682	7	313	849	282	421	367	340	315	612	232
Shared Lane Traffic (%)												
Lane Group Flow (vph)	193	689	0	313	849	282	421	367	340	315	612	232
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	48.7	33.1		56.3	37.2	37.2	49.4	30.9	30.9	40.7	26.5	26.5
Actuated g/C Ratio	0.41	0.28		0.47	0.31	0.31	0.41	0.26	0.26	0.34	0.22	0.22
v/c Ratio	0.68	0.76		0.85	0.81	0.43	0.67	0.42	0.53	0.42	0.85	0.46
Control Delay	34.1	47.1		46.0	46.9	6.3	28.8	38.9	7.0	24.6	57.5	8.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	47.1		46.0	46.9	6.3	28.8	38.9	7.0	24.6	57.5	8.2
LOS	C	D		D	D	A	C	D	A	C	E	A
Approach Delay		44.3			38.8			25.5			38.7	
Approach LOS		D			D			C			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	21.7	34.1	34.1	16.6	29.0	29.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Hold	Hold	Gap	Max	Max
70th %ile Green (s)	17.8	33.0		19.0	34.2	34.2	19.5	33.9	33.9	14.6	29.0	29.0
70th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Max	Max
50th %ile Green (s)	14.9	33.0		19.0	37.1	37.1	17.8	33.6	33.6	13.2	29.0	29.0
50th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Max	Max
30th %ile Green (s)	11.9	33.0		19.0	40.1	40.1	16.1	29.9	29.9	11.9	25.7	25.7
30th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	10.0	33.0		17.1	40.1	40.1	13.2	23.6	23.6	10.0	20.4	20.4
10th %ile Term Code	Min	MaxR		Gap	Hold	Hold	Gap	Hold	Hold	Min	Gap	Gap
Stops (vph)	113	564		170	665	26	247	271	29	194	517	24
Fuel Used(l)	17	78		38	114	19	32	32	15	28	73	14
CO Emissions (g/hr)	325	1446		699	2122	346	592	599	279	519	1357	260
NOx Emissions (g/hr)	63	279		135	410	67	114	116	54	100	262	50
VOC Emissions (g/hr)	75	334		161	489	80	136	138	64	120	313	60
Dilemma Vehicles (#)	0	26		0	31	0	0	14	0	0	23	0
Queue Length 50th (m)	28.1	85.3		49.3	105.7	0.0	35.4	40.0	0.0	25.6	77.4	0.0
Queue Length 95th (m)	50.7	113.4		#110.6	#159.2	22.2	47.5	57.0	24.4	35.9	#104.2	21.6
Internal Link Dist (m)		425.3			752.8			430.3			377.6	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	343	905		374	1045	662	802	903	652	1020	789	528
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.76		0.84	0.81	0.43	0.52	0.41	0.52	0.31	0.78	0.44

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 119.9			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 36.6		Intersection LOS: D	
Intersection Capacity Utilization 80.1%		ICU Level of Service D	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 126.7			
70th %ile Actuated Cycle: 124.5			
50th %ile Actuated Cycle: 122.8			
30th %ile Actuated Cycle: 117.8			
10th %ile Actuated Cycle: 107.7			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



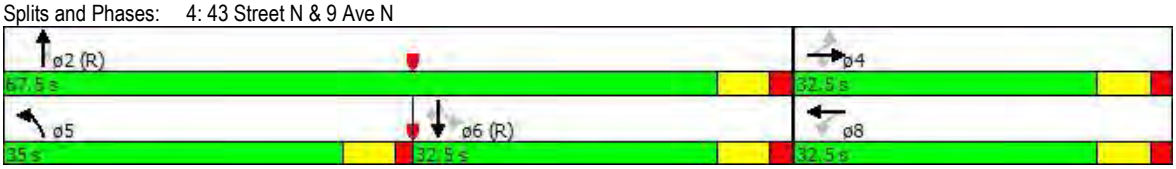
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	18	116	27	9	6	282	518	110	17	452	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.942				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1316	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.746			0.743			0.950			0.415		
Satd. Flow (perm)	1376	1845	1568	1038	1316	0	1656	3312	1482	723	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140		7				133			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	13	22	140	33	11	7	340	624	133	20	545	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	22	140	33	18	0	340	624	133	20	545	23
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	32.5	32.5	32.5	32.5	32.5		35.0	67.5	67.5	32.5	32.5	32.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%		35.0%	67.5%	67.5%	32.5%	32.5%	32.5%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		29.0	61.0	61.0	26.0	26.0	26.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	10.6	10.6	10.6	10.6	10.6		25.4	76.4	76.4	45.0	45.0	45.0
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.25	0.76	0.76	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.48	0.30	0.12		0.81	0.25	0.11	0.06	0.37	0.03
Control Delay	41.3	41.4	13.1	48.6	31.9		46.1	2.2	0.3	19.7	20.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	41.4	13.1	48.6	31.9		46.1	2.2	0.3	19.7	20.3	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	B	C	A
Approach Delay		18.8			42.7			15.6			19.5	
Approach LOS		B			D			B			B	
90th %ile Green (s)	12.7	12.7	12.7	12.7	12.7		32.9	74.3	74.3	35.4	35.4	35.4
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	10.2	10.2	10.2	10.2	10.2		28.8	76.8	76.8	42.0	42.0	42.0
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		25.6	77.0	77.0	45.4	45.4	45.4
50th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		22.3	77.0	77.0	48.7	48.7	48.7
30th %ile Term Code	Min	Min	Min	Hold	Hold		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		17.3	77.0	77.0	53.7	53.7	53.7
10th %ile Term Code	Min	Min	Min	Hold	Hold		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	11	18	20	26	12		257	76	0	12	294	0
Fuel Used(l)	1	2	10	3	2		40	43	8	2	40	1
CO Emissions (g/hr)	26	42	184	61	29		742	800	157	29	749	19
NOx Emissions (g/hr)	5	8	35	12	6		143	154	30	6	144	4
VOC Emissions (g/hr)	6	10	42	14	7		171	185	36	7	173	4
Dilemma Vehicles (#)	0	0	0	0	0		0	25	0	0	23	0
Queue Length 50th (m)	2.5	4.2	0.0	6.4	2.1		59.9	5.2	0.0	2.2	37.0	0.0
Queue Length 95th (m)	7.6	10.4	13.9	14.6	8.0		80.7	6.0	0.0	7.5	54.7	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	357	479	511	269	347		493	2531	1163	325	1491	724
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.05	0.27	0.12	0.05		0.69	0.25	0.11	0.06	0.37	0.03

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 17.8 Intersection LOS: B
Intersection Capacity Utilization 52.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



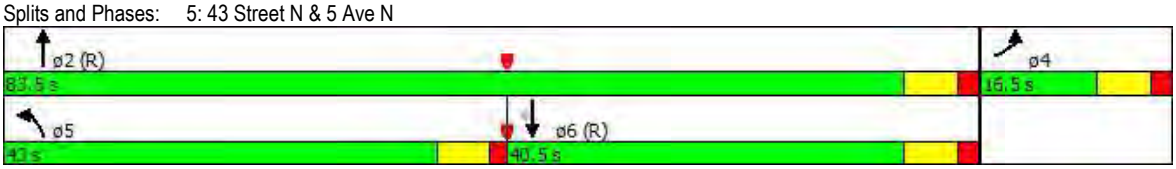
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	42	213	356	925	604	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		245				47
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	48	245	409	1063	694	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	245	409	1063	694	47
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		43.0	83.5	40.5	40.5
Total Split (%)	16.5%		43.0%	83.5%	40.5%	40.5%
Maximum Green (s)	10.0		37.0	77.0	34.0	34.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	29.2	86.2	48.4	48.4
Actuated g/C Ratio	0.10	1.00	0.29	0.86	0.48	0.48
v/c Ratio	0.15	0.17	0.82	0.36	0.46	0.07
Control Delay	42.5	0.3	46.6	3.1	11.2	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	0.3	46.6	3.1	11.2	1.1

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	B	A
Approach Delay	7.2			15.1	10.5	
Approach LOS	A			B	B	
90th %ile Green (s)	10.0		37.0	77.0	34.0	34.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		33.1	77.0	37.9	37.9
70th %ile Term Code	Max		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		29.6	77.0	41.4	41.4
50th %ile Term Code	Max		Gap	Coord	Coord	Coord
30th %ile Green (s)	0.0		25.9	93.5	61.6	61.6
30th %ile Term Code	Skip		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		20.4	93.5	67.1	67.1
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	38	0	322	191	345	2
Fuel Used(l)	5	15	43	60	63	3
CO Emissions (g/hr)	95	275	800	1114	1164	60
NOx Emissions (g/hr)	18	53	154	215	225	12
VOC Emissions (g/hr)	22	63	184	257	269	14
Dilemma Vehicles (#)	0	0	0	31	28	0
Queue Length 50th (m)	4.6	0.0	77.0	30.7	15.5	0.2
Queue Length 95th (m)	10.0	0.0	97.5	37.1	23.0	0.4
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	312	1442	630	2936	1506	697
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.17	0.65	0.36	0.46	0.07

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 12.8 Intersection LOS: B
Intersection Capacity Utilization 60.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 5: 43 Street N & 5 Ave N



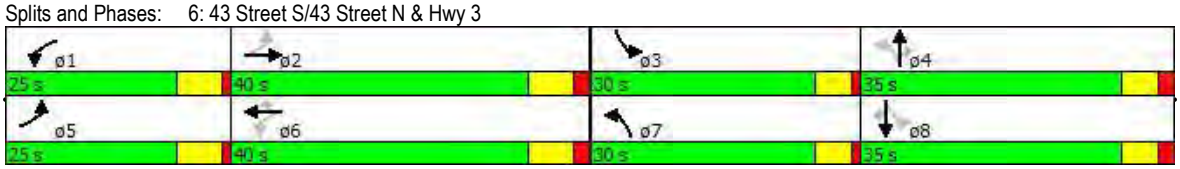
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	429	878	12	354	854	541	377	821	255	521	538	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	3246	0	1656	3312	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.121			0.121			0.329			0.118		
Satd. Flow (perm)	207	3246	0	211	3312	1482	1102	3282	1468	378	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				384			232			278
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	466	954	13	385	928	588	410	892	277	566	585	278
Shared Lane Traffic (%)												
Lane Group Flow (vph)	466	967	0	385	928	588	410	892	277	566	585	278
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	53.0	33.0		53.0	33.0	33.0	46.1	29.0	29.0	56.9	35.1	35.1
Actuated g/C Ratio	0.42	0.26		0.42	0.26	0.26	0.36	0.23	0.23	0.45	0.28	0.28
v/c Ratio	1.56	1.15		1.27	1.08	0.88	0.62	1.19	0.54	0.89	0.68	0.47
Control Delay	298.6	122.6		177.1	99.2	31.5	27.3	142.1	13.2	51.0	46.0	7.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	298.6	122.6		177.1	99.2	31.5	27.3	142.1	13.2	51.0	46.0	7.1
LOS	F	F		F	F	C	C	F	B	D	D	A
Approach Delay		179.9			94.0			89.7			40.4	
Approach LOS		F			F			F			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	20.7	29.0	29.0	25.0	33.3	33.3
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Max	Hold	Hold
70th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	17.5	29.0	29.0	25.0	36.5	36.5
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Max	Hold	Hold
50th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	16.0	29.0	29.0	23.8	36.8	36.8
50th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
30th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	14.4	29.0	29.0	20.6	35.2	35.2
30th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
10th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	12.1	29.0	29.0	16.7	33.6	33.6
10th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
Stops (vph)	258	746		223	734	201	257	676	50	393	469	26
Fuel Used(l)	129	158		83	160	58	31	144	14	62	64	17
CO Emissions (g/hr)	2391	2944		1538	2967	1073	578	2678	265	1156	1194	307
NOx Emissions (g/hr)	462	568		297	573	207	112	517	51	223	230	59
VOC Emissions (g/hr)	552	679		355	684	248	133	618	61	267	275	71
Dilemma Vehicles (#)	0	30		0	29	0	0	26	0	0	21	0
Queue Length 50th (m)	~162.7	~161.3		~115.2	~147.1	59.0	34.4	~152.6	9.7	60.2	72.3	0.0
Queue Length 95th (m)	#234.6	#207.5		#182.7	#192.4	#134.3	46.2	#197.5	37.7	#84.7	98.2	23.2
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	298	843		303	859	668	879	748	513	694	865	588
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.56	1.15		1.27	1.08	0.88	0.47	1.19	0.54	0.82	0.68	0.47

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 127.2
Natural Cycle: 130
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.56
Intersection Signal Delay: 100.3 Intersection LOS: F
Intersection Capacity Utilization 104.9% ICU Level of Service G
Analysis Period (min) 15
90th %ile Actuated Cycle: 130
70th %ile Actuated Cycle: 130
50th %ile Actuated Cycle: 128.8
30th %ile Actuated Cycle: 125.6
10th %ile Actuated Cycle: 121.7
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3

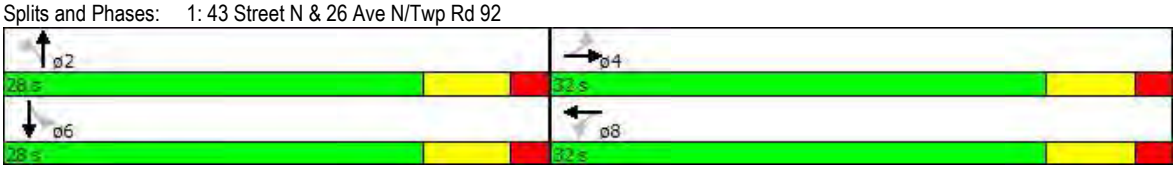


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	99	252	23	84	6	89	111	26	6	51	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.908			0.993			0.984			0.985	
Flt Protected		0.998			0.990			0.981			0.995	
Satd. Flow (prot)	0	1656	0	0	1796	0	0	1714	0	0	1605	0
Flt Permitted		0.979			0.864			0.835			0.950	
Satd. Flow (perm)	0	1624	0	0	1567	0	0	1459	0	0	1533	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		226			6			12			9	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		697.6			744.1			520.4			321.7	
Travel Time (s)		50.2			53.6			26.8			16.5	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	16%	16%	16%
Adj. Flow (vph)	22	129	327	30	109	8	116	144	34	8	66	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	478	0	0	147	0	0	294	0	0	83	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	32.0	32.0		32.0	32.0		28.0	28.0		28.0	28.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	25.5	25.5		25.5	25.5		21.5	21.5		21.5	21.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.3			14.3			13.8			13.8	
Actuated g/C Ratio		0.34			0.34			0.33			0.33	
v/c Ratio		0.68			0.27			0.60			0.16	
Control Delay		11.8			11.5			18.0			11.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.8			11.5			18.0			11.0	
LOS		B			B			B			B	
Approach Delay		11.8			11.5			18.0			11.0	
Approach LOS		B			B			B			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	25.0	25.0		25.0	25.0		21.5	21.5		21.5	21.5	
90th %ile Term Code	Gap	Gap		Hold	Hold		Max	Max		Hold	Hold	
70th %ile Green (s)	16.4	16.4		16.4	16.4		16.0	16.0		16.0	16.0	
70th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Gap		Hold	Hold	
50th %ile Green (s)	12.2	12.2		12.2	12.2		12.5	12.5		12.5	12.5	
50th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Gap		Hold	Hold	
30th %ile Green (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
30th %ile Term Code	Min	Min		Min	Min		Min	Min		Min	Min	
10th %ile Green (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
10th %ile Term Code	Min	Min		Hold	Hold		Min	Min		Min	Min	
Stops (vph)		157			68			165			39	
Fuel Used(l)		31			11			20			4	
CO Emissions (g/hr)		581			196			371			73	
NOx Emissions (g/hr)		112			38			72			14	
VOC Emissions (g/hr)		134			45			86			17	
Dilemma Vehicles (#)		0			0			26			7	
Queue Length 50th (m)		13.0			6.7			14.9			3.3	
Queue Length 95th (m)		30.8			16.8			37.1			11.4	
Internal Link Dist (m)		673.6			720.1			496.4			297.7	
Turn Bay Length (m)												
Base Capacity (vph)		1124			1008			795			834	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.43			0.15			0.37			0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 41.7			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 52.7%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 59.5			
70th %ile Actuated Cycle: 45.4			
50th %ile Actuated Cycle: 37.7			
30th %ile Actuated Cycle: 33			
10th %ile Actuated Cycle: 33			

Splits and Phases: 1: 43 Street N & 26 Ave N/Twp Rd 92



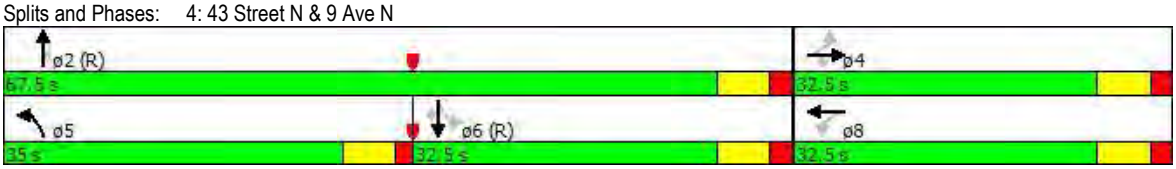
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	18	116	27	9	6	282	518	110	17	452	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.942				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1316	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.746			0.743			0.950			0.415		
Satd. Flow (perm)	1376	1845	1568	1038	1316	0	1656	3312	1482	723	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140		7				133			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	13	22	140	33	11	7	340	624	133	20	545	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	22	140	33	18	0	340	624	133	20	545	23
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	32.5	32.5	32.5	32.5	32.5		35.0	67.5	67.5	32.5	32.5	32.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%		35.0%	67.5%	67.5%	32.5%	32.5%	32.5%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		29.0	61.0	61.0	26.0	26.0	26.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	10.6	10.6	10.6	10.6	10.6		25.4	76.4	76.4	45.0	45.0	45.0
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.25	0.76	0.76	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.48	0.30	0.12		0.81	0.25	0.11	0.06	0.37	0.03
Control Delay	41.3	41.4	13.1	48.6	31.9		46.1	2.2	0.3	19.7	20.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	41.4	13.1	48.6	31.9		46.1	2.2	0.3	19.7	20.3	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	B	C	A
Approach Delay		18.8			42.7			15.6			19.5	
Approach LOS		B			D			B			B	
90th %ile Green (s)	12.7	12.7	12.7	12.7	12.7		32.9	74.3	74.3	35.4	35.4	35.4
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	10.2	10.2	10.2	10.2	10.2		28.8	76.8	76.8	42.0	42.0	42.0
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		25.6	77.0	77.0	45.4	45.4	45.4
50th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		22.3	77.0	77.0	48.7	48.7	48.7
30th %ile Term Code	Min	Min	Min	Hold	Hold		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		17.3	77.0	77.0	53.7	53.7	53.7
10th %ile Term Code	Min	Min	Min	Hold	Hold		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	11	18	20	26	12		257	76	0	12	294	0
Fuel Used(l)	1	2	10	3	2		40	43	8	2	40	1
CO Emissions (g/hr)	26	42	184	61	29		742	800	157	29	749	19
NOx Emissions (g/hr)	5	8	35	12	6		143	154	30	6	144	4
VOC Emissions (g/hr)	6	10	42	14	7		171	185	36	7	173	4
Dilemma Vehicles (#)	0	0	0	0	0		0	25	0	0	23	0
Queue Length 50th (m)	2.5	4.2	0.0	6.4	2.1		59.9	5.2	0.0	2.2	37.0	0.0
Queue Length 95th (m)	7.6	10.4	13.9	14.6	8.0		80.7	6.0	0.0	7.5	54.7	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	357	479	511	269	347		493	2531	1163	325	1491	724
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.05	0.27	0.12	0.05		0.69	0.25	0.11	0.06	0.37	0.03

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 17.8 Intersection LOS: B
Intersection Capacity Utilization 52.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



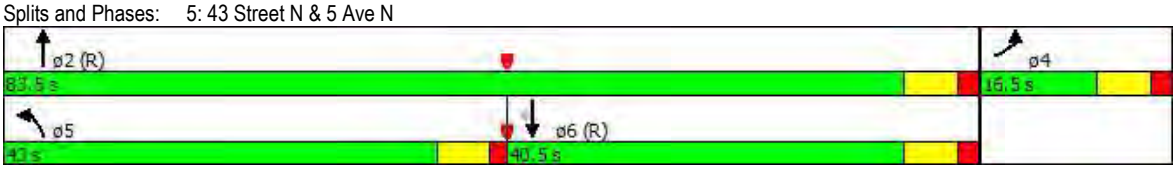
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	42	213	356	925	604	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		245				47
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	48	245	409	1063	694	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	245	409	1063	694	47
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		43.0	83.5	40.5	40.5
Total Split (%)	16.5%		43.0%	83.5%	40.5%	40.5%
Maximum Green (s)	10.0		37.0	77.0	34.0	34.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	29.2	86.2	48.4	48.4
Actuated g/C Ratio	0.10	1.00	0.29	0.86	0.48	0.48
v/c Ratio	0.15	0.17	0.82	0.36	0.46	0.07
Control Delay	42.5	0.3	46.6	3.1	11.2	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	0.3	46.6	3.1	11.2	1.1

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	B	A
Approach Delay	7.2			15.1	10.5	
Approach LOS	A			B	B	
90th %ile Green (s)	10.0		37.0	77.0	34.0	34.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		33.1	77.0	37.9	37.9
70th %ile Term Code	Max		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		29.6	77.0	41.4	41.4
50th %ile Term Code	Max		Gap	Coord	Coord	Coord
30th %ile Green (s)	0.0		25.9	93.5	61.6	61.6
30th %ile Term Code	Skip		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		20.4	93.5	67.1	67.1
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	38	0	322	191	345	2
Fuel Used(l)	5	15	43	60	63	3
CO Emissions (g/hr)	95	275	800	1114	1164	60
NOx Emissions (g/hr)	18	53	154	215	225	12
VOC Emissions (g/hr)	22	63	184	257	269	14
Dilemma Vehicles (#)	0	0	0	31	28	0
Queue Length 50th (m)	4.6	0.0	77.0	30.7	15.5	0.2
Queue Length 95th (m)	10.0	0.0	97.5	37.1	23.0	0.4
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	312	1442	630	2936	1506	697
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.17	0.65	0.36	0.46	0.07

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 12.8 Intersection LOS: B
Intersection Capacity Utilization 60.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 5: 43 Street N & 5 Ave N



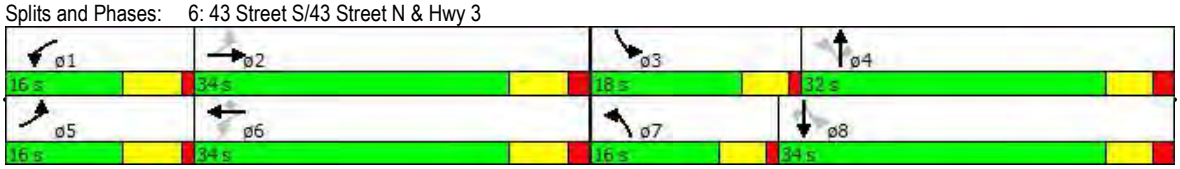
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	429	878	12	354	854	541	377	821	255	521	538	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	2		0	2		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3155	4664	0	3213	4759	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.186			0.169			0.322			0.142		
Satd. Flow (perm)	618	4664	0	571	4759	1482	1079	3282	1468	455	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				265			235			249
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	466	954	13	385	928	588	410	892	277	566	585	278
Shared Lane Traffic (%)												
Lane Group Flow (vph)	466	967	0	385	928	588	410	892	277	566	585	278
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	16.0	34.0		16.0	34.0	34.0	16.0	32.0	32.0	18.0	34.0	34.0
Total Split (%)	16.0%	34.0%		16.0%	34.0%	34.0%	16.0%	32.0%	32.0%	18.0%	34.0%	34.0%
Maximum Green (s)	10.0	27.0		10.0	27.0	27.0	11.0	26.0	26.0	13.0	28.0	28.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	38.0	27.0		38.0	27.0	27.0	37.8	26.0	26.0	42.2	28.2	28.2
Actuated g/C Ratio	0.38	0.27		0.38	0.27	0.27	0.38	0.26	0.26	0.42	0.28	0.28
v/c Ratio	0.95	0.77		0.80	0.72	0.99	0.64	1.05	0.50	1.07	0.66	0.48
Control Delay	53.4	38.3		33.0	36.9	56.4	23.2	80.4	10.0	86.0	36.1	8.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	38.3		33.0	36.9	56.4	23.2	80.4	10.0	86.0	36.1	8.5
LOS	D	D		C	D	E	C	F	A	F	D	A
Approach Delay		43.2			42.2			53.2			50.5	
Approach LOS		D			D			D			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	10.0	27.0		10.0	27.0	27.0	11.0	26.0	26.0	13.0	28.0	28.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Max	Max
70th %ile Green (s)	10.0	27.0		10.0	27.0	27.0	11.0	26.0	26.0	13.0	28.0	28.0
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
50th %ile Green (s)	10.0	27.0		10.0	27.0	27.0	11.0	26.0	26.0	13.0	28.0	28.0
50th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
30th %ile Green (s)	10.0	27.0		10.0	27.0	27.0	11.0	26.0	26.0	13.0	28.0	28.0
30th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
10th %ile Green (s)	10.0	27.0		10.0	27.0	27.0	10.2	26.0	26.0	13.0	28.8	28.8
10th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Max	Hold	Hold
Stops (vph)	265	795		223	750	279	251	715	50	326	463	42
Fuel Used(l)	48	103		43	120	73	30	106	14	74	60	17
CO Emissions (g/hr)	893	1922		808	2223	1350	552	1977	253	1377	1113	322
NOx Emissions (g/hr)	172	371		156	429	261	107	382	49	266	215	62
VOC Emissions (g/hr)	206	443		186	513	311	127	456	58	318	257	74
Dilemma Vehicles (#)	0	44		0	43	0	0	37	0	0	27	0
Queue Length 50th (m)	31.3	66.3		25.1	62.8	73.9	26.4	~104.5	6.6	~51.5	55.5	4.4
Queue Length 95th (m)	#60.3	82.8		#43.1	78.6	#149.3	37.2	#144.1	29.3	#86.3	75.0	26.2
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	488	1260		481	1284	593	641	853	555	528	883	574
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.77		0.80	0.72	0.99	0.64	1.05	0.50	1.07	0.66	0.48

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 47.0 Intersection LOS: D
Intersection Capacity Utilization 86.5% ICU Level of Service E
Analysis Period (min) 15
90th %ile Actuated Cycle: 100
70th %ile Actuated Cycle: 100
50th %ile Actuated Cycle: 100
30th %ile Actuated Cycle: 100
10th %ile Actuated Cycle: 100
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	8	330	147	17	18	192	479	27	5	632	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.923				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1719	0	1597	3195	1429	1687	3374	1509
Flt Permitted	0.729			0.751			0.950			0.426		
Satd. Flow (perm)	1307	1792	1524	1399	1719	0	1597	3195	1429	756	3374	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			412		22				38			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	13%	13%	13%	7%	7%	7%
Adj. Flow (vph)	28	10	412	184	21	22	240	599	34	6	790	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	10	412	184	43	0	240	599	34	6	790	48
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	32.5	32.5	32.5	32.5	32.5		29.0	67.5	67.5	38.5	38.5	38.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%		29.0%	67.5%	67.5%	38.5%	38.5%	38.5%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		23.0	61.0	61.0	32.0	32.0	32.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	18.4	18.4	18.4	18.4	18.4		19.3	68.6	68.6	43.3	43.3	43.3
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18		0.19	0.69	0.69	0.43	0.43	0.43
v/c Ratio	0.12	0.03	0.67	0.72	0.13		0.78	0.27	0.03	0.02	0.54	0.07
Control Delay	32.4	30.1	9.2	53.3	19.2		51.1	5.0	0.7	22.0	24.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	30.1	9.2	53.3	19.2		51.1	5.0	0.7	22.0	24.8	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C	A	D	B		D	A	A	C	C	A
Approach Delay		11.1			46.8			17.5			23.4	
Approach LOS		B			D			B			C	
90th %ile Green (s)	25.5	25.5	25.5	25.5	25.5		23.5	61.5	61.5	32.0	32.0	32.0
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Max	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	21.4	21.4	21.4	21.4	21.4		23.0	65.6	65.6	36.6	36.6	36.6
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	18.4	18.4	18.4	18.4	18.4		20.1	68.6	68.6	42.5	42.5	42.5
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	15.4	15.4	15.4	15.4	15.4		17.2	71.6	71.6	48.4	48.4	48.4
30th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	11.1	11.1	11.1	11.1	11.1		12.9	75.9	75.9	57.0	57.0	57.0
10th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	18	8	35	134	17		177	161	2	5	468	0
Fuel Used(l)	3	1	27	18	3		28	44	2	1	60	2
CO Emissions (g/hr)	47	17	495	337	56		520	814	40	9	1121	37
NOx Emissions (g/hr)	9	3	96	65	11		100	157	8	2	216	7
VOC Emissions (g/hr)	11	4	114	78	13		120	188	9	2	259	9
Dilemma Vehicles (#)	0	0	0	0	0		0	23	0	0	32	0
Queue Length 50th (m)	4.8	1.7	0.0	35.6	3.6		39.2	10.5	0.3	0.7	62.1	0.0
Queue Length 95th (m)	10.3	5.1	12.5	47.3	10.1		62.0	27.4	0.3	3.4	82.9	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	339	465	701	363	463		369	2192	992	327	1460	712
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.59	0.51	0.09		0.65	0.27	0.03	0.02	0.54	0.07

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 21.1 Intersection LOS: C
Intersection Capacity Utilization 62.5% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



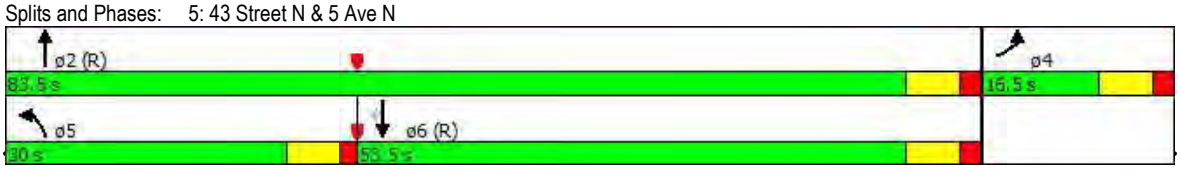
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	47	365	306	765	1275	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3273	1509	1612	3223	3406	1524
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3273	1509	1612	3223	3406	1524
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		406				83
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			240.1	882.4	
Travel Time (s)	52.4			14.4	52.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	12%	12%	6%	6%
Adj. Flow (vph)	52	406	340	850	1417	83
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	406	340	850	1417	83
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		30.0	83.5	53.5	53.5
Total Split (%)	16.5%		30.0%	83.5%	53.5%	53.5%
Maximum Green (s)	10.0		24.0	77.0	47.0	47.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	23.1	81.6	51.2	51.2
Actuated g/C Ratio	0.10	1.00	0.23	0.82	0.51	0.51
v/c Ratio	0.16	0.27	0.91	0.32	0.81	0.10
Control Delay	42.5	0.4	67.6	3.5	22.1	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	0.4	67.6	3.5	22.1	2.6

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	E	A	C	A
Approach Delay	5.2			21.8	21.1	
Approach LOS	A			C	C	
90th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
70th %ile Term Code	Max		Max	Coord	Coord	Coord
50th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
50th %ile Term Code	Max		Max	Coord	Coord	Coord
30th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
30th %ile Term Code	Max		Max	Coord	Coord	Coord
10th %ile Green (s)	0.0		19.7	93.5	67.8	67.8
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	42	0	270	184	1064	5
Fuel Used(l)	6	25	42	51	154	6
CO Emissions (g/hr)	107	472	775	942	2860	113
NOx Emissions (g/hr)	21	91	150	182	552	22
VOC Emissions (g/hr)	25	109	179	217	660	26
Dilemma Vehicles (#)	0	0	0	33	31	0
Queue Length 50th (m)	5.1	0.0	67.1	23.0	145.5	0.4
Queue Length 95th (m)	11.0	0.0	#118.1	29.8	#187.6	m3.8
Internal Link Dist (m)	704.0			216.1	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	327	1509	386	2629	1742	820
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.27	0.88	0.32	0.81	0.10

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 19.0 Intersection LOS: B
Intersection Capacity Utilization 76.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 43 Street N & 5 Ave N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	836	8	384	1041	343	516	447	417	382	739	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.999				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3279	0	1687	3374	1509	3273	3374	1509	3155	3252	1455
Flt Permitted	0.132			0.095			0.114			0.400		
Satd. Flow (perm)	228	3279	0	169	3374	1509	393	3374	1509	1328	3252	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				290			333			184
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			401.6	
Travel Time (s)		20.2			35.0			27.3			24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	7%	7%	7%	7%	7%	7%	11%	11%	11%
Adj. Flow (vph)	255	909	9	417	1132	373	561	486	453	415	803	297
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	918	0	417	1132	373	561	486	453	415	803	297
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	16.0	43.0		31.0	58.0	58.0	20.0	41.0	41.0	15.0	36.0	36.0
Total Split (%)	12.3%	33.1%		23.8%	44.6%	44.6%	15.4%	31.5%	31.5%	11.5%	27.7%	27.7%
Maximum Green (s)	10.0	36.0		25.0	51.0	51.0	15.0	35.0	35.0	10.0	30.0	30.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	47.0	36.0		68.0	51.0	51.0	51.0	35.0	35.0	41.0	30.0	30.0
Actuated g/C Ratio	0.36	0.28		0.52	0.39	0.39	0.39	0.27	0.27	0.32	0.23	0.23
v/c Ratio	1.34	1.01		1.10	0.86	0.49	1.15	0.54	0.70	0.74	1.07	0.62
Control Delay	210.5	79.1		111.7	43.8	9.0	123.1	43.1	17.6	39.8	100.6	23.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	210.5	79.1		111.7	43.8	9.0	123.1	43.1	17.6	39.8	100.6	23.0
LOS	F	E		F	D	A	F	D	B	D	F	C
Approach Delay		107.7			51.8			65.3			68.8	
Approach LOS		F			D			E			E	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	10.0	36.0		25.0	51.0	51.0	15.0	35.0	35.0	10.0	30.0	30.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Max	Max
70th %ile Green (s)	10.0	36.0		25.0	51.0	51.0	15.0	35.0	35.0	10.0	30.0	30.0
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
50th %ile Green (s)	10.0	36.0		25.0	51.0	51.0	15.0	35.0	35.0	10.0	30.0	30.0
50th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
30th %ile Green (s)	10.0	36.0		25.0	51.0	51.0	15.0	35.0	35.0	10.0	30.0	30.0
30th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
10th %ile Green (s)	10.0	36.0		25.0	51.0	51.0	15.0	35.0	35.0	10.0	30.0	30.0
10th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
Stops (vph)	143	758		273	922	64	335	373	118	325	649	100
Fuel Used(l)	55	125		72	152	27	80	45	26	43	119	23
CO Emissions (g/hr)	1015	2321		1342	2821	503	1489	828	482	809	2220	433
NOx Emissions (g/hr)	196	448		259	544	97	287	160	93	156	429	84
VOC Emissions (g/hr)	234	535		309	651	116	343	191	111	187	512	100
Dilemma Vehicles (#)	0	30		0	40	0	0	17	0	0	26	0
Queue Length 50th (m)	~71.2	~133.1		~111.3	145.4	14.3	~75.8	59.1	27.6	39.9	~126.1	26.6
Queue Length 95th (m)	#127.5	#179.7		#178.4	176.4	41.3	#113.4	77.4	69.5	53.5	#167.4	59.2
Internal Link Dist (m)		425.3			752.8			430.3			377.6	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	191	908		380	1323	768	486	908	649	559	750	477
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.34	1.01		1.10	0.86	0.49	1.15	0.54	0.70	0.74	1.07	0.62

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.34			
Intersection Signal Delay: 70.1		Intersection LOS: E	
Intersection Capacity Utilization 99.8%		ICU Level of Service F	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 130			
70th %ile Actuated Cycle: 130			
50th %ile Actuated Cycle: 130			
30th %ile Actuated Cycle: 130			
10th %ile Actuated Cycle: 130			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	51	242	12	108	0	335	75	54	12	172	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.893						0.984			0.978	
Flt Protected		0.998			0.995			0.965			0.997	
Satd. Flow (prot)	0	1628	0	0	1818	0	0	1686	0	0	1597	0
Flt Permitted		0.983			0.935			0.645			0.966	
Satd. Flow (perm)	0	1604	0	0	1708	0	0	1127	0	0	1547	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		260						16			23	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		697.6			744.1			520.4			321.7	
Travel Time (s)		50.2			53.6			26.8			16.5	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	16%	16%	16%
Adj. Flow (vph)	12	55	260	13	116	0	360	81	58	13	185	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	327	0	0	129	0	0	499	0	0	236	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		37.0	37.0		37.0	37.0	
Total Split (%)	38.3%	38.3%		38.3%	38.3%		61.7%	61.7%		61.7%	61.7%	
Maximum Green (s)	16.5	16.5		16.5	16.5		30.5	30.5		30.5	30.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.3			11.3			25.5			25.5	
Actuated g/C Ratio		0.23			0.23			0.51			0.51	
v/c Ratio		0.58			0.33			0.86			0.30	
Control Delay		9.9			20.6			28.4			7.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.9			20.6			28.4			7.5	
LOS		A			C			C			A	
Approach Delay		9.9			20.6			28.4			7.5	
Approach LOS		A			C			C			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	15.8	15.8		15.8	15.8		30.5	30.5		30.5	30.5	
90th %ile Term Code	Gap	Gap		Hold	Hold		Max	Max		Hold	Hold	
70th %ile Green (s)	10.8	10.8		10.8	10.8		30.5	30.5		30.5	30.5	
70th %ile Term Code	Gap	Gap		Hold	Hold		Max	Max		Hold	Hold	
50th %ile Green (s)	10.0	10.0		10.0	10.0		28.8	28.8		28.8	28.8	
50th %ile Term Code	Min	Min		Min	Min		Gap	Gap		Hold	Hold	
30th %ile Green (s)	10.0	10.0		10.0	10.0		22.7	22.7		22.7	22.7	
30th %ile Term Code	Min	Min		Min	Min		Gap	Gap		Hold	Hold	
10th %ile Green (s)	10.0	10.0		10.0	10.0		16.3	16.3		16.3	16.3	
10th %ile Term Code	Min	Min		Hold	Hold		Gap	Gap		Hold	Hold	
Stops (vph)		78			94			325			97	
Fuel Used(l)		24			12			44			11	
CO Emissions (g/hr)		450			232			820			209	
NOx Emissions (g/hr)		87			45			158			40	
VOC Emissions (g/hr)		104			54			189			48	
Dilemma Vehicles (#)		0			0			43			21	
Queue Length 50th (m)		5.6			11.1			32.4			9.4	
Queue Length 95th (m)		24.6			24.2			#101.7			24.5	
Internal Link Dist (m)		673.6			720.1			496.4			297.7	
Turn Bay Length (m)												
Base Capacity (vph)		712			574			706			970	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.46			0.22			0.71			0.24	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 18.3		Intersection LOS: B	
Intersection Capacity Utilization 74.0%		ICU Level of Service D	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 59.3			
70th %ile Actuated Cycle: 54.3			
50th %ile Actuated Cycle: 51.8			
30th %ile Actuated Cycle: 45.7			
10th %ile Actuated Cycle: 39.3			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: 43 Street N & 26 Ave N/Twp Rd 92



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	8	330	147	17	18	192	479	27	5	632	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.923				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1719	0	1597	3195	1429	1687	3374	1509
Flt Permitted	0.729			0.751			0.950			0.426		
Satd. Flow (perm)	1307	1792	1524	1399	1719	0	1597	3195	1429	756	3374	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			412		22				38			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	13%	13%	13%	7%	7%	7%
Adj. Flow (vph)	28	10	412	184	21	22	240	599	34	6	790	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	10	412	184	43	0	240	599	34	6	790	48
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	32.5	32.5	32.5	32.5	32.5		29.0	67.5	67.5	38.5	38.5	38.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%		29.0%	67.5%	67.5%	38.5%	38.5%	38.5%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		23.0	61.0	61.0	32.0	32.0	32.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	18.4	18.4	18.4	18.4	18.4		19.3	68.6	68.6	43.3	43.3	43.3
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18		0.19	0.69	0.69	0.43	0.43	0.43
v/c Ratio	0.12	0.03	0.67	0.72	0.13		0.78	0.27	0.03	0.02	0.54	0.07
Control Delay	32.4	30.1	9.2	53.3	19.2		51.1	5.0	0.7	22.0	24.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	30.1	9.2	53.3	19.2		51.1	5.0	0.7	22.0	24.8	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C	A	D	B		D	A	A	C	C	A
Approach Delay		11.1			46.8			17.5			23.4	
Approach LOS		B			D			B			C	
90th %ile Green (s)	25.5	25.5	25.5	25.5	25.5		23.5	61.5	61.5	32.0	32.0	32.0
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Max	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	21.4	21.4	21.4	21.4	21.4		23.0	65.6	65.6	36.6	36.6	36.6
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	18.4	18.4	18.4	18.4	18.4		20.1	68.6	68.6	42.5	42.5	42.5
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	15.4	15.4	15.4	15.4	15.4		17.2	71.6	71.6	48.4	48.4	48.4
30th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	11.1	11.1	11.1	11.1	11.1		12.9	75.9	75.9	57.0	57.0	57.0
10th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	18	8	35	134	17		177	161	2	5	468	0
Fuel Used(l)	3	1	27	18	3		28	44	2	1	60	2
CO Emissions (g/hr)	47	17	495	337	56		520	814	40	9	1121	37
NOx Emissions (g/hr)	9	3	96	65	11		100	157	8	2	216	7
VOC Emissions (g/hr)	11	4	114	78	13		120	188	9	2	259	9
Dilemma Vehicles (#)	0	0	0	0	0		0	23	0	0	32	0
Queue Length 50th (m)	4.8	1.7	0.0	35.6	3.6		39.2	10.5	0.3	0.7	62.1	0.0
Queue Length 95th (m)	10.3	5.1	12.5	47.3	10.1		62.0	27.4	0.3	3.4	82.9	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	339	465	701	363	463		369	2192	992	327	1460	712
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.59	0.51	0.09		0.65	0.27	0.03	0.02	0.54	0.07

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 21.1 Intersection LOS: C
Intersection Capacity Utilization 62.5% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



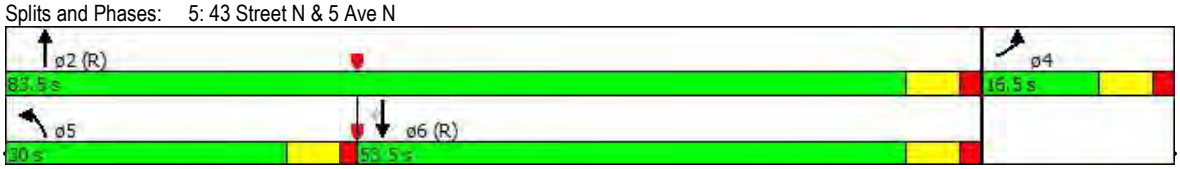
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	47	365	306	765	1275	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3273	1509	1612	3223	3406	1524
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3273	1509	1612	3223	3406	1524
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		406				83
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			240.1	882.4	
Travel Time (s)	52.4			14.4	52.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	12%	12%	6%	6%
Adj. Flow (vph)	52	406	340	850	1417	83
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	406	340	850	1417	83
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		30.0	83.5	53.5	53.5
Total Split (%)	16.5%		30.0%	83.5%	53.5%	53.5%
Maximum Green (s)	10.0		24.0	77.0	47.0	47.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	23.1	81.6	51.2	51.2
Actuated g/C Ratio	0.10	1.00	0.23	0.82	0.51	0.51
v/c Ratio	0.16	0.27	0.91	0.32	0.81	0.10
Control Delay	42.5	0.4	67.6	3.5	22.1	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	0.4	67.6	3.5	22.1	2.6

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	E	A	C	A
Approach Delay	5.2			21.8	21.1	
Approach LOS	A			C	C	
90th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
70th %ile Term Code	Max		Max	Coord	Coord	Coord
50th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
50th %ile Term Code	Max		Max	Coord	Coord	Coord
30th %ile Green (s)	10.0		24.0	77.0	47.0	47.0
30th %ile Term Code	Max		Max	Coord	Coord	Coord
10th %ile Green (s)	0.0		19.7	93.5	67.8	67.8
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	42	0	270	184	1064	5
Fuel Used(l)	6	25	42	51	154	6
CO Emissions (g/hr)	107	472	775	942	2860	113
NOx Emissions (g/hr)	21	91	150	182	552	22
VOC Emissions (g/hr)	25	109	179	217	660	26
Dilemma Vehicles (#)	0	0	0	33	31	0
Queue Length 50th (m)	5.1	0.0	67.1	23.0	145.5	0.4
Queue Length 95th (m)	11.0	0.0	#118.1	29.8	#187.6	m3.8
Internal Link Dist (m)	704.0			216.1	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	327	1509	386	2629	1742	820
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.27	0.88	0.32	0.81	0.10

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 19.0 Intersection LOS: B
Intersection Capacity Utilization 76.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 43 Street N & 5 Ave N

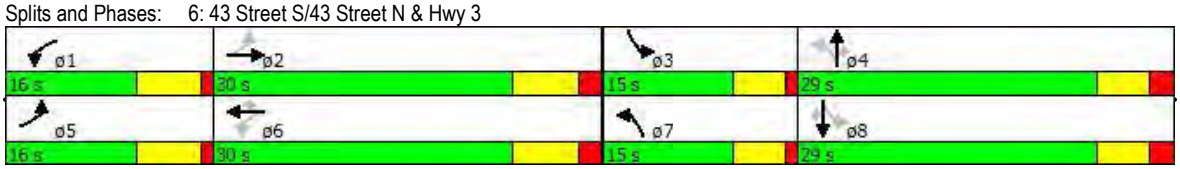


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	836	8	384	1041	343	516	447	417	382	739	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	2		0	2		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.999				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3183	4711	0	3273	4848	1509	3273	3374	1509	3155	3252	1455
Flt Permitted	0.174			0.190			0.174			0.370		
Satd. Flow (perm)	583	4711	0	655	4848	1509	599	3374	1509	1229	3252	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				331			277			257
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			401.6	
Travel Time (s)		20.2			35.0			27.3			24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	7%	7%	7%	7%	7%	7%	11%	11%	11%
Adj. Flow (vph)	255	909	9	417	1132	373	561	486	453	415	803	297
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	918	0	417	1132	373	561	486	453	415	803	297
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	16.0	30.0		16.0	30.0	30.0	15.0	29.0	29.0	15.0	29.0	29.0
Total Split (%)	17.8%	33.3%		17.8%	33.3%	33.3%	16.7%	32.2%	32.2%	16.7%	32.2%	32.2%
Maximum Green (s)	10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	34.0	23.0		34.0	23.0	23.0	34.0	23.0	23.0	34.0	23.0	23.0
Actuated g/C Ratio	0.38	0.26		0.38	0.26	0.26	0.38	0.26	0.26	0.38	0.26	0.26
v/c Ratio	0.50	0.76		0.78	0.91	0.59	1.07	0.56	0.77	0.61	0.97	0.53
Control Delay	19.2	35.8		28.2	45.1	9.4	82.8	32.1	21.7	21.4	58.5	9.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	35.8		28.2	45.1	9.4	82.8	32.1	21.7	21.4	58.5	9.5
LOS	B	D		C	D	A	F	C	C	C	E	A
Approach Delay		32.2			34.5			47.9			38.7	
Approach LOS		C			C			D			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Max	Max
70th %ile Green (s)	10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Max	Max
50th %ile Green (s)	10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
50th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
30th %ile Green (s)	10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
30th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
10th %ile Green (s)	10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
10th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
Stops (vph)	145	756		245	942	61	315	377	161	256	652	52
Fuel Used(l)	20	97		46	154	27	63	41	29	36	95	19
CO Emissions (g/hr)	374	1796		853	2862	501	1179	760	532	667	1776	351
NOx Emissions (g/hr)	72	347		165	552	97	228	147	103	129	343	68
VOC Emissions (g/hr)	86	414		197	660	116	272	175	123	154	410	81
Dilemma Vehicles (#)	0	47		0	56	0	0	24	0	0	38	0
Queue Length 50th (m)	13.9	56.5		24.1	73.4	5.9	~42.3	40.5	28.9	24.6	76.1	5.6
Queue Length 95th (m)	21.7	72.0		#40.3	#100.1	31.7	#75.9	56.8	#77.9	35.4	#115.2	28.0
Internal Link Dist (m)		425.3			752.8			430.3			377.6	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	509	1204		538	1238	632	523	862	591	678	831	563
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.76		0.78	0.91	0.59	1.07	0.56	0.77	0.61	0.97	0.53

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 38.4		Intersection LOS: D	
Intersection Capacity Utilization 83.6%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 90			
70th %ile Actuated Cycle: 90			
50th %ile Actuated Cycle: 90			
30th %ile Actuated Cycle: 90			
10th %ile Actuated Cycle: 90			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3

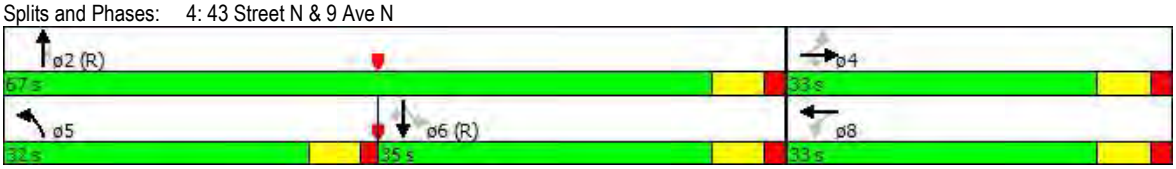


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	21	81	48	9	11	198	381	179	34	320	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.919				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1284	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.742			0.741			0.950			0.488		
Satd. Flow (perm)	1369	1845	1568	1035	1284	0	1656	3312	1482	851	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104		13				216			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	12	25	98	58	11	13	239	459	216	41	386	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	25	98	58	24	0	239	459	216	41	386	17
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0		32.0	67.0	67.0	35.0	35.0	35.0
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%		32.0%	67.0%	67.0%	35.0%	35.0%	35.0%
Maximum Green (s)	26.5	26.5	26.5	26.5	26.5		26.0	60.5	60.5	28.5	28.5	28.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	12.1	12.1	12.1	12.1	12.1		19.6	79.5	79.5	52.6	52.6	52.6
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.20	0.80	0.80	0.53	0.53	0.53
v/c Ratio	0.07	0.11	0.35	0.46	0.14		0.74	0.17	0.18	0.09	0.22	0.02
Control Delay	38.1	38.8	10.5	52.4	25.8		47.1	1.7	0.7	17.6	15.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	38.8	10.5	52.4	25.8		47.1	1.7	0.7	17.6	15.8	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	B	B	A
Approach Delay		18.2			44.6			13.3			15.4	
Approach LOS		B			D			B			B	
90th %ile Green (s)	16.6	16.6	16.6	16.6	16.6		26.4	70.4	70.4	38.0	38.0	38.0
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	13.2	13.2	13.2	13.2	13.2		22.5	73.8	73.8	45.3	45.3	45.3
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	10.9	10.9	10.9	10.9	10.9		19.6	76.1	76.1	50.5	50.5	50.5
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		16.7	77.0	77.0	54.3	54.3	54.3
30th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	0.0	0.0	0.0	0.0	0.0		12.6	93.5	93.5	74.9	74.9	74.9
10th %ile Term Code	Skip	Skip	Skip	Skip	Skip		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	10	20	13	44	12		180	69	12	21	177	0
Fuel Used(l)	1	3	7	6	2		28	32	14	3	26	1
CO Emissions (g/hr)	23	48	125	110	35		524	594	264	54	491	14
NOx Emissions (g/hr)	4	9	24	21	7		101	115	51	10	95	3
VOC Emissions (g/hr)	5	11	29	25	8		121	137	61	13	113	3
Dilemma Vehicles (#)	0	0	0	0	0		0	9	0	0	16	0
Queue Length 50th (m)	2.2	4.7	0.0	11.4	2.1		43.4	3.4	0.0	4.2	22.2	0.0
Queue Length 95th (m)	6.7	10.9	10.6	21.2	8.4		61.5	7.3	0.1	11.9	36.8	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	362	488	491	274	349		431	2631	1222	447	1742	828
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.05	0.20	0.21	0.07		0.55	0.17	0.18	0.09	0.22	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 50.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: 43 Street N & 9 Ave N



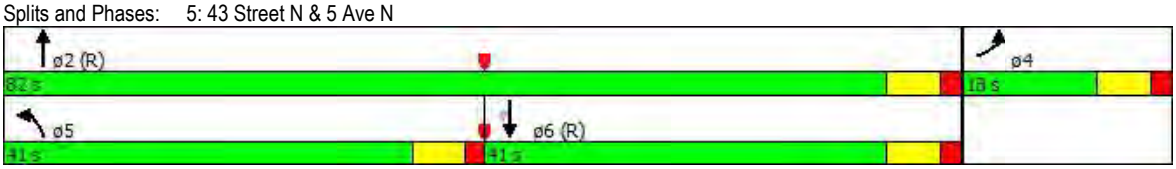
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	44	150	249	753	452	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		172				38
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	51	172	286	866	520	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	51	172	286	866	520	38
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	18.0		41.0	82.0	41.0	41.0
Total Split (%)	18.0%		41.0%	82.0%	41.0%	41.0%
Maximum Green (s)	11.5		35.0	75.5	34.5	34.5
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	22.2	81.6	52.1	52.1
Actuated g/C Ratio	0.10	1.00	0.22	0.82	0.52	0.52
v/c Ratio	0.16	0.12	0.76	0.31	0.32	0.05
Control Delay	42.6	0.2	48.8	3.4	9.8	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	0.2	48.8	3.4	9.8	2.4

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	A	A
Approach Delay	9.9			14.7	9.3	
Approach LOS	A			B	A	
90th %ile Green (s)	10.0		29.8	77.0	41.2	41.2
90th %ile Term Code	Min		Gap	Coord	Coord	Coord
70th %ile Green (s)	10.0		25.4	77.0	45.6	45.6
70th %ile Term Code	Min		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		22.3	77.0	48.7	48.7
50th %ile Term Code	Min		Gap	Coord	Coord	Coord
30th %ile Green (s)	10.0		19.1	77.0	51.9	51.9
30th %ile Term Code	Min		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		14.5	93.5	73.0	73.0
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	40	0	225	179	131	3
Fuel Used(l)	5	10	30	50	42	3
CO Emissions (g/hr)	100	193	567	925	787	50
NOx Emissions (g/hr)	19	37	109	178	152	10
VOC Emissions (g/hr)	23	45	131	213	181	12
Dilemma Vehicles (#)	0	0	0	32	20	0
Queue Length 50th (m)	5.0	0.0	54.8	23.1	14.5	0.0
Queue Length 95th (m)	10.4	0.0	73.2	28.4	21.8	1.8
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	359	1442	596	2779	1620	743
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.12	0.48	0.31	0.32	0.05

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 12.6 Intersection LOS: B
Intersection Capacity Utilization 50.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 5: 43 Street N & 5 Ave N

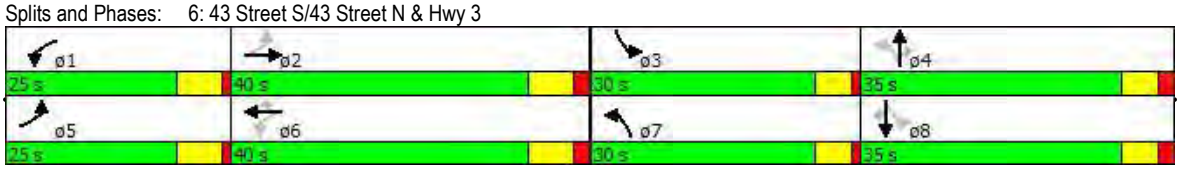


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	335	615	9	248	598	415	264	609	179	376	386	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	3246	0	1656	3312	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.226			0.250			0.462			0.145		
Satd. Flow (perm)	387	3246	0	436	3312	1482	1548	3282	1468	465	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				409			195			205
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	364	668	10	270	650	451	287	662	195	409	420	205
Shared Lane Traffic (%)												
Lane Group Flow (vph)	364	678	0	270	650	451	287	662	195	409	420	205
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	55.0	35.1		51.1	33.1	33.1	41.2	27.7	27.7	49.0	31.7	31.7
Actuated g/C Ratio	0.46	0.29		0.42	0.27	0.27	0.34	0.23	0.23	0.41	0.26	0.26
v/c Ratio	0.98	0.72		0.76	0.72	0.64	0.41	0.88	0.40	0.75	0.51	0.39
Control Delay	68.0	44.5		34.8	45.3	10.2	24.5	59.1	8.0	34.1	40.3	7.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.0	44.5		34.8	45.3	10.2	24.5	59.1	8.0	34.1	40.3	7.1
LOS	E	D		C	D	B	C	E	A	C	D	A
Approach Delay		52.7			31.7			41.7			31.2	
Approach LOS		D			C			D			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	15.7	29.0	29.0	21.8	35.1	35.1
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
70th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	13.8	29.0	29.0	18.3	33.5	33.5
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
50th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	12.4	29.0	29.0	16.3	32.9	32.9
50th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Gap	Hold	Hold
30th %ile Green (s)	19.0	35.8		16.2	33.0	33.0	11.2	28.6	28.6	14.6	32.0	32.0
30th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Gap	Gap	Gap	Gap	Hold	Hold
10th %ile Green (s)	19.0	39.6		12.4	33.0	33.0	10.0	22.9	22.9	12.3	25.2	25.2
10th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Min	Gap	Gap	Gap	Hold	Hold
Stops (vph)	199	547		156	527	63	176	553	21	247	316	20
Fuel Used(l)	41	75		31	88	32	21	70	9	39	44	12
CO Emissions (g/hr)	759	1392		572	1630	600	392	1294	164	721	812	227
NOx Emissions (g/hr)	146	269		110	315	116	76	250	32	139	157	44
VOC Emissions (g/hr)	175	321		132	376	138	90	298	38	166	187	52
Dilemma Vehicles (#)	0	25		0	25	0	0	24	0	0	16	0
Queue Length 50th (m)	~62.6	82.3		40.4	77.8	7.9	23.1	83.7	0.0	34.6	46.7	0.0
Queue Length 95th (m)	#138.1	111.6		#71.0	105.8	43.4	32.7	#121.7	19.6	49.7	65.4	18.8
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	372	946		385	909	703	981	792	502	731	846	528
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.72		0.70	0.72	0.64	0.29	0.84	0.39	0.56	0.50	0.39

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 120.4			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 38.9		Intersection LOS: D	
Intersection Capacity Utilization 82.8%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 126.8			
70th %ile Actuated Cycle: 123.3			
50th %ile Actuated Cycle: 121.3			
30th %ile Actuated Cycle: 119.2			
10th %ile Actuated Cycle: 111.2			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



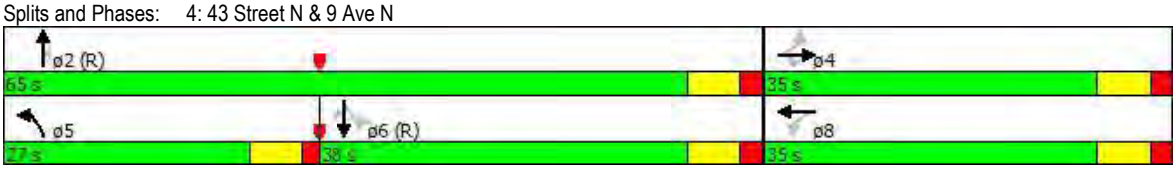
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	9	231	195	19	33	135	344	51	11	472	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.905				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1686	0	1597	3195	1429	1687	3374	1509
Flt Permitted	0.715			0.750			0.950			0.502		
Satd. Flow (perm)	1282	1792	1524	1397	1686	0	1597	3195	1429	891	3374	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			289		41				64			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	13%	13%	13%	7%	7%	7%
Adj. Flow (vph)	20	11	289	244	24	41	169	430	64	14	590	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	11	289	244	65	0	169	430	64	14	590	36
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		12.0	22.5	22.5	22.5	22.5	22.5
Total Split (s)	35.0	35.0	35.0	35.0	35.0		27.0	65.0	65.0	38.0	38.0	38.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%		27.0%	65.0%	65.0%	38.0%	38.0%	38.0%
Maximum Green (s)	28.5	28.5	28.5	28.5	28.5		21.0	58.5	58.5	31.5	31.5	31.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0			11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	22.1	22.1	22.1	22.1	22.1		15.6	64.9	64.9	43.3	43.3	43.3
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22		0.16	0.65	0.65	0.43	0.43	0.43
v/c Ratio	0.07	0.03	0.51	0.79	0.16		0.68	0.21	0.07	0.04	0.40	0.05
Control Delay	28.6	27.4	7.0	54.4	14.5		49.8	6.9	1.5	22.0	22.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	27.4	7.0	54.4	14.5		49.8	6.9	1.5	22.0	22.6	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C	A	D	B		D	A	A	C	C	A
Approach Delay		9.1			46.0			17.3			21.4	
Approach LOS		A			D			B			C	
90th %ile Green (s)	28.5	28.5	28.5	28.5	28.5		21.0	58.5	58.5	31.5	31.5	31.5
90th %ile Term Code	Hold	Hold	Hold	Max	Max		Max	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	26.0	26.0	26.0	26.0	26.0		18.3	61.0	61.0	36.7	36.7	36.7
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	22.7	22.7	22.7	22.7	22.7		15.8	64.3	64.3	42.5	42.5	42.5
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	19.2	19.2	19.2	19.2	19.2		13.3	67.8	67.8	48.5	48.5	48.5
30th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	14.2	14.2	14.2	14.2	14.2		9.7	72.8	72.8	57.1	57.1	57.1
10th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	14	8	25	179	19		125	146	9	9	325	0
Fuel Used(l)	2	1	18	24	4		20	33	4	1	43	2
CO Emissions (g/hr)	34	19	340	451	79		364	612	79	20	808	28
NOx Emissions (g/hr)	6	4	66	87	15		70	118	15	4	156	5
VOC Emissions (g/hr)	8	4	78	104	18		84	141	18	5	186	7
Dilemma Vehicles (#)	0	0	0	0	0		0	16	0	0	24	0
Queue Length 50th (m)	3.2	1.8	0.0	46.9	3.9		33.3	7.6	0.0	1.6	43.0	0.0
Queue Length 95th (m)	7.7	5.2	11.8	60.0	11.4		46.0	27.6	3.3	6.0	60.4	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	365	510	640	398	509		335	2072	949	385	1459	711
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.45	0.61	0.13		0.50	0.21	0.07	0.04	0.40	0.05

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 21.9 Intersection LOS: C
Intersection Capacity Utilization 58.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



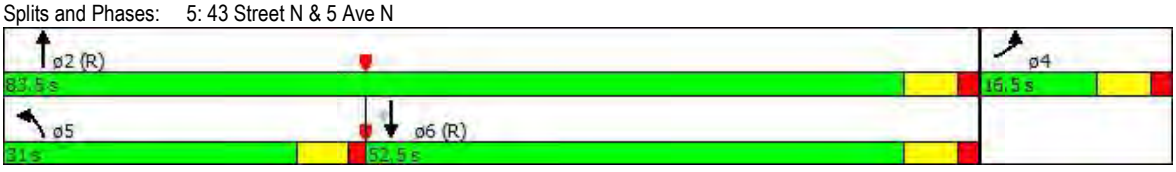
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	38	256	215	571	998	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3273	1509	1612	3223	3406	1524
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3273	1509	1612	3223	3406	1524
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		284				77
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			240.1	882.4	
Travel Time (s)	52.4			14.4	52.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	12%	12%	6%	6%
Adj. Flow (vph)	42	284	239	634	1109	77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	42	284	239	634	1109	77
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		31.0	83.5	52.5	52.5
Total Split (%)	16.5%		31.0%	83.5%	52.5%	52.5%
Maximum Green (s)	10.0		25.0	77.0	46.0	46.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	19.5	86.2	58.1	58.1
Actuated g/C Ratio	0.10	1.00	0.20	0.86	0.58	0.58
v/c Ratio	0.13	0.19	0.76	0.23	0.56	0.08
Control Delay	42.1	0.3	53.1	2.5	15.7	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	0.3	53.1	2.5	15.7	4.2

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	B	A
Approach Delay	5.7			16.4	14.9	
Approach LOS	A			B	B	
90th %ile Green (s)	10.0		25.0	77.0	46.0	46.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		22.9	77.0	48.1	48.1
70th %ile Term Code	Max		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		20.0	77.0	51.0	51.0
50th %ile Term Code	Max		Gap	Coord	Coord	Coord
30th %ile Green (s)	0.0		17.0	93.5	70.5	70.5
30th %ile Term Code	Skip		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		12.8	93.5	74.7	74.7
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	34	0	197	103	661	8
Fuel Used(l)	5	18	27	36	110	6
CO Emissions (g/hr)	86	330	505	674	2043	107
NOx Emissions (g/hr)	17	64	97	130	394	21
VOC Emissions (g/hr)	20	76	116	156	471	25
Dilemma Vehicles (#)	0	0	0	20	15	0
Queue Length 50th (m)	4.0	0.0	46.2	15.6	98.8	0.9
Queue Length 95th (m)	9.4	0.0	69.3	21.0	64.1	m5.4
Internal Link Dist (m)	704.0			216.1	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	327	1509	403	2778	1977	917
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.19	0.59	0.23	0.56	0.08

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 14.2 Intersection LOS: B
Intersection Capacity Utilization 63.7% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 43 Street N & 5 Ave N

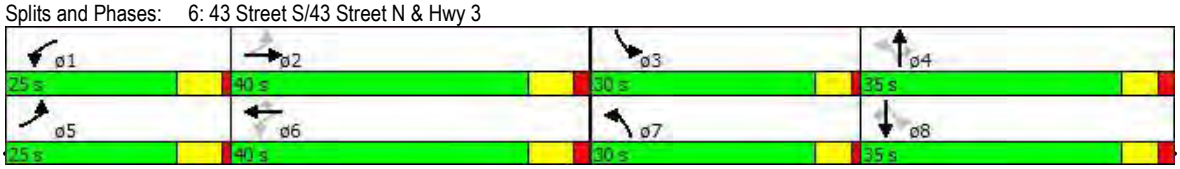


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	176	585	6	269	729	253	362	325	292	303	553	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3275	0	1687	3374	1509	3273	3374	1509	3155	3252	1455
Flt Permitted	0.198			0.236			0.183			0.519		
Satd. Flow (perm)	342	3275	0	419	3374	1509	630	3374	1509	1723	3252	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				275			317			247
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			401.6	
Travel Time (s)		20.2			35.0			27.3			24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	7%	7%	7%	7%	7%	7%	11%	11%	11%
Adj. Flow (vph)	191	636	7	292	792	275	393	353	317	329	601	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	191	643	0	292	792	275	393	353	317	329	601	247
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	25.0	40.0		25.0	40.0	40.0	30.0	35.0	35.0	30.0	35.0	35.0
Total Split (%)	19.2%	30.8%		19.2%	30.8%	30.8%	23.1%	26.9%	26.9%	23.1%	26.9%	26.9%
Maximum Green (s)	19.0	33.0		19.0	33.0	33.0	25.0	29.0	29.0	25.0	29.0	29.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	48.6	33.2		54.3	36.1	36.1	46.5	29.0	29.0	40.4	25.9	25.9
Actuated g/C Ratio	0.42	0.28		0.46	0.31	0.31	0.40	0.25	0.25	0.35	0.22	0.22
v/c Ratio	0.63	0.69		0.77	0.76	0.42	0.63	0.42	0.52	0.43	0.83	0.48
Control Delay	29.1	43.2		34.9	43.8	6.3	27.7	39.1	7.2	24.6	55.2	8.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	43.2		34.9	43.8	6.3	27.7	39.1	7.2	24.6	55.2	8.2
LOS	C	D		C	D	A	C	D	A	C	E	A
Approach Delay		40.0			34.3			25.4			36.7	
Approach LOS		D			C			C			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	19.0	33.0		19.0	33.0	33.0	20.5	32.4	32.4	17.1	29.0	29.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Hold	Hold	Gap	Max	Max
70th %ile Green (s)	17.5	33.0		19.0	34.5	34.5	18.4	32.4	32.4	15.0	29.0	29.0
70th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Max	Max
50th %ile Green (s)	14.6	33.0		19.0	37.4	37.4	16.9	31.4	31.4	13.6	28.1	28.1
50th %ile Term Code	Gap	MaxR		Max	Hold	Hold	Gap	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	11.6	33.0		16.8	38.2	38.2	15.2	28.2	28.2	12.0	25.0	25.0
30th %ile Term Code	Gap	MaxR		Gap	Hold	Hold	Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	10.0	33.0		12.8	35.8	35.8	12.1	21.3	21.3	10.0	19.2	19.2
10th %ile Term Code	Min	MaxR		Gap	Hold	Hold	Gap	Hold	Hold	Min	Gap	Gap
Stops (vph)	109	515		161	623	25	231	262	29	202	509	25
Fuel Used(l)	16	70		33	105	18	29	31	14	29	71	15
CO Emissions (g/hr)	305	1305		612	1951	337	548	577	262	542	1315	277
NOx Emissions (g/hr)	59	252		118	377	65	106	111	51	105	254	53
VOC Emissions (g/hr)	70	301		141	450	78	126	133	60	125	303	64
Dilemma Vehicles (#)	0	25		0	30	0	0	13	0	0	23	0
Queue Length 50th (m)	26.9	76.6		44.0	94.0	0.0	32.7	38.5	0.0	26.9	75.0	0.0
Queue Length 95th (m)	45.8	103.3		#84.0	#140.0	21.8	44.3	55.2	23.9	37.4	100.5	22.1
Internal Link Dist (m)		425.3			752.8			430.3			377.6	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	367	929		404	1039	655	829	891	631	1020	811	548
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.69		0.72	0.76	0.42	0.47	0.40	0.50	0.32	0.74	0.45

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 117			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 33.9		Intersection LOS: C	
Intersection Capacity Utilization 77.2%		ICU Level of Service D	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 125.5			
70th %ile Actuated Cycle: 123.4			
50th %ile Actuated Cycle: 121			
30th %ile Actuated Cycle: 114			
10th %ile Actuated Cycle: 101.1			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	28	87	40	10	10	212	857	166	34	441	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.925				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1292	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.742			0.735			0.950			0.277		
Satd. Flow (perm)	1369	1845	1568	1027	1292	0	1656	3312	1482	483	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105		12				200			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	46	34	105	48	12	12	255	1033	200	41	531	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	34	105	48	24	0	255	1033	200	41	531	25
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	32.5	32.5	32.5	32.5	32.5		27.0	67.5	67.5	40.5	40.5	40.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%		27.0%	67.5%	67.5%	40.5%	40.5%	40.5%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		21.0	61.0	61.0	34.0	34.0	34.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	11.4	11.4	11.4	11.4	11.4		20.7	80.2	80.2	52.2	52.2	52.2
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.21	0.80	0.80	0.52	0.52	0.52
v/c Ratio	0.29	0.16	0.39	0.41	0.15		0.75	0.39	0.16	0.16	0.31	0.03
Control Delay	44.9	40.8	12.2	51.4	27.6		44.2	2.3	0.4	19.7	16.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	40.8	12.2	51.4	27.6		44.2	2.3	0.4	19.7	16.7	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	B	B	A
Approach Delay		25.6			43.4			9.2			16.2	
Approach LOS		C			D			A			B	
90th %ile Green (s)	15.1	15.1	15.1	15.1	15.1		27.0	71.9	71.9	38.9	38.9	38.9
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	12.1	12.1	12.1	12.1	12.1		23.7	74.9	74.9	45.2	45.2	45.2
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		20.9	77.0	77.0	50.1	50.1	50.1
50th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		18.0	77.0	77.0	53.0	53.0	53.0
30th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	0.0	0.0	0.0	0.0	0.0		13.7	93.5	93.5	73.8	73.8	73.8
10th %ile Term Code	Skip	Skip	Skip	Skip	Skip		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	34	26	17	38	13		175	136	2	22	254	0
Fuel Used(l)	5	3	7	5	2		29	72	13	3	37	1
CO Emissions (g/hr)	89	64	138	91	36		541	1331	239	56	687	20
NOx Emissions (g/hr)	17	12	27	18	7		104	257	46	11	133	4
VOC Emissions (g/hr)	21	15	32	21	8		125	307	55	13	159	5
Dilemma Vehicles (#)	0	0	0	0	0		0	33	0	0	22	0
Queue Length 50th (m)	8.9	6.5	0.0	9.4	2.3		36.6	12.1	0.0	4.4	32.5	0.0
Queue Length 95th (m)	17.7	13.9	12.1	18.6	8.8		56.3	13.2	0.0	12.8	50.0	0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	355	479	485	267	344		376	2655	1227	251	1729	823
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.07	0.22	0.18	0.07		0.68	0.39	0.16	0.16	0.31	0.03

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 13.3 Intersection LOS: B
Intersection Capacity Utilization 61.3% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: 43 Street N & 9 Ave N



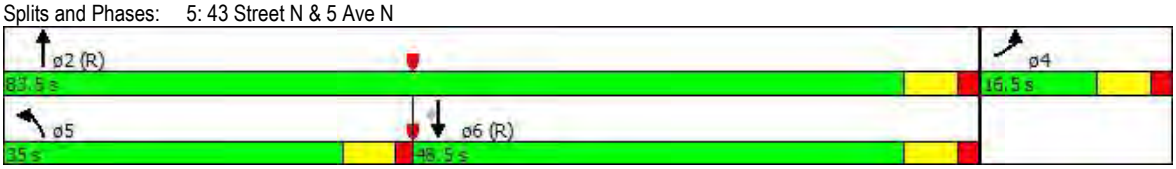
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	91	160	267	1186	563	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		184				51
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	105	184	307	1363	647	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	184	307	1363	647	51
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		35.0	83.5	48.5	48.5
Total Split (%)	16.5%		35.0%	83.5%	48.5%	48.5%
Maximum Green (s)	10.0		29.0	77.0	42.0	42.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	22.8	81.6	51.5	51.5
Actuated g/C Ratio	0.10	1.00	0.23	0.82	0.52	0.52
v/c Ratio	0.34	0.13	0.79	0.49	0.40	0.07
Control Delay	45.2	0.2	50.9	4.5	8.5	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.2	0.2	50.9	4.5	8.5	1.2

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	D	A	A	A
Approach Delay	16.5			13.0	8.0	
Approach LOS	B			B	A	
90th %ile Green (s)	10.0		29.0	77.0	42.0	42.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		26.3	77.0	44.7	44.7
70th %ile Term Code	Max		Gap	Coord	Coord	Coord
50th %ile Green (s)	10.0		23.2	77.0	47.8	47.8
50th %ile Term Code	Max		Gap	Coord	Coord	Coord
30th %ile Green (s)	10.0		20.1	77.0	50.9	50.9
30th %ile Term Code	Max		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		15.4	93.5	72.1	72.1
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	83	0	244	351	211	3
Fuel Used(l)	11	11	33	82	54	4
CO Emissions (g/hr)	211	206	618	1517	998	65
NOx Emissions (g/hr)	41	40	119	293	193	13
VOC Emissions (g/hr)	49	48	142	350	230	15
Dilemma Vehicles (#)	0	0	0	50	25	0
Queue Length 50th (m)	10.4	0.0	58.9	45.3	13.4	0.0
Queue Length 95th (m)	18.2	0.0	80.0	53.6	19.7	1.3
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	312	1442	493	2779	1602	741
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.13	0.62	0.49	0.40	0.07

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 12.1 Intersection LOS: B
Intersection Capacity Utilization 54.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 5: 43 Street N & 5 Ave N

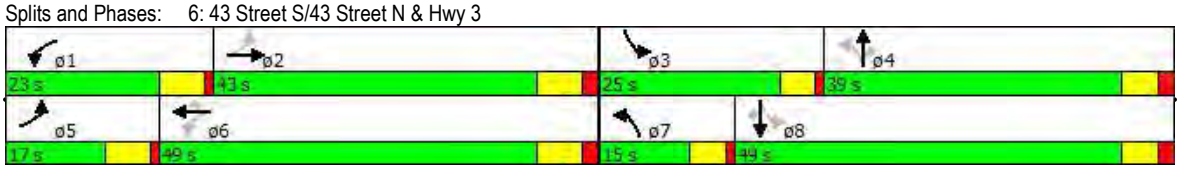


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	480	659	9	266	641	589	283	750	192	432	438	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	3246	0	1656	3312	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.288			0.162			0.480			0.105		
Satd. Flow (perm)	493	3246	0	282	3312	1482	1608	3282	1468	337	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				288			199			247
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	522	716	10	289	697	640	308	815	209	470	476	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	522	726	0	289	697	640	308	815	209	470	476	247
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	17.0	43.0		23.0	49.0	49.0	15.0	39.0	39.0	25.0	49.0	49.0
Total Split (%)	13.1%	33.1%		17.7%	37.7%	37.7%	11.5%	30.0%	30.0%	19.2%	37.7%	37.7%
Maximum Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	48.0	36.0		60.0	42.0	42.0	44.0	33.0	33.0	57.5	41.5	41.5
Actuated g/C Ratio	0.37	0.28		0.47	0.33	0.33	0.34	0.26	0.26	0.45	0.32	0.32
v/c Ratio	1.86	0.80		0.92	0.64	0.94	0.46	0.97	0.40	0.87	0.47	0.40
Control Delay	424.7	50.8		61.6	40.4	47.0	25.3	71.5	8.5	49.7	36.5	5.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	424.7	50.8		61.6	40.4	47.0	25.3	71.5	8.5	49.7	36.5	5.7
LOS	F	D		E	D	D	C	E	A	D	D	A
Approach Delay		207.2			46.8			50.9			35.3	
Approach LOS		F			D			D			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
70th %ile Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
50th %ile Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
50th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
30th %ile Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	18.2	41.2	41.2
30th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Gap	Hold	Hold
10th %ile Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	14.6	37.6	37.6
10th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Gap	Hold	Hold
Stops (vph)	279	605		158	535	324	196	675	26	309	340	21
Fuel Used(l)	190	84		38	90	76	23	93	10	51	48	14
CO Emissions (g/hr)	3531	1570		705	1671	1412	428	1723	180	941	887	266
NOx Emissions (g/hr)	682	303		136	323	273	83	333	35	182	171	51
VOC Emissions (g/hr)	814	362		163	385	326	99	397	41	217	204	61
Dilemma Vehicles (#)	0	26		0	25	0	0	27	0	0	17	0
Queue Length 50th (m)	~206.3	96.1		50.7	84.6	106.2	25.4	115.4	2.1	48.4	53.1	0.0
Queue Length 95th (m)	#285.2	120.8		#106.6	106.7	#188.9	35.4	#159.0	22.6	#73.7	70.1	19.1
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	280	909		313	1082	678	673	842	525	572	1050	634
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.86	0.80		0.92	0.64	0.94	0.46	0.97	0.40	0.82	0.45	0.39

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 128.6			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.86			
Intersection Signal Delay: 82.3		Intersection LOS: F	
Intersection Capacity Utilization 99.6%		ICU Level of Service F	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 130			
70th %ile Actuated Cycle: 130			
50th %ile Actuated Cycle: 130			
30th %ile Actuated Cycle: 128.2			
10th %ile Actuated Cycle: 124.6			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3

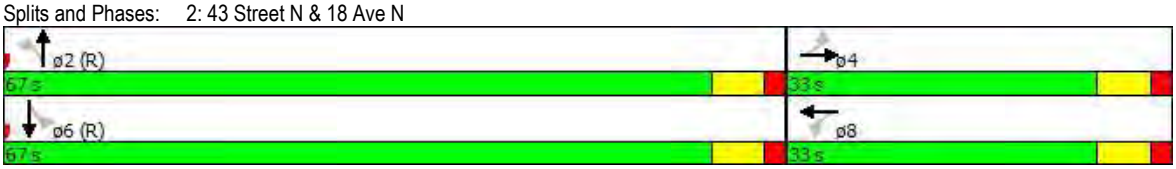


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	35	112	54	8	6	187	179	243	28	298	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.904			0.987			0.946			0.995	
Flt Protected		0.997			0.962			0.985			0.996	
Satd. Flow (prot)	0	1529	0	0	1640	0	0	1609	0	0	1828	0
Flt Permitted		0.980			0.633			0.731			0.901	
Satd. Flow (perm)	0	1503	0	0	1079	0	0	1194	0	0	1654	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		120			5			61			3	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		716.1			196.5			496.3			520.4	
Travel Time (s)		51.6			14.1			25.5			26.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.78	0.78	0.78	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.78	0.78
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	12%	12%	12%	10%	10%	10%	10%	10%	10%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	14	45	144	59	9	7	240	229	312	36	382	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	203	0	0	75	0	0	781	0	0	433	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		26.5	26.5		22.5	22.5	
Total Split (s)	33.0	33.0		33.0	33.0		67.0	67.0		67.0	67.0	
Total Split (%)	33.0%	33.0%		33.0%	33.0%		67.0%	67.0%		67.0%	67.0%	
Maximum Green (s)	26.5	26.5		26.5	26.5		60.5	60.5		60.5	60.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		26.5			26.5			60.5			60.5	
Actuated g/C Ratio		0.26			0.26			0.60			0.60	
v/c Ratio		0.42			0.26			1.05			0.43	
Control Delay		15.7			30.0			45.8			12.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.7			30.0			45.8			12.2	
LOS		B			C			D			B	
Approach Delay		15.7			30.0			45.8			12.2	
Approach LOS		B			C			D			B	
Queue Length 50th (m)		13.2			11.3			~168.4			43.4	
Queue Length 95th (m)		25.1			24.0			#184.1			52.7	
Internal Link Dist (m)		692.1			172.5			472.3			496.4	
Turn Bay Length (m)												
Base Capacity (vph)		486			289			746			1001	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.42			0.26			1.05			0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 86 (86%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.05			
Intersection Signal Delay: 31.1		Intersection LOS: C	
Intersection Capacity Utilization 91.5%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: 43 Street N & 18 Ave N

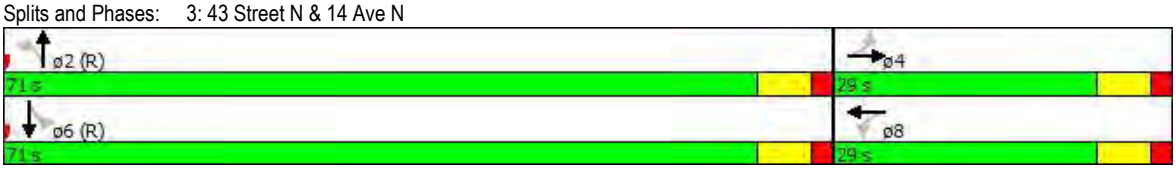


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	7	21	53	2	6	76	582	236	28	421	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.912			0.986			0.957			0.995	
Flt Protected		0.994			0.959		0.950				0.997	
Satd. Flow (prot)	0	1111	0	0	1633	0	1641	1653	0	0	1778	0
Flt Permitted		0.971			0.733		0.432				0.669	
Satd. Flow (perm)	0	1086	0	0	1248	0	746	1653	0	0	1193	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			5			41			4	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		748.5			168.6			405.2			496.3	
Travel Time (s)		53.9			12.1			20.8			25.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.92	0.92	0.92	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	55%	55%	55%	10%	10%	10%	10%	10%	10%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	5	9	26	58	2	7	94	719	291	35	520	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	67	0	94	1010	0	0	575	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	29.0	29.0		29.0	29.0		71.0	71.0		71.0	71.0	
Total Split (%)	29.0%	29.0%		29.0%	29.0%		71.0%	71.0%		71.0%	71.0%	
Maximum Green (s)	22.5	22.5		22.5	22.5		64.5	64.5		64.5	64.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.5			6.5		6.5	6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		22.5			22.5		64.5	64.5			64.5	
Actuated g/C Ratio		0.22			0.22		0.64	0.64			0.64	
v/c Ratio		0.15			0.24		0.20	0.94			0.75	
Control Delay		17.9			32.0		6.3	27.9			20.3	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		17.9			32.0		6.3	27.9			20.3	
LOS		B			C		A	C			C	
Approach Delay		17.9			32.0			26.0			20.3	
Approach LOS		B			C			C			C	
Queue Length 50th (m)		2.3			10.4		4.8	177.3			75.4	
Queue Length 95th (m)		9.6			22.7		7.9	203.9			96.6	
Internal Link Dist (m)		724.5			144.6			381.2			472.3	
Turn Bay Length (m)							75.0					
Base Capacity (vph)		264			284		481	1080			770	
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		0.15			0.24		0.20	0.94			0.75	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 63 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 24.2		Intersection LOS: C	
Intersection Capacity Utilization 67.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: 43 Street N & 14 Ave N



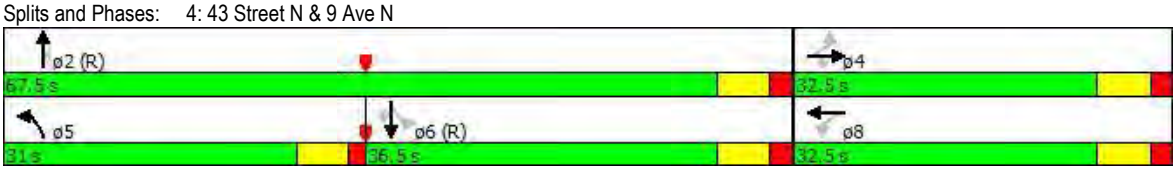
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	28	87	40	10	10	212	857	166	34	441	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850		0.925				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1292	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.742			0.735			0.950			0.277		
Satd. Flow (perm)	1369	1845	1568	1027	1292	0	1656	3312	1482	483	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105		12				200			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	46	34	105	48	12	12	255	1033	200	41	531	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	34	105	48	24	0	255	1033	200	41	531	25
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	32.5	32.5	32.5	32.5	32.5		31.0	67.5	67.5	36.5	36.5	36.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%		31.0%	67.5%	67.5%	36.5%	36.5%	36.5%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		25.0	61.0	61.0	30.0	30.0	30.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	11.4	11.4	11.4	11.4	11.4		20.4	80.2	80.2	52.4	52.4	52.4
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.20	0.80	0.80	0.52	0.52	0.52
v/c Ratio	0.29	0.16	0.39	0.41	0.15		0.75	0.39	0.16	0.16	0.31	0.03
Control Delay	44.9	40.8	12.2	51.4	27.6		47.9	2.8	0.5	24.0	19.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	40.8	12.2	51.4	27.6		47.9	2.8	0.5	24.0	19.2	0.0
LOS	D	D	B	D	C		D	A	A	C	B	A
Approach Delay		25.6			43.4			10.2			18.8	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	8.9	6.5	0.0	9.4	2.3		42.8	19.5	0.0	5.1	34.8	0.0
Queue Length 95th (m)	17.7	13.9	12.1	18.6	8.8		47.2	21.6	0.6	m9.7	54.9	m0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	355	479	485	267	344		422	2655	1227	252	1736	826
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.07	0.22	0.18	0.07		0.60	0.39	0.16	0.16	0.31	0.03

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 87 (87%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 14.6 Intersection LOS: B
Intersection Capacity Utilization 61.3% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: 43 Street N & 9 Ave N



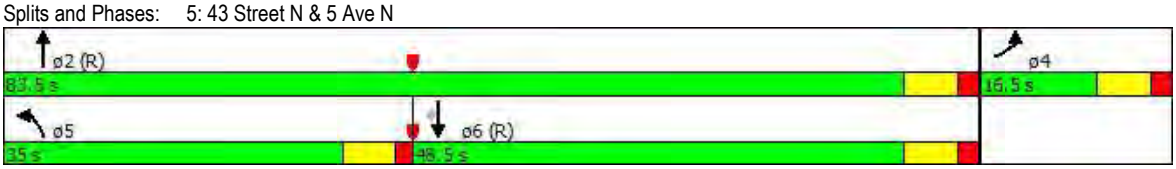


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	91	160	267	1186	563	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		184				51
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	105	184	307	1363	647	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	184	307	1363	647	51
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		35.0	83.5	48.5	48.5
Total Split (%)	16.5%		35.0%	83.5%	48.5%	48.5%
Maximum Green (s)	10.0		29.0	77.0	42.0	42.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0		3.0	3.0	3.0	3.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Time Before Reduce (s)	0.0		0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0		0.0	0.0	0.0	0.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	22.8	81.6	51.5	51.5
Actuated g/C Ratio	0.10	1.00	0.23	0.82	0.52	0.52
v/c Ratio	0.34	0.13	0.79	0.49	0.40	0.07
Control Delay	45.2	0.2	50.9	4.5	11.1	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.2	0.2	50.9	4.5	11.1	1.6
LOS	D	A	D	A	B	A
Approach Delay	16.5			13.0	10.4	
Approach LOS	B			B	B	
Queue Length 50th (m)	10.4	0.0	58.9	45.3	50.8	0.4
Queue Length 95th (m)	18.2	0.0	80.0	53.6	17.7	1.3
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	312	1442	493	2779	1602	741
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.13	0.62	0.49	0.40	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 32 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 12.7		Intersection LOS: B	
Intersection Capacity Utilization 54.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: 43 Street N & 5 Ave N



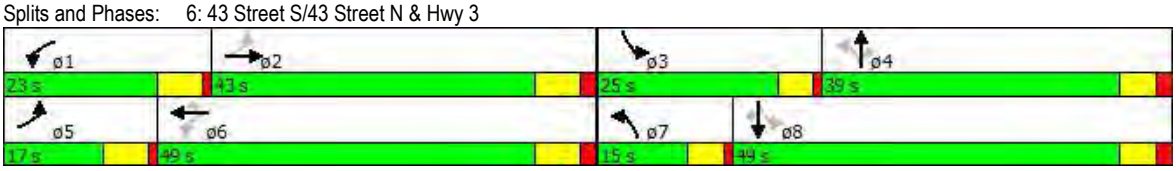
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	480	659	9	266	641	589	283	750	192	432	438	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	2		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3155	3246	0	1656	3312	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.288			0.162			0.480			0.105		
Satd. Flow (perm)	956	3246	0	282	3312	1482	1608	3282	1468	337	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				288			199			247
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	522	716	10	289	697	640	308	815	209	470	476	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	522	726	0	289	697	640	308	815	209	470	476	247
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	17.0	43.0		23.0	49.0	49.0	15.0	39.0	39.0	25.0	49.0	49.0
Total Split (%)	13.1%	33.1%		17.7%	37.7%	37.7%	11.5%	30.0%	30.0%	19.2%	37.7%	37.7%
Maximum Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	48.0	36.0		60.0	42.0	42.0	44.0	33.0	33.0	57.5	41.5	41.5
Actuated g/C Ratio	0.37	0.28		0.47	0.33	0.33	0.34	0.26	0.26	0.45	0.32	0.32
v/c Ratio	0.96	0.80		0.92	0.64	0.94	0.46	0.97	0.40	0.87	0.47	0.40
Control Delay	57.8	50.8		61.6	40.4	47.0	25.3	71.5	8.5	49.7	36.5	5.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	50.8		61.6	40.4	47.0	25.3	71.5	8.5	49.7	36.5	5.7
LOS	E	D		E	D	D	C	E	A	D	D	A
Approach Delay		53.7			46.8			50.9			35.3	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	45.8	96.1		50.7	84.6	106.2	25.4	115.4	2.1	48.4	53.1	0.0
Queue Length 95th (m)	#78.5	120.8		#106.6	106.7	#188.9	35.4	#159.0	22.6	#73.7	70.1	19.1
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	545	909		313	1082	678	673	842	525	572	1050	634
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.80		0.92	0.64	0.94	0.46	0.97	0.40	0.82	0.45	0.39

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 128.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 46.9 Intersection LOS: D
Intersection Capacity Utilization 86.7% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



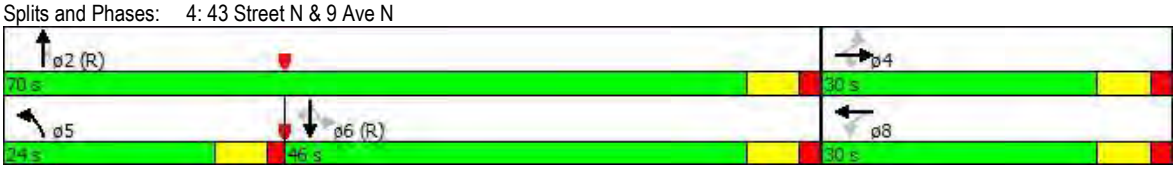


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	9	248	186	25	33	144	477	42	9	904	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.915				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1704	0	1597	3195	1429	1687	3374	1509
Flt Permitted	0.710			0.750			0.950			0.427		
Satd. Flow (perm)	1273	1792	1524	1397	1704	0	1597	3195	1429	758	3374	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			310		41				52			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	13%	13%	13%	7%	7%	7%
Adj. Flow (vph)	29	11	310	232	31	41	180	596	52	11	1130	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	11	310	232	72	0	180	596	52	11	1130	70
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		12.0	22.5	22.5	22.5	22.5	22.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0		24.0	70.0	70.0	46.0	46.0	46.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%		24.0%	70.0%	70.0%	46.0%	46.0%	46.0%
Maximum Green (s)	23.5	23.5	23.5	23.5	23.5		18.0	63.5	63.5	39.5	39.5	39.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0			11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	20.3	20.3	20.3	20.3	20.3		15.3	66.7	66.7	45.4	45.4	45.4
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20		0.15	0.67	0.67	0.45	0.45	0.45
v/c Ratio	0.11	0.03	0.56	0.82	0.19		0.74	0.28	0.05	0.03	0.74	0.09
Control Delay	31.9	30.1	7.9	60.5	17.3		54.3	6.1	1.5	18.8	27.6	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	30.1	7.9	60.5	17.3		54.3	6.1	1.5	18.8	27.6	1.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C	A	E	B		D	A	A	B	C	A
Approach Delay		10.6			50.2			16.3			26.0	
Approach LOS		B			D			B			C	
90th %ile Green (s)	23.5	23.5	23.5	23.5	23.5		18.0	63.5	63.5	39.5	39.5	39.5
90th %ile Term Code	Hold	Hold	Hold	Max	Max		Max	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	23.5	23.5	23.5	23.5	23.5		18.0	63.5	63.5	39.5	39.5	39.5
70th %ile Term Code	Hold	Hold	Hold	Max	Max		Max	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	22.0	22.0	22.0	22.0	22.0		16.4	65.0	65.0	42.6	42.6	42.6
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	18.7	18.7	18.7	18.7	18.7		13.9	68.3	68.3	48.4	48.4	48.4
30th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	13.9	13.9	13.9	13.9	13.9		10.2	73.1	73.1	56.9	56.9	56.9
10th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	19	9	29	171	24		135	205	8	6	722	3
Fuel Used(l)	3	1	20	24	5		21	45	4	1	90	3
CO Emissions (g/hr)	49	20	369	446	91		398	845	66	15	1672	58
NOx Emissions (g/hr)	9	4	71	86	18		77	163	13	3	323	11
VOC Emissions (g/hr)	11	5	85	103	21		92	195	15	3	386	13
Dilemma Vehicles (#)	0	0	0	0	0		0	22	0	0	45	0
Queue Length 50th (m)	4.8	1.8	0.0	44.5	5.1		35.4	28.5	0.5	1.3	102.2	0.0
Queue Length 95th (m)	10.9	5.6	12.7	61.4	13.9		50.5	34.3	2.1	4.5	114.3	2.2
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	299	421	595	328	431		287	2130	970	343	1531	741
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.03	0.52	0.71	0.17		0.63	0.28	0.05	0.03	0.74	0.09

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 23.8		Intersection LOS: C	
Intersection Capacity Utilization 66.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: 43 Street N & 9 Ave N



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	51	274	230	697	1406	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3273	1509	1612	3223	3406	1524
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3273	1509	1612	3223	3406	1524
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		304				124
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			240.1	882.4	
Travel Time (s)	52.4			14.4	52.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	12%	12%	6%	6%
Adj. Flow (vph)	57	304	256	774	1562	124
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	304	256	774	1562	124
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		28.0	83.5	55.5	55.5
Total Split (%)	16.5%		28.0%	83.5%	55.5%	55.5%
Maximum Green (s)	10.0		22.0	77.0	49.0	49.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	19.5	81.6	54.8	54.8
Actuated g/C Ratio	0.10	1.00	0.20	0.82	0.55	0.55
v/c Ratio	0.17	0.20	0.82	0.29	0.84	0.14
Control Delay	42.7	0.3	59.0	3.3	15.2	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	0.3	59.0	3.3	15.2	1.2

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	E	A	B	A
Approach Delay	7.0			17.2	14.2	
Approach LOS	A			B	B	
90th %ile Green (s)	10.0		22.0	77.0	49.0	49.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		22.0	77.0	49.0	49.0
70th %ile Term Code	Max		Max	Coord	Coord	Coord
50th %ile Green (s)	10.0		21.3	77.0	49.7	49.7
50th %ile Term Code	Max		Gap	Coord	Coord	Coord
30th %ile Green (s)	10.0		18.3	77.0	52.7	52.7
30th %ile Term Code	Max		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		13.9	93.5	73.6	73.6
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	46	0	210	162	804	5
Fuel Used(l)	6	19	30	46	150	9
CO Emissions (g/hr)	116	354	559	853	2793	165
NOx Emissions (g/hr)	22	68	108	165	539	32
VOC Emissions (g/hr)	27	82	129	197	644	38
Dilemma Vehicles (#)	0	0	0	30	54	0
Queue Length 50th (m)	5.5	0.0	49.2	20.3	46.5	0.1
Queue Length 95th (m)	11.8	0.0	#83.5	26.6	#201.4	m2.3
Internal Link Dist (m)	704.0			216.1	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	327	1509	354	2629	1866	891
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.20	0.72	0.29	0.84	0.14

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 14.4 Intersection LOS: B
Intersection Capacity Utilization 75.8% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 43 Street N & 5 Ave N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	216	627	6	288	781	303	387	374	313	452	694	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3275	0	1687	3374	1509	3273	3374	1509	3155	3252	1455
Flt Permitted	0.250			0.203			0.120			0.418		
Satd. Flow (perm)	432	3275	0	360	3374	1509	413	3374	1509	1388	3252	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				329			313			204
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			401.6	
Travel Time (s)		20.2			35.0			27.3			24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	7%	7%	7%	7%	7%	7%	11%	11%	11%
Adj. Flow (vph)	235	682	7	313	849	329	421	407	340	491	754	380
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	689	0	313	849	329	421	407	340	491	754	380
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	16.0	43.0		29.0	56.0	56.0	19.0	40.0	40.0	18.0	39.0	39.0
Total Split (%)	12.3%	33.1%		22.3%	43.1%	43.1%	14.6%	30.8%	30.8%	13.8%	30.0%	30.0%
Maximum Green (s)	10.0	36.0		23.0	49.0	49.0	14.0	34.0	34.0	13.0	33.0	33.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	50.3	39.3		65.6	49.0	49.0	48.3	33.3	33.3	46.3	32.3	32.3
Actuated g/C Ratio	0.39	0.30		0.51	0.38	0.38	0.37	0.26	0.26	0.36	0.25	0.25
v/c Ratio	0.90	0.69		0.82	0.66	0.42	0.91	0.47	0.55	0.73	0.93	0.74
Control Delay	60.8	44.8		38.3	36.5	4.6	56.3	42.6	9.4	35.8	65.9	29.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.8	44.8		38.3	36.5	4.6	56.3	42.6	9.4	35.8	65.9	29.6
LOS	E	D		D	D	A	E	D	A	D	E	C
Approach Delay		48.9			29.8			37.9			48.3	
Approach LOS		D			C			D			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	10.0	36.0		23.0	49.0	49.0	14.0	34.0	34.0	13.0	33.0	33.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	10.0	36.0		23.0	49.0	49.0	14.0	34.0	34.0	13.0	33.0	33.0
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
50th %ile Green (s)	10.0	38.3		20.7	49.0	49.0	14.0	34.0	34.0	13.0	33.0	33.0
50th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
30th %ile Green (s)	10.0	41.0		18.0	49.0	49.0	14.0	34.0	34.0	13.0	33.0	33.0
30th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
10th %ile Green (s)	10.0	45.1		13.9	49.0	49.0	14.0	30.5	30.5	13.0	29.5	29.5
10th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Hold	Hold	Max	Gap	Gap
Stops (vph)	138	551		172	633	24	261	308	42	350	638	162
Fuel Used(l)	26	76		36	106	21	40	37	16	49	94	33
CO Emissions (g/hr)	477	1411		669	1972	390	753	687	297	910	1757	608
NOx Emissions (g/hr)	92	272		129	381	75	145	133	57	176	339	117
VOC Emissions (g/hr)	110	326		154	455	90	174	159	68	210	405	140
Dilemma Vehicles (#)	0	24		0	30	0	0	14	0	0	26	0
Queue Length 50th (m)	35.4	87.2		49.5	99.5	0.0	41.8	48.7	5.5	47.3	104.4	44.5
Queue Length 95th (m)	#79.3	113.1		#80.0	123.0	19.4	#72.4	65.3	33.2	62.1	#141.6	84.6
Internal Link Dist (m)		425.3			752.8			430.3			377.6	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	261	996		419	1278	776	463	887	627	674	830	523
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.69		0.75	0.66	0.42	0.91	0.46	0.54	0.73	0.91	0.73

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 129.3			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 40.8		Intersection LOS: D	
Intersection Capacity Utilization 83.8%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 130			
70th %ile Actuated Cycle: 130			
50th %ile Actuated Cycle: 130			
30th %ile Actuated Cycle: 130			
10th %ile Actuated Cycle: 126.5			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	9	179	218	31	25	106	338	60	7	279	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.883			0.988			0.984			0.994	
Flt Protected		0.995			0.962			0.990			0.999	
Satd. Flow (prot)	0	1531	0	0	1642	0	0	1698	0	0	1747	0
Flt Permitted		0.949			0.581			0.825			0.986	
Satd. Flow (perm)	0	1461	0	0	992	0	0	1415	0	0	1724	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		208			6			10			3	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		716.1			264.9			496.3			520.4	
Travel Time (s)		51.6			19.1			25.5			26.8	
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	9%	9%	9%	10%	10%	10%	9%	9%	9%	8%	8%	8%
Adj. Flow (vph)	23	10	208	237	34	27	123	393	70	8	324	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	241	0	0	298	0	0	586	0	0	347	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		26.5	26.5		22.5	22.5	
Total Split (s)	43.2	43.2		43.2	43.2		56.8	56.8		56.8	56.8	
Total Split (%)	43.2%	43.2%		43.2%	43.2%		56.8%	56.8%		56.8%	56.8%	
Maximum Green (s)	36.7	36.7		36.7	36.7		50.3	50.3		50.3	50.3	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		36.7			36.7			50.3			50.3	
Actuated g/C Ratio		0.37			0.37			0.50			0.50	
v/c Ratio		0.36			0.81			0.82			0.40	
Control Delay		6.4			47.3			18.8			17.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		6.4			47.3			18.8			17.1	
LOS		A			D			B			B	
Approach Delay		6.4			47.3			18.8			17.1	
Approach LOS		A			D			B			B	
Stops (vph)		33			227			228			177	
Fuel Used(l)		16			22			38			24	
CO Emissions (g/hr)		295			408			700			452	
NOx Emissions (g/hr)		57			79			135			87	
VOC Emissions (g/hr)		68			94			162			104	
Dilemma Vehicles (#)		0			0			38			15	
Queue Length 50th (m)		4.3			53.1			17.8			41.8	
Queue Length 95th (m)		18.3			#100.8			100.1			60.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		692.1			240.9			472.3			496.4	
Turn Bay Length (m)												
Base Capacity (vph)		667			367			716			868	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.36			0.81			0.82			0.40	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 86 (86%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 22.1		Intersection LOS: C	
Intersection Capacity Utilization 92.7%		ICU Level of Service F	
Analysis Period (min) 15			

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

Splits and Phases: 2: 43 Street N & 18 Ave N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	2	89	212	6	25	17	489	58	7	653	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.885			0.986			0.986			0.999	
Flt Protected		0.993			0.958		0.950					
Satd. Flow (prot)	0	1621	0	0	1632	0	1656	1719	0	0	1726	0
Flt Permitted		0.937			0.684		0.307				0.993	
Satd. Flow (perm)	0	1530	0	0	1165	0	535	1719	0	0	1713	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		107			6			9			1	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		748.5			244.9			405.2			496.3	
Travel Time (s)		53.9			17.6			20.8			25.5	
Peak Hour Factor	0.83	0.92	0.83	0.92	0.92	0.92	0.83	0.83	0.92	0.92	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	10%	10%	10%	9%	9%	9%	10%	10%	10%
Adj. Flow (vph)	17	2	107	230	7	27	20	589	63	8	787	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	126	0	0	264	0	20	652	0	0	800	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	36.0	36.0		36.0	36.0		64.0	64.0		64.0	64.0	
Total Split (%)	36.0%	36.0%		36.0%	36.0%		64.0%	64.0%		64.0%	64.0%	
Maximum Green (s)	29.5	29.5		29.5	29.5		57.5	57.5		57.5	57.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.5			6.5		6.5	6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		29.5			29.5		57.5	57.5			57.5	
Actuated g/C Ratio		0.30			0.30		0.58	0.58			0.58	
v/c Ratio		0.24			0.76		0.07	0.66			0.81	
Control Delay		8.5			47.3		8.6	16.2			22.1	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		8.5			47.3		8.6	16.2			22.1	
LOS		A			D		A	B			C	
Approach Delay		8.5			47.3			15.9			22.1	
Approach LOS		A			D			B			C	
Stops (vph)		23			206		6	342			473	
Fuel Used(l)		9			19		1	49			59	
CO Emissions (g/hr)		161			355		23	906			1096	
NOx Emissions (g/hr)		31			69		4	175			212	
VOC Emissions (g/hr)		37			82		5	209			253	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Dilemma Vehicles (#)		0			0		0	24			57	
Queue Length 50th (m)		2.8			47.7		1.4	53.2			108.0	
Queue Length 95th (m)		16.3			#88.2		3.4	62.7			147.7	
Internal Link Dist (m)		724.5			220.9			381.2			472.3	
Turn Bay Length (m)							75.0					
Base Capacity (vph)		526			347		307	992			985	
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		0.24			0.76		0.07	0.66			0.81	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 63 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 22.5		Intersection LOS: C	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: 43 Street N & 14 Ave N



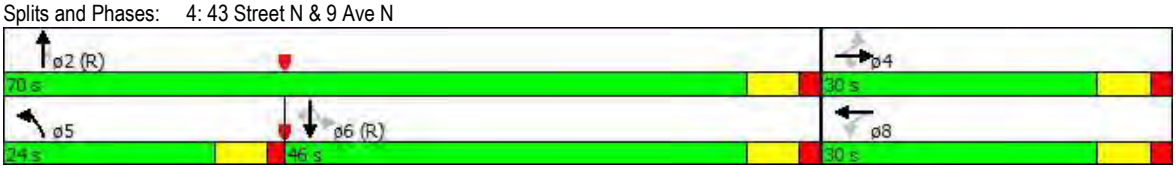
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	9	248	186	25	33	144	477	42	9	904	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.915				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1704	0	1597	3195	1429	1687	3374	1509
Flt Permitted	0.710			0.750			0.950			0.427		
Satd. Flow (perm)	1273	1792	1524	1397	1704	0	1597	3195	1429	758	3374	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			310		41				52			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	13%	13%	13%	7%	7%	7%
Adj. Flow (vph)	29	11	310	232	31	41	180	596	52	11	1130	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	11	310	232	72	0	180	596	52	11	1130	70
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		12.0	22.5	22.5	22.5	22.5	22.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0		24.0	70.0	70.0	46.0	46.0	46.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%		24.0%	70.0%	70.0%	46.0%	46.0%	46.0%
Maximum Green (s)	23.5	23.5	23.5	23.5	23.5		18.0	63.5	63.5	39.5	39.5	39.5
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0			11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	20.3	20.3	20.3	20.3	20.3		15.3	66.7	66.7	45.4	45.4	45.4
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20		0.15	0.67	0.67	0.45	0.45	0.45
v/c Ratio	0.11	0.03	0.56	0.82	0.19		0.74	0.28	0.05	0.03	0.74	0.09
Control Delay	31.9	30.1	7.9	60.5	17.3		54.3	6.1	1.5	20.8	25.4	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	30.1	7.9	60.5	17.3		54.3	6.1	1.5	20.8	25.4	2.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C	A	E	B		D	A	A	C	C	A
Approach Delay		10.6			50.2			16.3			24.1	
Approach LOS		B			D			B			C	
90th %ile Green (s)	23.5	23.5	23.5	23.5	23.5		18.0	63.5	63.5	39.5	39.5	39.5
90th %ile Term Code	Hold	Hold	Hold	Max	Max		Max	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	23.5	23.5	23.5	23.5	23.5		18.0	63.5	63.5	39.5	39.5	39.5
70th %ile Term Code	Hold	Hold	Hold	Max	Max		Max	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	22.0	22.0	22.0	22.0	22.0		16.4	65.0	65.0	42.6	42.6	42.6
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	18.7	18.7	18.7	18.7	18.7		13.9	68.3	68.3	48.4	48.4	48.4
30th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	13.9	13.9	13.9	13.9	13.9		10.2	73.1	73.1	56.9	56.9	56.9
10th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	19	9	29	171	24		135	205	8	7	638	7
Fuel Used(l)	3	1	20	24	5		21	45	4	1	86	3
CO Emissions (g/hr)	49	20	369	446	91		398	845	66	16	1593	61
NOx Emissions (g/hr)	9	4	71	86	18		77	163	13	3	307	12
VOC Emissions (g/hr)	11	5	85	103	21		92	195	15	4	367	14
Dilemma Vehicles (#)	0	0	0	0	0		0	22	0	0	59	0
Queue Length 50th (m)	4.8	1.8	0.0	44.5	5.1		35.4	28.5	0.5	1.2	80.1	0.1
Queue Length 95th (m)	10.9	5.6	12.7	61.4	13.9		50.5	34.3	2.1	m2.3	104.1	m0.8
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	299	421	595	328	431		287	2130	970	343	1531	741
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.03	0.52	0.71	0.17		0.63	0.28	0.05	0.03	0.74	0.09

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 85 (85%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 22.9 Intersection LOS: C
Intersection Capacity Utilization 66.9% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: 43 Street N & 9 Ave N



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	51	274	230	697	1406	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3273	1509	1612	3223	3406	1524
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3273	1509	1612	3223	3406	1524
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		304				124
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			240.1	882.4	
Travel Time (s)	52.4			14.4	52.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	12%	12%	6%	6%
Adj. Flow (vph)	57	304	256	774	1562	124
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	304	256	774	1562	124
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		28.0	83.5	55.5	55.5
Total Split (%)	16.5%		28.0%	83.5%	55.5%	55.5%
Maximum Green (s)	10.0		22.0	77.0	49.0	49.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	19.5	81.6	54.8	54.8
Actuated g/C Ratio	0.10	1.00	0.20	0.82	0.55	0.55
v/c Ratio	0.17	0.20	0.82	0.29	0.84	0.14
Control Delay	42.7	0.3	59.0	3.3	15.2	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	0.3	59.0	3.3	15.2	1.2

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	E	A	B	A
Approach Delay	7.0			17.2	14.2	
Approach LOS	A			B	B	
90th %ile Green (s)	10.0		22.0	77.0	49.0	49.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		22.0	77.0	49.0	49.0
70th %ile Term Code	Max		Max	Coord	Coord	Coord
50th %ile Green (s)	10.0		21.3	77.0	49.7	49.7
50th %ile Term Code	Max		Gap	Coord	Coord	Coord
30th %ile Green (s)	10.0		18.3	77.0	52.7	52.7
30th %ile Term Code	Max		Gap	Coord	Coord	Coord
10th %ile Green (s)	0.0		13.9	93.5	73.6	73.6
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Stops (vph)	46	0	210	162	770	5
Fuel Used(l)	6	19	30	46	149	9
CO Emissions (g/hr)	116	354	559	853	2773	165
NOx Emissions (g/hr)	22	68	108	165	535	32
VOC Emissions (g/hr)	27	82	129	197	639	38
Dilemma Vehicles (#)	0	0	0	30	61	0
Queue Length 50th (m)	5.5	0.0	49.2	20.3	47.5	0.1
Queue Length 95th (m)	11.8	0.0	#83.5	26.6	#201.3	m2.3
Internal Link Dist (m)	704.0			216.1	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	327	1509	354	2629	1866	891
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.20	0.72	0.29	0.84	0.14

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 14.3 Intersection LOS: B
Intersection Capacity Utilization 75.8% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 43 Street N & 5 Ave N

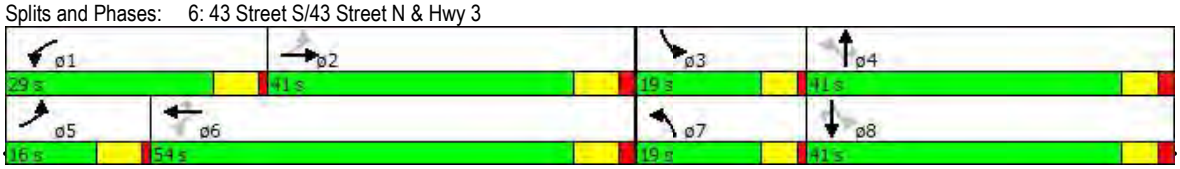


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	216	627	6	288	781	303	387	374	313	452	694	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	2		0	1		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3183	3275	0	1687	3374	1509	3273	3374	1509	3155	3252	1455
Flt Permitted	0.245			0.190			0.136			0.407		
Satd. Flow (perm)	821	3275	0	337	3374	1509	469	3374	1509	1352	3252	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				329			315			202
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			401.6	
Travel Time (s)		20.2			35.0			27.3			24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	7%	7%	7%	7%	7%	7%	11%	11%	11%
Adj. Flow (vph)	235	682	7	313	849	329	421	407	340	491	754	380
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	689	0	313	849	329	421	407	340	491	754	380
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	16.0	41.0		29.0	54.0	54.0	19.0	41.0	41.0	19.0	41.0	41.0
Total Split (%)	12.3%	31.5%		22.3%	41.5%	41.5%	14.6%	31.5%	31.5%	14.6%	31.5%	31.5%
Maximum Green (s)	10.0	34.0		23.0	47.0	47.0	14.0	35.0	35.0	14.0	35.0	35.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	47.9	36.9		63.6	47.0	47.0	48.3	33.3	33.3	48.3	33.3	33.3
Actuated g/C Ratio	0.37	0.29		0.50	0.37	0.37	0.38	0.26	0.26	0.38	0.26	0.26
v/c Ratio	0.48	0.73		0.83	0.69	0.43	0.87	0.47	0.54	0.70	0.89	0.72
Control Delay	22.9	47.6		41.7	38.2	4.8	48.5	41.9	9.1	32.7	59.9	28.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	47.6		41.7	38.2	4.8	48.5	41.9	9.1	32.7	59.9	28.2
LOS	C	D		D	D	A	D	D	A	C	E	C
Approach Delay		41.3			31.6			34.7			44.3	
Approach LOS		D			C			C			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	10.0	34.0		23.0	47.0	47.0	14.0	35.0	35.0	14.0	35.0	35.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	10.0	34.0		23.0	47.0	47.0	14.0	35.0	35.0	14.0	35.0	35.0
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
50th %ile Green (s)	10.0	34.7		22.3	47.0	47.0	14.0	35.0	35.0	14.0	35.0	35.0
50th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Hold	Hold	Max	Max	Max
30th %ile Green (s)	10.0	38.5		18.5	47.0	47.0	14.0	33.9	33.9	14.0	33.9	33.9
30th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Hold	Hold	Max	Gap	Gap
10th %ile Green (s)	10.0	43.1		13.9	47.0	47.0	14.0	27.8	27.8	14.0	27.8	27.8
10th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Hold	Hold	Max	Gap	Gap
Stops (vph)	139	562		178	647	24	256	306	41	329	640	161
Fuel Used(l)	19	78		37	108	21	38	37	16	47	91	32
CO Emissions (g/hr)	361	1448		689	2006	391	706	682	295	877	1699	601
NOx Emissions (g/hr)	70	280		133	387	75	136	132	57	169	328	116
VOC Emissions (g/hr)	83	334		159	463	90	163	157	68	202	392	139
Dilemma Vehicles (#)	0	25		0	30	0	0	14	0	0	26	0
Queue Length 50th (m)	17.4	91.0		51.2	102.2	0.0	38.6	48.2	5.0	45.9	102.1	44.1
Queue Length 95th (m)	25.3	115.7		#90.8	126.4	19.9	#66.9	64.5	32.2	60.4	#134.2	83.3
Internal Link Dist (m)		425.3			752.8			430.3			377.6	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	490	943		410	1236	761	482	920	640	705	887	544
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.73		0.76	0.69	0.43	0.87	0.44	0.53	0.70	0.85	0.70

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 128.3			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 38.0		Intersection LOS: D	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 130			
70th %ile Actuated Cycle: 130			
50th %ile Actuated Cycle: 130			
30th %ile Actuated Cycle: 128.9			
10th %ile Actuated Cycle: 122.8			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3

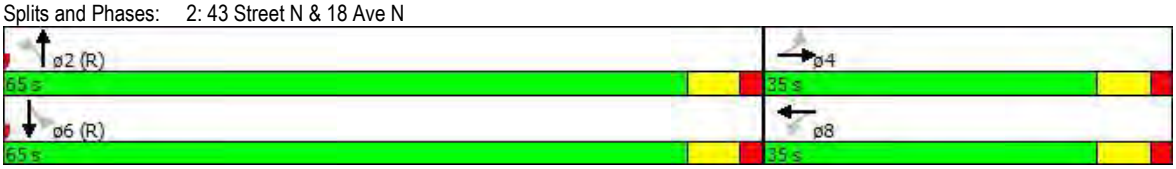


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	35	149	54	8	6	249	212	243	28	376	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.898			0.987			0.953			0.995	
Flt Protected		0.997			0.962			0.983			0.997	
Satd. Flow (prot)	0	1519	0	0	1640	0	0	1618	0	0	1830	0
Flt Permitted		0.980			0.595			0.645			0.905	
Satd. Flow (perm)	0	1493	0	0	1014	0	0	1062	0	0	1661	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		155			5			46			3	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		716.1			196.5			496.3			520.4	
Travel Time (s)		51.6			14.1			25.5			26.8	
Peak Hour Factor	0.78	0.78	0.78	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles (%)	12%	12%	12%	10%	10%	10%	10%	10%	10%	3%	3%	3%
Adj. Flow (vph)	17	45	191	59	9	7	319	272	312	36	482	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	253	0	0	75	0	0	903	0	0	537	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		26.5	26.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		65.0	65.0		65.0	65.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		65.0%	65.0%		65.0%	65.0%	
Maximum Green (s)	28.5	28.5		28.5	28.5		58.5	58.5		58.5	58.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		28.5			28.5			58.5			58.5	
Actuated g/C Ratio		0.28			0.28			0.58			0.58	
v/c Ratio		0.47			0.26			1.41			0.55	
Control Delay		14.8			28.6			204.0			15.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.8			28.6			204.0			15.4	
LOS		B			C			F			B	
Approach Delay		14.8			28.6			204.0			15.4	
Approach LOS		B			C			F			B	
Stops (vph)		66			49			351			247	
Fuel Used(l)		17			4			154			34	
CO Emissions (g/hr)		318			73			2871			624	
NOx Emissions (g/hr)		61			14			554			120	
VOC Emissions (g/hr)		73			17			662			144	
Dilemma Vehicles (#)		0			0			33			21	
Queue Length 50th (m)		15.3			11.0			~243.2			62.3	
Queue Length 95th (m)		28.0			23.5			m#233.4			73.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		692.1			172.5			472.3			496.4	
Turn Bay Length (m)												
Base Capacity (vph)		536			292			640			972	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.47			0.26			1.41			0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 86 (86%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 110			
Control Type: Pretimed			
Maximum v/c Ratio: 1.41			
Intersection Signal Delay: 112.2		Intersection LOS: F	
Intersection Capacity Utilization 101.6%		ICU Level of Service G	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2: 43 Street N & 18 Ave N

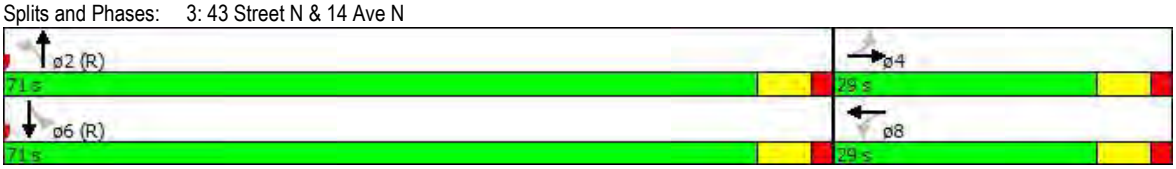


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	7	27	53	2	6	101	670	236	28	532	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.905			0.986			0.961			0.995	
Flt Protected		0.995			0.959		0.950				0.998	
Satd. Flow (prot)	0	1104	0	0	1633	0	1641	1660	0	0	1780	0
Flt Permitted		0.975			0.728		0.368				0.501	
Satd. Flow (perm)	0	1082	0	0	1240	0	636	1660	0	0	894	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			5			36			4	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		748.5			168.6			405.2			496.3	
Travel Time (s)		53.9			12.1			20.8			25.5	
Peak Hour Factor	0.81	0.81	0.81	0.92	0.92	0.92	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	55%	55%	55%	10%	10%	10%	10%	10%	10%	6%	6%	6%
Adj. Flow (vph)	5	9	33	58	2	7	125	827	291	35	657	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	0	67	0	125	1118	0	0	718	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	29.0	29.0		29.0	29.0		71.0	71.0		71.0	71.0	
Total Split (%)	29.0%	29.0%		29.0%	29.0%		71.0%	71.0%		71.0%	71.0%	
Maximum Green (s)	22.5	22.5		22.5	22.5		64.5	64.5		64.5	64.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.5			6.5		6.5	6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		22.5			22.5		64.5	64.5			64.5	
Actuated g/C Ratio		0.22			0.22		0.64	0.64			0.64	
v/c Ratio		0.17			0.24		0.30	1.03			1.24	
Control Delay		16.7			32.1		7.8	49.3			146.6	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		16.7			32.1		7.8	49.3			146.6	
LOS		B			C		A	D			F	
Approach Delay		16.7			32.1			45.2			146.6	
Approach LOS		B			C			D			F	
Stops (vph)		15			47		27	613			428	
Fuel Used(l)		4			4		7	106			108	
CO Emissions (g/hr)		66			67		126	1968			2008	
NOx Emissions (g/hr)		13			13		24	380			388	
VOC Emissions (g/hr)		15			15		29	454			463	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Dilemma Vehicles (#)		0			0		0	37			38	
Queue Length 50th (m)		2.3			10.4		7.3	~182.5			~177.2	
Queue Length 95th (m)		10.1			22.7		11.0	#130.1			#213.5	
Internal Link Dist (m)		724.5			144.6			381.2			472.3	
Turn Bay Length (m)							75.0					
Base Capacity (vph)		269			282		410	1083			578	
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		0.17			0.24		0.30	1.03			1.24	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 63 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.24			
Intersection Signal Delay: 79.2		Intersection LOS: E	
Intersection Capacity Utilization 73.1%		ICU Level of Service D	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: 43 Street N & 14 Ave N



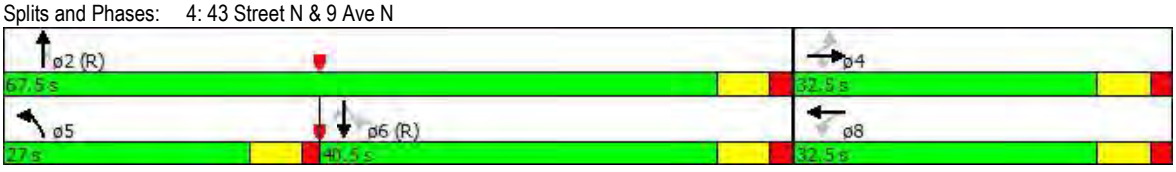
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	32	116	46	12	11	282	971	193	38	551	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.928				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1296	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.740			0.732			0.950			0.242		
Satd. Flow (perm)	1365	1845	1568	1023	1296	0	1656	3312	1482	422	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140		13				233			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	47	39	140	55	14	13	340	1170	233	46	664	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	39	140	55	27	0	340	1170	233	46	664	30
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	32.5	32.5	32.5	32.5	32.5		27.0	67.5	67.5	40.5	40.5	40.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%		27.0%	67.5%	67.5%	40.5%	40.5%	40.5%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		21.0	61.0	61.0	34.0	34.0	34.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	12.0	12.0	12.0	12.0	12.0		28.0	75.0	75.0	41.0	41.0	41.0
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.28	0.75	0.75	0.41	0.41	0.41
v/c Ratio	0.29	0.18	0.45	0.45	0.16		0.73	0.47	0.20	0.27	0.49	0.04
Control Delay	43.9	40.4	11.6	52.3	27.1		35.5	3.0	0.4	29.8	28.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	40.4	11.6	52.3	27.1		35.5	3.0	0.4	29.8	28.7	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	C	C	A
Approach Delay		23.3			44.0			9.0			27.6	
Approach LOS		C			D			A			C	
90th %ile Green (s)	16.2	16.2	16.2	16.2	16.2		30.8	70.8	70.8	34.0	34.0	34.0
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Max	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	12.9	12.9	12.9	12.9	12.9		29.8	74.1	74.1	38.3	38.3	38.3
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	10.7	10.7	10.7	10.7	10.7		28.6	76.3	76.3	41.7	41.7	41.7
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		27.1	77.0	77.0	43.9	43.9	43.9
30th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		23.9	77.0	77.0	47.1	47.1	47.1
10th %ile Term Code	Min	Min	Min	Hold	Hold		Gap	Coord	Coord	Coord	Coord	Coord
Stops (vph)	34	29	18	42	13		211	162	2	26	387	0
Fuel Used(l)	5	4	10	6	2		36	82	15	4	54	1
CO Emissions (g/hr)	90	73	181	105	39		672	1523	277	69	996	24
NOx Emissions (g/hr)	17	14	35	20	8		130	294	54	13	192	5
VOC Emissions (g/hr)	21	17	42	24	9		155	351	64	16	230	6
Dilemma Vehicles (#)	0	0	0	0	0		0	45	0	0	39	0
Queue Length 50th (m)	9.0	7.4	0.0	10.8	2.6		44.2	16.6	0.0	6.9	53.3	0.0
Queue Length 95th (m)	17.7	15.2	13.3	20.4	9.4		68.2	17.8	0.2	m6.8	m45.8	m0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	354	479	511	265	346		464	2485	1170	172	1357	668
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.08	0.27	0.21	0.08		0.73	0.47	0.20	0.27	0.49	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 87 (87%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 64.8%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: 43 Street N & 9 Ave N



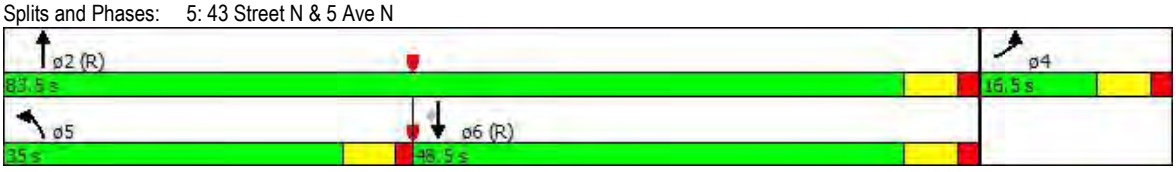
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	98	213	356	1405	711	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		245				61
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	113	245	409	1615	817	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	113	245	409	1615	817	61
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		35.0	83.5	48.5	48.5
Total Split (%)	16.5%		35.0%	83.5%	48.5%	48.5%
Maximum Green (s)	10.0		29.0	77.0	42.0	42.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	100.0	26.9	77.0	44.1	44.1
Actuated g/C Ratio	0.10	1.00	0.27	0.77	0.44	0.44
v/c Ratio	0.36	0.17	0.89	0.62	0.60	0.09
Control Delay	45.6	0.3	58.0	6.3	9.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	0.3	58.0	6.3	9.6	1.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	E	A	A	A
Approach Delay	14.6			16.7	9.0	
Approach LOS	B			B	A	
90th %ile Green (s)	10.0		29.0	77.0	42.0	42.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		29.0	77.0	42.0	42.0
70th %ile Term Code	Max		Max	Coord	Coord	Coord
50th %ile Green (s)	10.0		29.0	77.0	42.0	42.0
50th %ile Term Code	Max		Max	Coord	Coord	Coord
30th %ile Green (s)	10.0		26.4	77.0	44.6	44.6
30th %ile Term Code	Max		Gap	Coord	Coord	Coord
10th %ile Green (s)	10.0		21.2	77.0	49.8	49.8
10th %ile Term Code	Max		Gap	Coord	Coord	Coord
Stops (vph)	88	0	319	553	283	3
Fuel Used(l)	12	15	46	103	69	4
CO Emissions (g/hr)	227	275	856	1914	1281	78
NOx Emissions (g/hr)	44	53	165	369	247	15
VOC Emissions (g/hr)	52	63	197	442	296	18
Dilemma Vehicles (#)	0	0	0	70	21	0
Queue Length 50th (m)	11.2	0.0	77.8	61.3	15.7	0.2
Queue Length 95th (m)	19.4	0.0	#120.9	71.7	21.8	1.6
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	312	1442	493	2622	1371	647
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.17	0.83	0.62	0.60	0.09

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 32 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 14.4 Intersection LOS: B
Intersection Capacity Utilization 63.5% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: 43 Street N & 5 Ave N

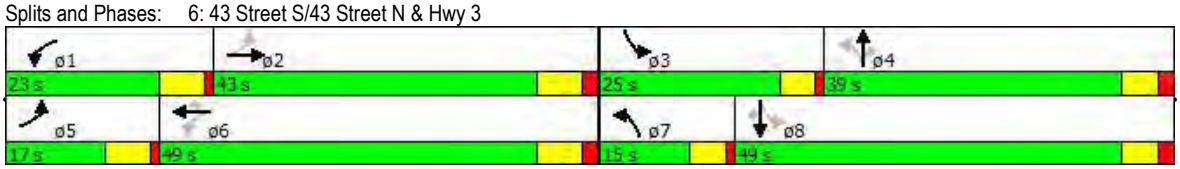


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	582	878	12	354	854	722	377	967	255	561	571	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	2		0	2		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3155	4664	0	3213	4759	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.220			0.154			0.375			0.105		
Satd. Flow (perm)	731	4664	0	521	4759	1482	1257	3282	1468	337	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				280			202			233
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	633	954	13	385	928	785	410	1051	277	610	621	315
Shared Lane Traffic (%)												
Lane Group Flow (vph)	633	967	0	385	928	785	410	1051	277	610	621	315
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	17.0	43.0		23.0	49.0	49.0	15.0	39.0	39.0	25.0	49.0	49.0
Total Split (%)	13.1%	33.1%		17.7%	37.7%	37.7%	11.5%	30.0%	30.0%	19.2%	37.7%	37.7%
Maximum Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	50.3	38.3		57.7	42.0	42.0	44.0	33.0	33.0	59.0	43.0	43.0
Actuated g/C Ratio	0.39	0.29		0.44	0.32	0.32	0.34	0.25	0.25	0.45	0.33	0.33
v/c Ratio	1.30	0.70		0.72	0.60	1.18	0.72	1.26	0.53	1.07	0.60	0.51
Control Delay	175.2	44.5		29.7	39.0	120.1	33.5	167.7	15.9	94.5	39.2	12.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	175.2	44.5		29.7	39.0	120.1	33.5	167.7	15.9	94.5	39.2	12.4
LOS	F	D		C	D	F	C	F	B	F	D	B
Approach Delay		96.2			67.6			111.8			55.6	
Approach LOS		F			E			F			E	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	11.0	36.0		17.0	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
70th %ile Green (s)	11.0	36.3		16.7	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
70th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
50th %ile Green (s)	11.0	38.0		15.0	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
50th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
30th %ile Green (s)	11.0	39.5		13.5	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
30th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
10th %ile Green (s)	11.0	41.6		11.4	42.0	42.0	10.0	33.0	33.0	20.0	43.0	43.0
10th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
Stops (vph)	350	776		212	699	418	297	787	67	395	465	68
Fuel Used(l)	119	106		42	118	135	34	188	15	85	64	21
CO Emissions (g/hr)	2215	1980		779	2194	2508	636	3503	285	1577	1191	393
NOx Emissions (g/hr)	428	382		150	423	484	123	676	55	304	230	76
VOC Emissions (g/hr)	511	457		180	506	578	147	808	66	364	275	91
Dilemma Vehicles (#)	0	34		0	33	0	0	29	0	0	22	0
Queue Length 50th (m)	~79.3	85.2		32.1	76.9	~198.8	35.0	~187.0	16.0	~79.0	73.3	15.7
Queue Length 95th (m)	#122.9	104.5		43.4	92.5	#278.5	47.0	#230.6	44.6	#117.7	93.8	44.2
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	487	1374		592	1537	668	573	833	523	569	1038	620
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.30	0.70		0.65	0.60	1.18	0.72	1.26	0.53	1.07	0.60	0.51

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.30			
Intersection Signal Delay: 82.5		Intersection LOS: F	
Intersection Capacity Utilization 103.9%		ICU Level of Service G	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 130			
70th %ile Actuated Cycle: 130			
50th %ile Actuated Cycle: 130			
30th %ile Actuated Cycle: 130			
10th %ile Actuated Cycle: 130			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3

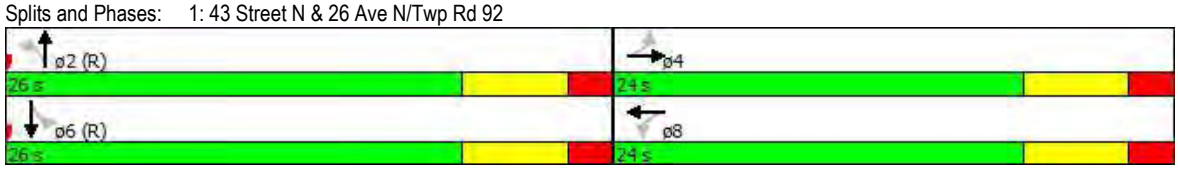


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	99	299	44	84	6	100	113	31	6	58	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.903			0.994			0.983			0.987	
Flt Protected		0.998			0.984			0.980			0.996	
Satd. Flow (prot)	0	1646	0	0	1787	0	0	1711	0	0	1610	0
Flt Permitted		0.980			0.567			0.825			0.965	
Satd. Flow (perm)	0	1617	0	0	1030	0	0	1440	0	0	1560	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		285			5			17			9	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		697.6			744.1			520.4			321.7	
Travel Time (s)		50.2			53.6			26.8			16.5	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	16%	16%	16%
Adj. Flow (vph)	22	129	388	57	109	8	130	147	40	8	75	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	539	0	0	174	0	0	317	0	0	92	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	24.0	24.0		24.0	24.0		26.0	26.0		26.0	26.0	
Total Split (%)	48.0%	48.0%		48.0%	48.0%		52.0%	52.0%		52.0%	52.0%	
Maximum Green (s)	17.5	17.5		17.5	17.5		19.5	19.5		19.5	19.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.4			14.4			22.6			22.6	
Actuated g/C Ratio		0.29			0.29			0.45			0.45	
v/c Ratio		0.81			0.58			0.48			0.13	
Control Delay		18.0			22.3			12.2			9.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.0			22.3			12.2			9.4	
LOS		B			C			B			A	
Approach Delay		18.0			22.3			12.2			9.4	
Approach LOS		B			C			B			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	17.5	17.5		17.5	17.5		19.5	19.5		19.5	19.5	
90th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord		Coord	Coord	
70th %ile Green (s)	18.3	18.3		18.3	18.3		18.7	18.7		18.7	18.7	
70th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	
50th %ile Green (s)	14.9	14.9		14.9	14.9		22.1	22.1		22.1	22.1	
50th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	
30th %ile Green (s)	11.3	11.3		11.3	11.3		25.7	25.7		25.7	25.7	
30th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	
10th %ile Green (s)	10.0	10.0		10.0	10.0		27.0	27.0		27.0	27.0	
10th %ile Term Code	Min	Min		Hold	Hold		Coord	Coord		Coord	Coord	
Queue Length 50th (m)		19.5			13.1			19.2			4.3	
Queue Length 95th (m)		31.7			21.7			28.3			10.1	
Internal Link Dist (m)		673.6			720.1			496.4			297.7	
Turn Bay Length (m)												
Base Capacity (vph)		755			366			664			714	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.71			0.48			0.48			0.13	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 50			
Offset: 35 (70%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 16.3		Intersection LOS: B	
Intersection Capacity Utilization 56.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: 43 Street N & 26 Ave N/Twp Rd 92



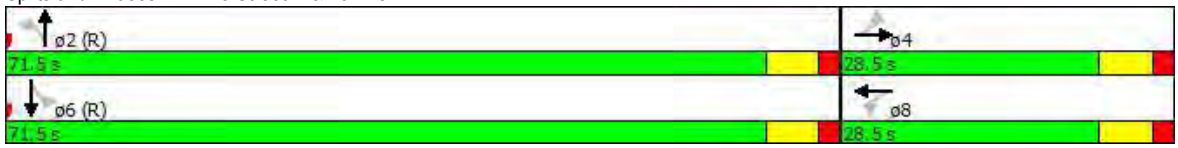
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	35	149	54	8	6	249	212	243	28	376	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.898			0.987			0.920			0.995	
Flt Protected		0.997			0.962		0.950				0.997	
Satd. Flow (prot)	0	1519	0	0	1640	0	1641	1589	0	0	1830	0
Flt Permitted		0.973			0.315		0.470				0.939	
Satd. Flow (perm)	0	1482	0	0	537	0	812	1589	0	0	1723	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		142			5			118			4	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		716.1			196.5			496.3			520.4	
Travel Time (s)		51.6			14.1			25.5			26.8	
Peak Hour Factor	0.78	0.78	0.78	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles (%)	12%	12%	12%	10%	10%	10%	10%	10%	10%	3%	3%	3%
Adj. Flow (vph)	17	45	191	59	9	7	319	272	312	36	482	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	253	0	0	75	0	319	584	0	0	537	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		26.5	26.5		22.5	22.5	
Total Split (s)	28.5	28.5		28.5	28.5		71.5	71.5		71.5	71.5	
Total Split (%)	28.5%	28.5%		28.5%	28.5%		71.5%	71.5%		71.5%	71.5%	
Maximum Green (s)	22.0	22.0		22.0	22.0		65.0	65.0		65.0	65.0	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.5			6.5		6.5	6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		14.9			14.9		72.1	72.1			72.1	
Actuated g/C Ratio		0.15			0.15		0.72	0.72			0.72	
v/c Ratio		0.74			0.89		0.55	0.50			0.43	
Control Delay		30.9			111.2		13.9	8.6			6.7	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		30.9			111.2		13.9	8.6			6.7	
LOS		C			F		B	A			A	
Approach Delay		30.9			111.2			10.4			6.7	
Approach LOS		C			F			B			A	
90th %ile Green (s)	22.0	22.0		22.0	22.0		65.0	65.0		65.0	65.0	
90th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Coord	Coord	
70th %ile Green (s)	17.5	17.5		17.5	17.5		69.5	69.5		69.5	69.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
70th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	
50th %ile Green (s)	14.1	14.1		14.1	14.1		72.9	72.9		72.9	72.9	
50th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	
30th %ile Green (s)	10.8	10.8		10.8	10.8		76.2	76.2		76.2	76.2	
30th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	
10th %ile Green (s)	10.0	10.0		10.0	10.0		77.0	77.0		77.0	77.0	
10th %ile Term Code	Min	Min		Hold	Hold		Coord	Coord		Coord	Coord	
Queue Length 50th (m)		21.5			14.4		27.8	37.8			44.8	
Queue Length 95th (m)		34.0			#34.8		m74.6	80.7			59.0	
Internal Link Dist (m)		692.1			172.5			472.3			496.4	
Turn Bay Length (m)												
Base Capacity (vph)		436			122		585	1178			1243	
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		0.58			0.61		0.55	0.50			0.43	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 16.5 Intersection LOS: B
Intersection Capacity Utilization 87.9% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 43 Street N & 18 Ave N

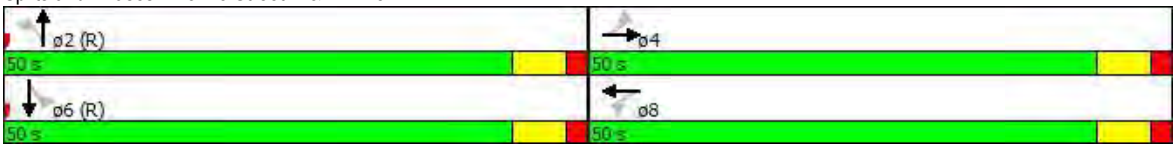


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	7	27	53	2	6	101	670	236	28	532	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.905			0.986			0.961			0.995	
Flt Protected		0.995			0.959		0.950				0.998	
Satd. Flow (prot)	0	1104	0	0	1633	0	1641	1660	0	0	1780	0
Flt Permitted		0.957			0.721		0.402				0.884	
Satd. Flow (perm)	0	1062	0	0	1228	0	694	1660	0	0	1577	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			7			22			2	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		748.5			168.6			405.2			496.3	
Travel Time (s)		53.9			12.1			20.8			25.5	
Peak Hour Factor	0.81	0.81	0.81	0.92	0.92	0.92	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	55%	55%	55%	10%	10%	10%	10%	10%	10%	6%	6%	6%
Adj. Flow (vph)	5	9	33	58	2	7	125	827	291	35	657	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	0	67	0	125	1118	0	0	718	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	13.5	13.5		13.5	13.5		16.5	16.5		16.5	16.5	
Total Split (s)	50.0	50.0		50.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	43.5	43.5		43.5	43.5		43.5	43.5		43.5	43.5	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.5			6.5		6.5	6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		10.4			10.4		80.6	80.6			80.6	
Actuated g/C Ratio		0.10			0.10		0.81	0.81			0.81	
v/c Ratio		0.34			0.50		0.22	0.83			0.56	
Control Delay		25.5			50.3		4.5	17.8			9.5	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		25.5			50.3		4.5	17.8			9.5	
LOS		C			D		A	B			A	
Approach Delay		25.5			50.3			16.4			9.5	
Approach LOS		C			D			B			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	15.0	15.0		15.0	15.0		72.0	72.0		72.0	72.0	
90th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	
70th %ile Green (s)	12.0	12.0		12.0	12.0		75.0	75.0		75.0	75.0	
70th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	
50th %ile Green (s)	10.0	10.0		10.0	10.0		77.0	77.0		77.0	77.0	
50th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	
30th %ile Green (s)	8.0	8.0		8.0	8.0		79.0	79.0		79.0	79.0	
30th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	
10th %ile Green (s)	0.0	0.0		0.0	0.0		93.5	93.5		93.5	93.5	
10th %ile Term Code	Skip	Skip		Skip	Skip		Coord	Coord		Coord	Coord	
Queue Length 50th (m)		2.7			11.8		5.5	74.1			68.8	
Queue Length 95th (m)		11.2			24.7		12.0	113.8			78.7	
Internal Link Dist (m)		724.5			144.6			381.2			472.3	
Turn Bay Length (m)							75.0					
Base Capacity (vph)		480			538		559	1342			1271	
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		0.10			0.12		0.22	0.83			0.56	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 74 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 73.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: 43 Street N & 14 Ave N



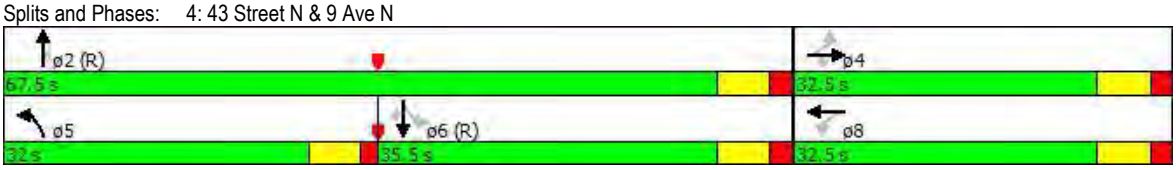
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	32	116	46	12	11	282	971	193	38	551	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		50.0	100.0		0.0	100.0		50.0	125.0		50.0
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.928				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1327	1296	0	1656	3312	1482	1656	3312	1482
Flt Permitted	0.740			0.732			0.950			0.242		
Satd. Flow (perm)	1365	1845	1568	1023	1296	0	1656	3312	1482	422	3312	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140		13				233			104
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		750.2			651.0			882.4			198.2	
Travel Time (s)		54.0			46.9			52.9			11.9	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	3%	3%	3%	36%	36%	36%	9%	9%	9%	9%	9%	9%
Adj. Flow (vph)	47	39	140	55	14	13	340	1170	233	46	664	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	39	140	55	27	0	340	1170	233	46	664	30
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	32.5	32.5	32.5	32.5	32.5		12.0	32.5	32.5	32.5	32.5	32.5
Total Split (s)	32.5	32.5	32.5	32.5	32.5		32.0	67.5	67.5	35.5	35.5	35.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%		32.0%	67.5%	67.5%	35.5%	35.5%	35.5%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		26.0	61.0	61.0	29.0	29.0	29.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0			18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0			0	0	0	0	0
Act Effct Green (s)	12.0	12.0	12.0	12.0	12.0		25.7	75.0	75.0	43.3	43.3	43.3
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.26	0.75	0.75	0.43	0.43	0.43
v/c Ratio	0.29	0.18	0.45	0.45	0.16		0.80	0.47	0.20	0.25	0.46	0.04
Control Delay	43.9	40.4	11.6	52.3	27.1		48.5	5.8	1.0	20.6	17.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	40.4	11.6	52.3	27.1		48.5	5.8	1.0	20.6	17.2	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D	B	D	C		D	A	A	C	B	A
Approach Delay		23.3			44.0			13.5			16.7	
Approach LOS		C			D			B			B	
90th %ile Green (s)	16.2	16.2	16.2	16.2	16.2		32.4	70.8	70.8	32.4	32.4	32.4
90th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
70th %ile Green (s)	12.9	12.9	12.9	12.9	12.9		29.2	74.1	74.1	38.9	38.9	38.9
70th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
50th %ile Green (s)	10.7	10.7	10.7	10.7	10.7		26.2	76.3	76.3	44.1	44.1	44.1
50th %ile Term Code	Hold	Hold	Hold	Gap	Gap		Gap	Coord	Coord	Coord	Coord	Coord
30th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		22.9	77.0	77.0	48.1	48.1	48.1
30th %ile Term Code	Min	Min	Min	Min	Min		Gap	Coord	Coord	Coord	Coord	Coord
10th %ile Green (s)	10.0	10.0	10.0	10.0	10.0		18.0	77.0	77.0	53.0	53.0	53.0
10th %ile Term Code	Min	Min	Min	Hold	Hold		Gap	Coord	Coord	Coord	Coord	Coord
Queue Length 50th (m)	9.0	7.4	0.0	10.8	2.6		64.5	37.4	0.0	3.4	27.1	0.0
Queue Length 95th (m)	17.7	15.2	13.3	20.4	9.4		80.3	54.6	4.7	m10.9	57.2	m0.0
Internal Link Dist (m)		726.2			627.0			858.4			174.2	
Turn Bay Length (m)			50.0	100.0			100.0		50.0	125.0		50.0
Base Capacity (vph)	354	479	511	265	346		462	2485	1170	182	1434	700
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.08	0.27	0.21	0.08		0.74	0.47	0.20	0.25	0.46	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 89 (89%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 64.8%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: 43 Street N & 9 Ave N

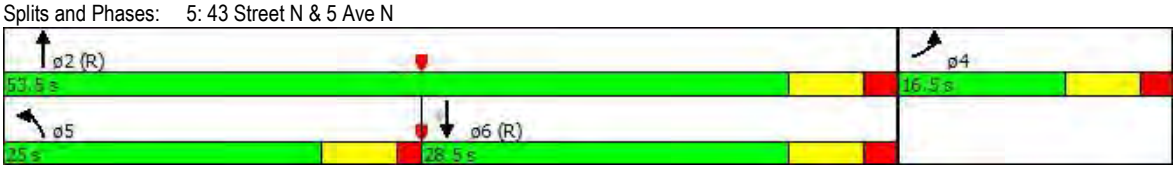


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	98	213	356	1405	711	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	140.0			100.0
Storage Lanes	2	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3127	1442	1703	3406	3112	1392
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3127	1442	1703	3406	3112	1392
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		245				61
Link Speed (k/h)	50			60	60	
Link Distance (m)	728.0			340.2	882.4	
Travel Time (s)	52.4			20.4	52.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	12%	12%	6%	6%	16%	16%
Adj. Flow (vph)	113	245	409	1615	817	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	113	245	409	1615	817	61
Turn Type	Prot	Free	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free				6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		6.0	15.0	15.0	15.0
Minimum Split (s)	16.5		12.0	28.5	21.5	21.5
Total Split (s)	16.5		25.0	53.5	28.5	28.5
Total Split (%)	23.6%		35.7%	76.4%	40.7%	40.7%
Maximum Green (s)	10.0		19.0	47.0	22.0	22.0
Yellow Time (s)	4.5		4.5	4.5	4.5	4.5
All-Red Time (s)	2.0		1.5	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5		6.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	C-Max	C-Max	C-Max
Walk Time (s)				8.0		
Flash Dont Walk (s)				14.0		
Pedestrian Calls (#/hr)				0		
Act Effct Green (s)	10.0	70.0	18.5	51.6	25.8	25.8
Actuated g/C Ratio	0.14	1.00	0.26	0.74	0.37	0.37
v/c Ratio	0.25	0.17	0.91	0.64	0.71	0.11
Control Delay	28.4	0.3	52.4	7.9	25.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	0.3	52.4	7.9	25.4	5.9

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	C	A	D	A	C	A
Approach Delay	9.1			16.9	24.1	
Approach LOS	A			B	C	
90th %ile Green (s)	10.0		19.0	47.0	22.0	22.0
90th %ile Term Code	Max		Max	Coord	Coord	Coord
70th %ile Green (s)	10.0		19.0	47.0	22.0	22.0
70th %ile Term Code	Max		Max	Coord	Coord	Coord
50th %ile Green (s)	10.0		19.0	47.0	22.0	22.0
50th %ile Term Code	Max		Max	Coord	Coord	Coord
30th %ile Green (s)	10.0		19.0	47.0	22.0	22.0
30th %ile Term Code	Max		Max	Coord	Coord	Coord
10th %ile Green (s)	0.0		16.4	63.5	41.1	41.1
10th %ile Term Code	Skip		Gap	Coord	Coord	Coord
Queue Length 50th (m)	7.2	0.0	53.9	61.3	54.4	0.0
Queue Length 95th (m)	13.7	0.0	#97.7	77.6	#75.7	7.1
Internal Link Dist (m)	704.0			316.2	858.4	
Turn Bay Length (m)		100.0	140.0			100.0
Base Capacity (vph)	446	1442	462	2510	1148	552
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.17	0.89	0.64	0.71	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 63.5%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: 43 Street N & 5 Ave N

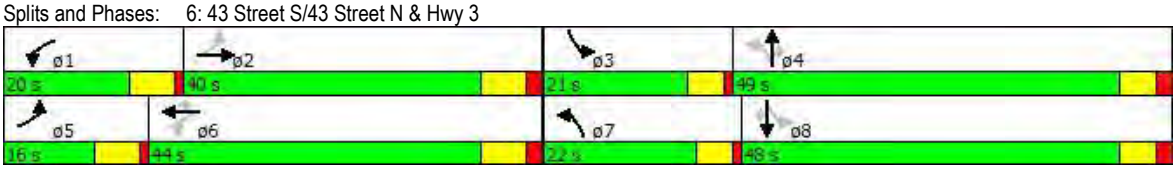


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	582	878	12	354	854	722	377	967	255	561	571	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		0.0	125.0		150.0	100.0		80.0	80.0		80.0
Storage Lanes	2		0	2		1	2		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3155	4664	0	3213	4759	1482	3183	3282	1468	3045	3139	1404
Flt Permitted	0.198			0.127			0.302			0.090		
Satd. Flow (perm)	658	4664	0	429	4759	1482	1012	3282	1468	288	3139	1404
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				266			189			222
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		449.3			776.8			454.3			301.5	
Travel Time (s)		20.2			35.0			27.3			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	9%	9%	9%	10%	10%	10%	15%	15%	15%
Adj. Flow (vph)	633	954	13	385	928	785	410	1051	277	610	621	315
Shared Lane Traffic (%)												
Lane Group Flow (vph)	633	967	0	385	928	785	410	1051	277	610	621	315
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	27.0		16.0	27.0	27.0	15.0	16.0	16.0	15.0	22.0	22.0
Total Split (s)	16.0	40.0		20.0	44.0	44.0	22.0	49.0	49.0	21.0	48.0	48.0
Total Split (%)	12.3%	30.8%		15.4%	33.8%	33.8%	16.9%	37.7%	37.7%	16.2%	36.9%	36.9%
Maximum Green (s)	10.0	33.0		14.0	37.0	37.0	17.0	43.0	43.0	16.0	42.0	42.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	44.3	33.3		51.7	37.0	37.0	58.8	43.0	43.0	61.2	44.2	44.2
Actuated g/C Ratio	0.34	0.26		0.40	0.28	0.28	0.45	0.33	0.33	0.47	0.34	0.34
v/c Ratio	1.52	0.81		0.83	0.69	1.28	0.58	0.97	0.45	1.28	0.58	0.50
Control Delay	273.5	51.7		43.7	44.4	165.6	22.5	63.7	13.4	176.2	38.3	13.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	273.5	51.7		43.7	44.4	165.6	22.5	63.7	13.4	176.2	38.3	13.5
LOS	F	D		D	D	F	C	E	B	F	D	B
Approach Delay		139.4			89.7			46.0			87.7	
Approach LOS		F			F			D			F	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	10.0	33.0		14.0	37.0	37.0	17.0	43.0	43.0	16.0	42.0	42.0
90th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Max	Max	Max	Max	Hold	Hold
70th %ile Green (s)	10.0	33.0		14.0	37.0	37.0	16.6	43.0	43.0	16.0	42.4	42.4
70th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Max	Hold	Hold
50th %ile Green (s)	10.0	33.0		14.0	37.0	37.0	15.1	43.0	43.0	16.0	43.9	43.9
50th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Max	Hold	Hold
30th %ile Green (s)	10.0	33.0		14.0	37.0	37.0	13.6	43.0	43.0	16.0	45.4	45.4
30th %ile Term Code	Max	MaxR		Max	MaxR	MaxR	Gap	Max	Max	Max	Hold	Hold
10th %ile Green (s)	10.0	34.5		12.5	37.0	37.0	11.5	43.0	43.0	16.0	47.5	47.5
10th %ile Term Code	Max	Hold		Gap	MaxR	MaxR	Gap	Max	Max	Max	Hold	Hold
Queue Length 50th (m)	~96.4	90.2		35.1	81.6	~214.9	31.8	146.4	16.9	~93.5	72.5	17.7
Queue Length 95th (m)	#137.2	108.0		#57.7	98.1	#294.5	42.6	#193.4	42.7	#133.4	95.0	47.9
Internal Link Dist (m)		425.3			752.8			430.3			277.5	
Turn Bay Length (m)	140.0			125.0		150.0	100.0		80.0	80.0		80.0
Base Capacity (vph)	416	1195		471	1354	612	758	1085	612	475	1068	624
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.52	0.81		0.82	0.69	1.28	0.54	0.97	0.45	1.28	0.58	0.50

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.52			
Intersection Signal Delay: 89.8		Intersection LOS: F	
Intersection Capacity Utilization 103.9%		ICU Level of Service G	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 130			
70th %ile Actuated Cycle: 130			
50th %ile Actuated Cycle: 130			
30th %ile Actuated Cycle: 130			
10th %ile Actuated Cycle: 130			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 43 Street S/43 Street N & Hwy 3



Appendix E

Synchro Software Capacity Analyses Files

Appendix F

TAC – Traffic Signal Warrant Worksheets

City of Lethbridge/Lethbridge County - Traffic Signal Warrant Analysis

Main Street (name)	43 Street North	Direction (EW or NS)	NS
Side Street (name)	26 Avenue/Twp Rd 92	Direction (EW or NS)	EW
Quadrant / Int #	3	Comments	60% of AM peak hour utilized for the period from 11:00 AM to 12:00 PM and 60% of PM peak hour utilized for the period from 12:00 PM to 01:00 PM

for Warrant Calculation Results, please hit 'Page Down'

CHECK SHEET

Road Authority:	City of Lethbridge/Lethbridge County
City:	Lethbridge
Analysis Date:	2018 Aug 12, Sun
Count Date:	Future 2037 with Site Traffic
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
43 Street North	NB	0	0	0	1	0	0	1,650	1
43 Street North	SB	0	0	0	1	0	0	5,000	1
26 Avenue/Twp Rd 92	WB	1	0	0	0	1	0		
26 Avenue/Twp Rd 92	EB	0	1	0	0	0	1		

Are the 26 Avenue/Twp Rd 92 WB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	90,000
Central Business District	(y/n)	n

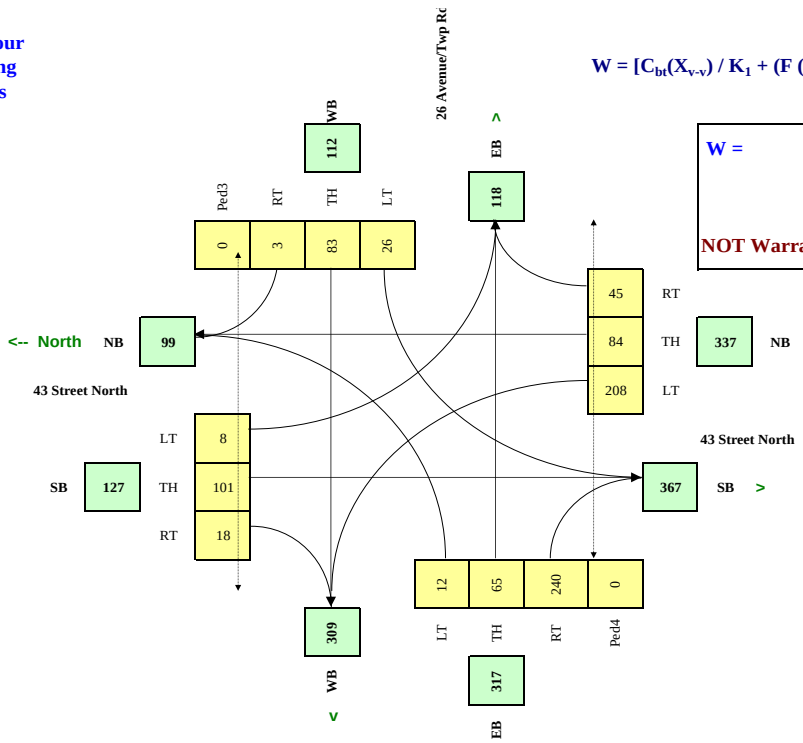
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
43 Street North	NS	70	12.0%	n	0.0
26 Avenue/Twp Rd 92	EW	60	4.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	100	113	31	6	58	7	44	84	6	17	99	299				
8:00 - 9:00	100	113	31	6	58	7	44	84	6	17	99	299				
11:00 - 12:00	60	68	19	4	35	4	26	50	4	10	59	180				
12:00 - 13:00	227	49	44	7	104	21	10	65	0	7	31	152				
16:00 - 17:00	379	81	73	12	174	35	17	108	0	11	51	254				
17:00 - 18:00	379	81	73	12	174	35	17	108	0	11	51	254				
Total (6-hour peak)	**1,245**	**505**	**271**	**47**	**603**	**109**	**158**	**499**	**16**	**73**	**390**	**1,438**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**208**	**84**	**45**	**8**	**101**	**18**	**26**	**83**	**3**	**12**	**65**	**240**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	89	89	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v3H © 2007 Transportation Association of Canada

City of Lethbridge/Lethbridge County - Traffic Signal Warrant Analysis

Main Street (name)	43 Street North	Direction (EW or NS)	NS
Side Street (name)	26 Avenue/Twp Rd 92	Direction (EW or NS)	EW
Quadrant / Int #	3	Comments	60% of AM peak hour utilized for the period from 11:00 AM to 12:00 PM and 60% of PM peak hour utilized for the period from 12:00 PM to 01:00 PM

for Warrant Calculation Results, please hit 'Page Down'

CHECK SHEET

Road Authority:	City of Lethbridge/Lethbridge County
City:	Lethbridge
Analysis Date:	2018 Aug 12, Sun
Count Date:	Future 2022 wth Site Traffic
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
43 Street North	NB	0	0	0	1	0	0	1,650	1
43 Street North	SB	0	0	0	1	0	0	5,000	1
26 Avenue/Twp Rd 92	WB	1	0	0	0	1	0		
26 Avenue/Twp Rd 92	EB	0	1	0	0	0	1		

Are the 26 Avenue/Twp Rd 92 WB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	90,000
Central Business District	(y/n)	n

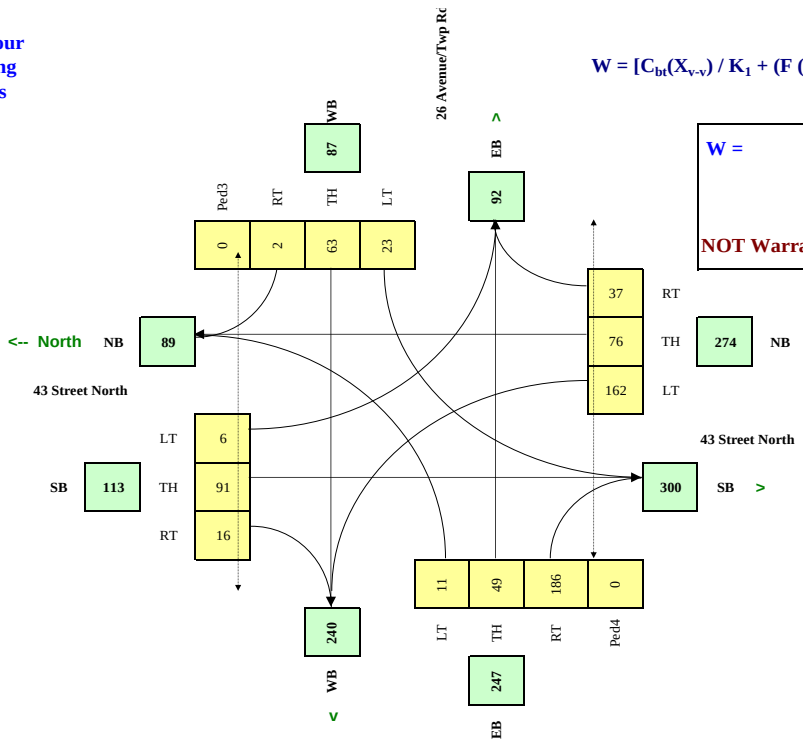
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
43 Street North	NS	70	12.0%	n	0.0
26 Avenue/Twp Rd 92	EW	60	4.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	78	104	25	5	49	6	38	63	5	16	75	236				
8:00 - 9:00	78	104	25	5	49	6	38	63	5	16	75	236				
11:00 - 12:00	47	63	15	3	29	4	23	38	3	10	45	142				
12:00 - 13:00	177	42	36	5	97	19	8	49	0	6	23	116				
16:00 - 17:00	295	70	60	9	161	31	14	81	0	10	39	194				
17:00 - 18:00	295	70	60	9	161	31	14	81	0	10	39	194				
Total (6-hour peak)	**970**	**453**	**221**	**36**	**546**	**97**	**135**	**375**	**13**	**68**	**296**	**1,118**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**162**	**76**	**37**	**6**	**91**	**16**	**23**	**63**	**2**	**11**	**49**	**186**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	59	59	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v3H © 2007 Transportation Association of Canada

City of Lethbridge/Lethbridge County - Traffic Signal Warrant Analysis

Main Street (name)	43 Street North	Direction (EW or NS)	NS
Side Street (name)	18 Avenue/Site Access	Direction (EW or NS)	EW
Quadrant / Int #	3	Comments	60% of AM peak hour utilized for the period from 11:00 AM to 12:00 PM and 60% of PM peak hour utilized for the period from 12:00 PM to 01:00 PM
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Lethbridge/Lethbridge County
City:	Lethbridge
Analysis Date:	2017 Nov 02, Thu
Count Date:	Background 2037 (Without Site Traffic)
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
43 Street North	NB	0	0	0	1	0	0	1,350	1
43 Street North	SB	0	0	0	1	0	0	5,200	1
18 Avenue/Site Access	WB	1	0	0	0	1	0		
18 Avenue/Site Access	EB	0	1	0	0	0	1		
Are the 18 Avenue/Site Access WB right turns significantly impeded by through movements? (y/n)							n		

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	90,000
Central Business District	(y/n)	n

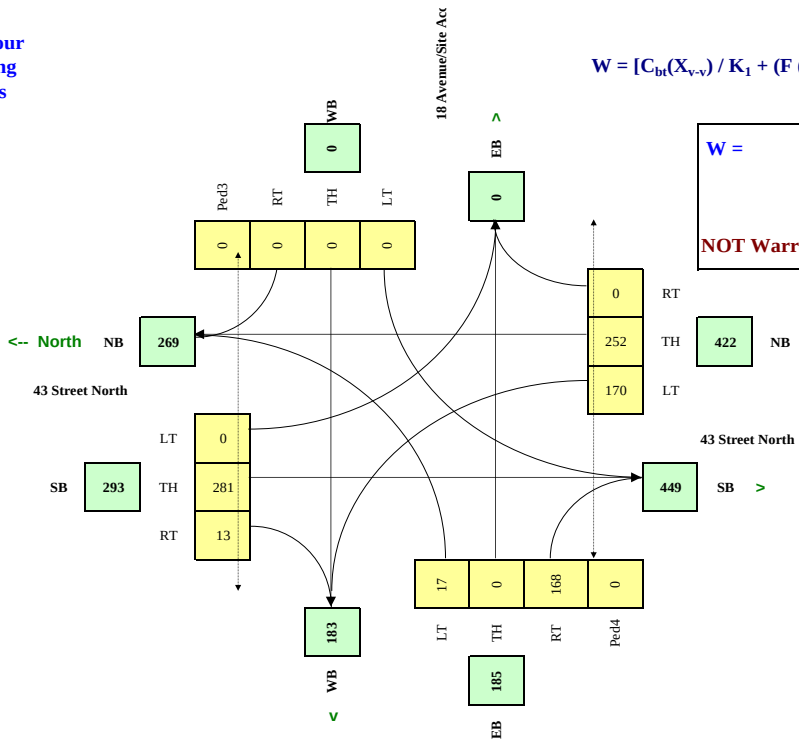
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
43 Street North	NS	70	10.0%	n	0.0
18 Avenue/Site Access	EW	50	10.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	249	199	0	0	329	15	0	0	0	13	0	149				
8:00 - 9:00	249	199	0	0	329	15	0	0	0	13	0	149				
11:00 - 12:00	149	119	0	0	197	9	0	0	0	8	0	89				
12:00 - 13:00	86	230	0	0	191	8	0	0	0	16	0	143				
16:00 - 17:00	144	383	0	0	319	14	0	0	0	26	0	239				
17:00 - 18:00	144	383	0	0	319	14	0	0	0	26	0	239				
Total (6-hour peak)	**1,021**	**1,513**	**0**	**0**	**1,684**	**75**	**0**	**0**	**0**	**102**	**0**	**1,008**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**170**	**252**	**0**	**0**	**281**	**13**	**0**	**0**	**0**	**17**	**0**	**168**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	61	61	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v3H © 2007 Transportation Association of Canada

City of Lethbridge/Lethbridge County - Traffic Signal Warrant Analysis

Main Street (name)	43 Street North	Direction (EW or NS)	NS
Side Street (name)	18 Avenue/Site Access	Direction (EW or NS)	EW
Quadrant / Int #	3	Comments	60% of AM peak hour utilized for the period from 11:00 AM to 12:00 PM and 60% of PM peak hour utilized for the period from 12:00 PM to 01:00 PM
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Lethbridge/Lethbridge County
City:	Lethbridge
Analysis Date:	2018 Aug 12, Sun
Count Date:	Future 2022 with Site Traffic
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
43 Street North	NB	0	0	0	1	0	0	1,350	1
43 Street North	SB	0	0	0	1	0	0	5,200	1
18 Avenue/Site Access	WB	1	0	0	0	1	0		
18 Avenue/Site Access	EB	0	1	0	0	0	1		

Are the 18 Avenue/Site Access WB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	90,000
Central Business District	(y/n)	n

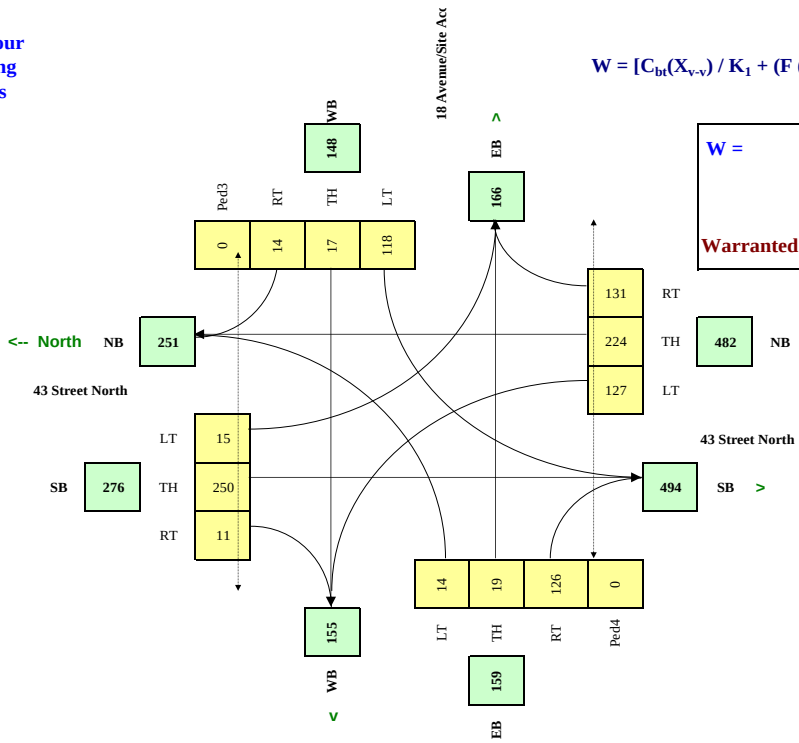
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
43 Street North	NS	70	10.0%	n	0.0
18 Avenue/Site Access	EW	50	10.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	187	179	243	28	298	12	54	8	6	11	35	112				
8:00 - 9:00	187	179	243	28	298	12	54	8	6	11	35	112				
11:00 - 12:00	112	107	146	17	179	7	32	5	4	7	21	67				
12:00 - 13:00	64	203	36	4	167	8	131	19	15	12	5	107				
16:00 - 17:00	106	338	60	7	279	13	218	31	25	20	9	179				
17:00 - 18:00	106	338	60	7	279	13	218	31	25	20	9	179				
Total (6-hour peak)	762	1,344	788	91	1,500	65	707	102	81	81	114	756	0	0	0	0
Average (6-hour peak)	127	224	131	15	250	11	118	17	14	14	19	126	0	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	131	131	0
		Veh	Ped

Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v3H © 2007 Transportation Association of Canada

City of Lethbridge/Lethbridge County - Traffic Signal Warrant Analysis

Main Street (name)	43 Street North	Direction (EW or NS)	NS
Side Street (name)	18 Avenue/Site Access	Direction (EW or NS)	EW
Quadrant / Int #	3	Comments	60% of AM peak hour utilized for the period from 11:00 AM to 12:00 PM and 60% of PM peak hour utilized for the period from 12:00 PM to 01:00 PM
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Lethbridge/Lethbridge County
City:	Lethbridge
Analysis Date:	2018 Aug 12, Sun
Count Date:	Future 2037 with Site Traffic
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
43 Street North	NB	0	0	0	1	0	0	1,350	1
43 Street North	SB	0	0	0	1	0	0	5,200	1
18 Avenue/Site Access	WB	1	0	0	0	1	0		
18 Avenue/Site Access	EB	0	1	0	0	0	1		

Are the 18 Avenue/Site Access WB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	90,000
Central Business District	(y/n)	n

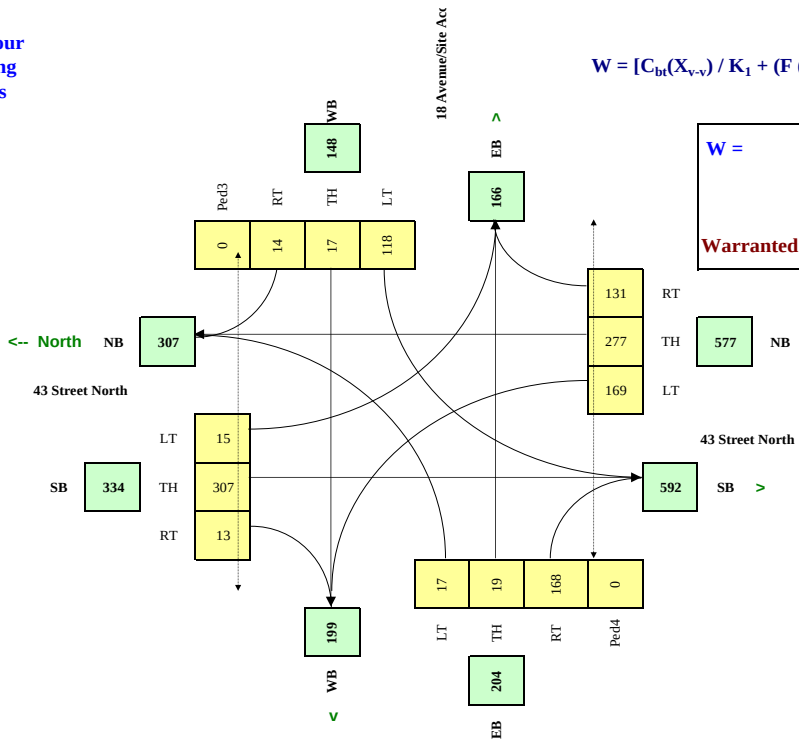
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
43 Street North	NS	70	10.0%	n	0.0
18 Avenue/Site Access	EW	50	10.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	249	212	243	28	376	15	54	8	6	13	35	149				
8:00 - 9:00	249	212	243	28	376	15	54	8	6	13	35	149				
11:00 - 12:00	149	127	146	17	226	9	32	5	4	8	21	89				
12:00 - 13:00	85	256	36	4	199	8	131	19	15	16	5	143				
16:00 - 17:00	141	426	60	7	331	14	218	31	25	26	9	239				
17:00 - 18:00	141	426	60	7	331	14	218	31	25	26	9	239				
Total (6-hour peak)	1,014	1,659	788	91	1,839	75	707	102	81	102	114	1,008	0	0	0	0
Average (6-hour peak)	169	277	131	15	307	13	118	17	14	17	19	168	0	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	182	182	0
		Veh	Ped

Warranted

RESET SHEET

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City of Lethbridge/Lethbridge County - Traffic Signal Warrant Analysis

Main Street (name)	43 Street North	Direction (EW or NS)	NS
Side Street (name)	14 Avenue/Site Access	Direction (EW or NS)	EW
Quadrant / Int #	3	Comments	60% of AM peak hour utilized for the period from 11:00 AM to 12:00 PM and 60% of PM peak hour utilized for the period from 12:00 PM to 01:00 PM
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Lethbridge/Lethbridge County
City:	Lethbridge
Analysis Date:	2017 Nov 02, Thu
Count Date:	Background 2037 (Without Site Traffic)
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
43 Street North	NB	0	0	0	1	0	0	1,350	1
43 Street North	SB	0	0	0	1	0	0	5,200	1
14 Avenue/Site Access	WB	1	0	0	0	1	0		
14 Avenue/Site Access	EB	0	1	0	0	0	1		

Are the 14 Avenue/Site Access WB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	90,000
Central Business District	(y/n)	n

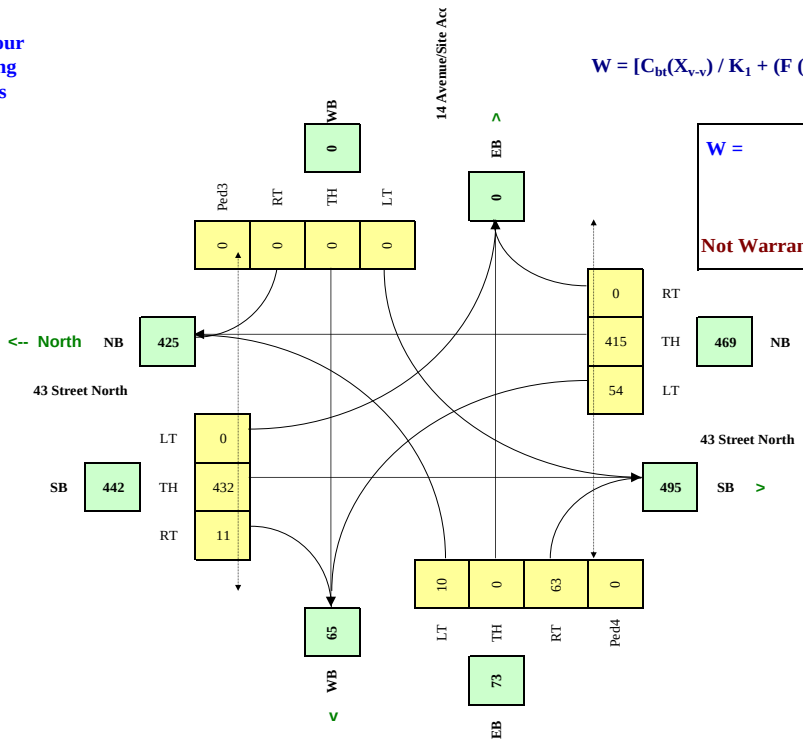
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
43 Street North	NS	70	10.0%	n	0.0
14 Avenue/Site Access	EW	50	10.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	101	420	0	0	459	21	0	0	0	4	0	27				
8:00 - 9:00	101	420	0	0	459	21	0	0	0	4	0	27				
11:00 - 12:00	61	252	0	0	275	13	0	0	0	2	0	16				
12:00 - 13:00	14	323	0	0	322	2	0	0	0	11	0	71				
16:00 - 17:00	23	538	0	0	537	4	0	0	0	18	0	119				
17:00 - 18:00	23	538	0	0	537	4	0	0	0	18	0	119				
Total (6-hour peak)	**323**	**2,491**	**0**	**0**	**2,589**	**65**	**0**	**0**	**0**	**57**	**0**	**379**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**54**	**415**	**0**	**0**	**432**	**11**	**0**	**0**	**0**	**10**	**0**	**63**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W = 34 (Veh) 34 (Ped) 0

Not Warranted - Vs<75

RESET SHEET

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City of Lethbridge/Lethbridge County - Traffic Signal Warrant Analysis

Main Street (name)	43 Street North	Direction (EW or NS)	NS
Side Street (name)	14 Avenue/Site Access	Direction (EW or NS)	EW
Quadrant / Int #	3	Comments	60% of AM peak hour utilized for the period from 11:00 AM to 12:00 PM and 60% of PM peak hour utilized for the period from 12:00 PM to 01:00 PM
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Lethbridge/Lethbridge County
City:	Lethbridge
Analysis Date:	2018 Aug 12, Sun
Count Date:	Future 2022 (With Site Traffic)
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
43 Street North	NB	0	0	0	1	0	0	1,350	1
43 Street North	SB	0	0	0	1	0	0	5,200	1
14 Avenue/Site Access	WB	1	0	0	0	1	0		
14 Avenue/Site Access	EB	0	1	0	0	0	1		
Are the 14 Avenue/Site Access WB right turns significantly impeded by through movements? (y/n)							n		

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	90,000
Central Business District	(y/n)	n

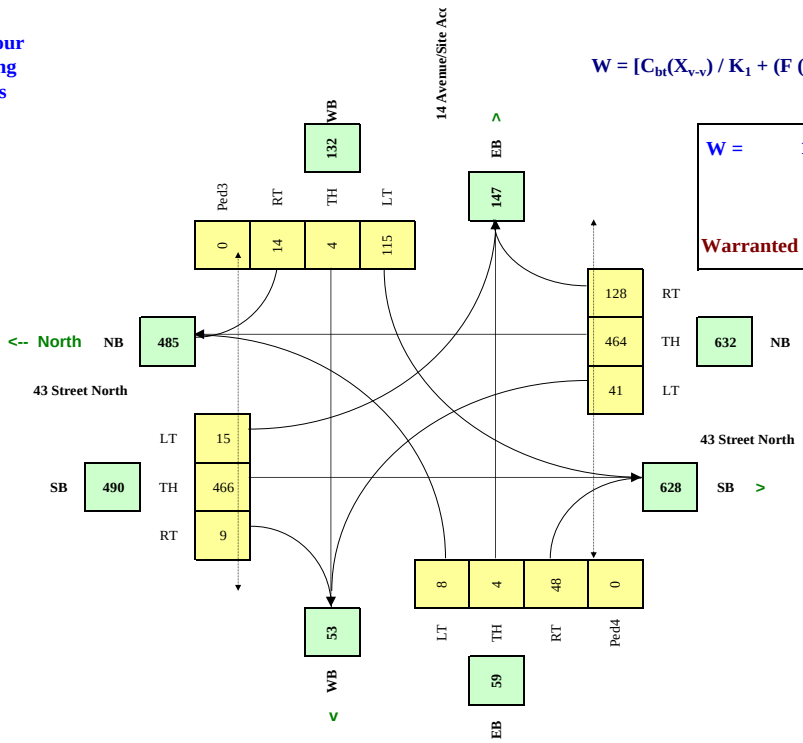
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
43 Street North	NS	70	10.0%	n	0.0
14 Avenue/Site Access	EW	50	10.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	76	582	236	28	421	16	53	2	6	4	7	21				
8:00 - 9:00	76	582	236	28	421	16	53	2	6	4	7	21				
11:00 - 12:00	46	349	142	17	253	10	32	1	4	2	4	13				
12:00 - 13:00	11	293	35	4	392	3	127	4	15	9	1	53				
16:00 - 17:00	17	489	58	7	653	4	212	6	25	14	2	89				
17:00 - 18:00	17	489	58	7	653	4	212	6	25	14	2	89				
Total (6-hour peak)	243	2,784	765	91	2,793	53	689	21	81	47	23	286	0	0	0	0
Average (6-hour peak)	41	464	128	15	466	9	115	4	14	8	4	48	0	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	133	133	0
		Veh	Ped

Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v3H © 2007 Transportation Association of Canada

City of Lethbridge/Lethbridge County - Traffic Signal Warrant Analysis

Main Street (name)	43 Street North	Direction (EW or NS)	NS
Side Street (name)	14 Avenue/Site Access	Direction (EW or NS)	EW
Quadrant / Int #	3	Comments	60% of AM peak hour utilized for the period from 11:00 AM to 12:00 PM and 60% of PM peak hour utilized for the period from 12:00 PM to 01:00 PM
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Lethbridge/Lethbridge County
City:	Lethbridge
Analysis Date:	2018 Aug 12, Sun
Count Date:	Future 2037 (With Site Traffic)
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
43 Street North	NB	0	0	0	1	0	0	1,350	1
43 Street North	SB	0	0	0	1	0	0	5,200	1
14 Avenue/Site Access	WB	1	0	0	0	1	0		
14 Avenue/Site Access	EB	0	1	0	0	0	1		

Are the 14 Avenue/Site Access WB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	90,000
Central Business District	(y/n)	n

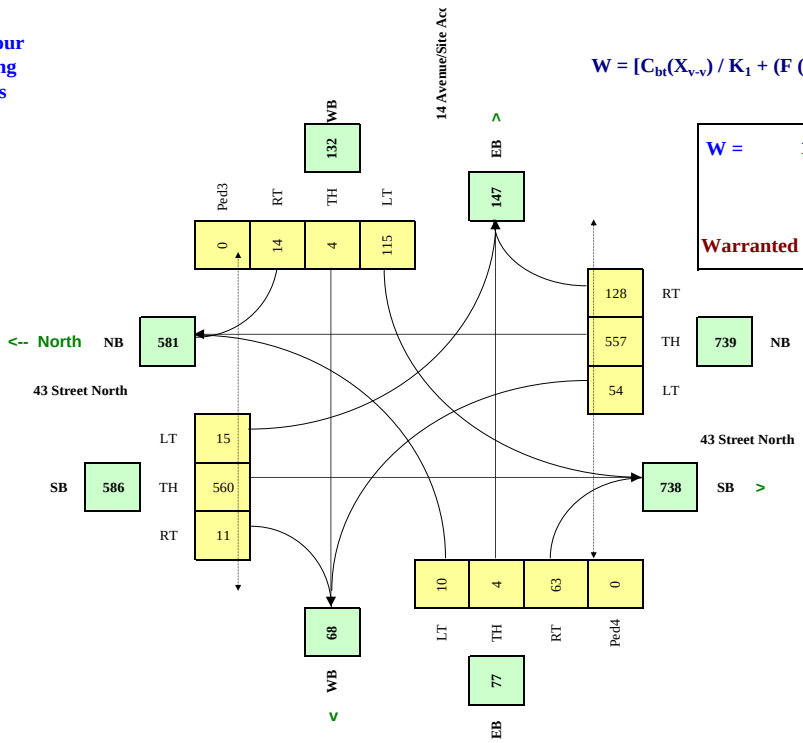
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
43 Street North	NS	70	10.0%	n	0.0
14 Avenue/Site Access	EW	50	10.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	101	670	236	28	532	21	53	2	6	4	7	27				
8:00 - 9:00	101	670	236	28	532	21	53	2	6	4	7	27				
11:00 - 12:00	61	402	142	17	319	13	32	1	4	3	4	16				
12:00 - 13:00	14	370	35	4	456	3	127	4	15	11	1	71				
16:00 - 17:00	23	616	58	7	760	4	212	6	25	18	2	119				
17:00 - 18:00	23	616	58	7	760	4	212	6	25	18	2	119				
Total (6-hour peak)	**323**	**3,344**	**765**	**91**	**3,359**	**66**	**689**	**21**	**81**	**58**	**23**	**379**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**54**	**557**	**128**	**15**	**560**	**11**	**115**	**4**	**14**	**10**	**4**	**63**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	174	174	0
		Veh	*Ped*

Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v3H © 2007 Transportation Association of Canada

APPENDIX B

CHINOOK INDUSTRIAL PARK ASP - STORMWATER MANAGEMENT PLAN

February 3, 2023

Prepared for:
Sumus Property Group Ltd.

Prepared by:
Stantec Consulting Ltd.

Project Number:
116549063

This document entitled Chinook Industrial Park ASP - Stormwater Management Plan was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Sumus Property Group Ltd. (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by: Emilie Hewko

Emilie Hewko

Reviewed by: _____

Ted Larson, P.Eng

Approved by: _____

Alan Ashcroft, P.Eng

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Introduction

Stantec Consulting Ltd. (Stantec) was retained by Sumus Property Group Ltd. (Sumus) to provide stormwater management planning services for the Chinook Industrial Park Area Structure Plan (ASP).

This document provides the design basis for the proposed stormwater management plan, including analysis details and summaries of hydraulic modeling performed to support the Chinook Industrial Park Area Structure Plan.

1 SITE DESCRIPTION

1.1 Study Area

The Chinook Industrial Park (study area) is in the County of Lethbridge. The study area is bound by Township Road 92 to the north, 43rd Street N (City of Lethbridge boundary) to the west, the St. Mary River Irrigation District (SMRID) canal to the east, and the Rave Industrial Park to the south. The study area boundary is shown on **Figure 1** for reference.

There is an existing Stormwater Management Facility (SWMF), Pond 100, located in the southeast corner of the study area which receives drainage from the existing southern stormwater catchment area. A current agreement between the County and SMRID exists for Pond 100 which requires the following before a pumped discharge of stormwater into the canal will be permitted:

1. Water must be sampled, tested, and meet SMRID water quality standards.
2. Available conveyance capacity within the canal must be confirmed prior to operation of pump system.

Based on the above, ponds will need to operate as zero-release facilities, storing an entire 1:100-year storm event until permission is granted by SMRID to discharge into the canal. A conveyance agreement between Lethbridge County and St. Mary River Irrigation District (SMRID) will be required to manage stormwater in the post-development condition.

1.2 Site Topography

The study area topography was determined using Altalis 7.5m LiDAR data. In general, there is a high point in the site topography which divides the study area into two major stormwater subcatchment areas (north and south). The north catchment area drains northeast towards the SMRID canal and Township Road 92. The south catchment area drains to Pond 100. **Figure 2** shows the topography throughout the study area.

2 Existing Drainage Conditions

Within the project boundary, the north subcatchment, N1, has an area of 62.3 ha, and can be characterized as an undeveloped parcel with overland sheet flow directed generally towards the SMRID canal. The southern subcatchment, S1, has an area of 44.3 ha, is substantially developed, and contains the Rave Industrial Park. For S1, the existing runoff is conveyed via ditches and drains into the existing detention pond (Pond 100). The existing SWMF (Pond 100) currently has a storage capacity of 37,270 m³ according to the *Rave Industrial Stormwater Management Plan* (Martin Geomatics, 2013). The existing stormwater infrastructure and drainage patterns are shown on **Figure 3** for reference.

3 Proposed Drainage Conditions

In the post-development condition, the Chinook Industrial Park will straddle two major subcatchment areas, each draining to a dedicated detention pond, Pond 100 or Pond 200. The proposed stormwater infrastructure and drainage patterns can be seen on **Figure 4**.

The proposed drainage system in the post-development condition will utilize a dual drainage approach, which is comprised of a minor system and a major system. The minor system, which consists of catch basins, storm sewers, and manholes has been designed to accommodate the runoff resulting from the 1:5-year design storm. In general, each private development within the study area will require onsite storage and will be restricted to a 40 L/s/ha release rate (during a 1:5-year design storm). The release rate restriction will benefit the project by reducing sewer pipe sizes in the minor system. However, a few areas along the east edge of the study area boundary will not be restricted and will be serviced via swales instead, conveying runoff to the proposed ponds.

The major system includes overland flow paths, swales, ditches, and stormwater detention ponds. The major system has been designed to manage runoff resulting from the 1:100-year design storm.

The ponds are designed to contain the entire 1:100-year design storm and will only discharge into the SMRID canal after all the requirements noted in **Section 1.1** have been met. Each of the ponds are also expected to require a dedicated lift station to pump into the SMRID canal, based on topographic constraints.

4 HYDROLOGIC ASSESSMENTS

4.1 Computer Model Analysis (Major System)

A hydrologic model was developed for the post-development condition using PCSWMM computer modelling software. Intensity-duration-frequency (IDF) storm data for the City of Lethbridge was used as the basis for the design storms used in the analysis. The hydrologic model was evaluated using 1:5-year 24-hour and 1:100-year 24-hour design storms, with a simulation duration of 48 hours, using the Chicago Distribution. The Chicago Distribution is commonly used for stormwater analysis of urban areas. Subcatchment boundaries were determined based on the proposed grading concept for the development.

The hydrologic models take into consideration the site topography, soil characteristics, surface imperviousness, surface depression storage, and precipitation. Soil infiltration is accounted for by using the Green Ampt Infiltration method. The infiltration parameters in the models are those associated with topsoil/loam. The hydrologic parameters of the models are shown below in **Table 1**, which are typical values used for the City of Lethbridge. The post development model used 80% imperviousness for all catchments, except for roadways/easements, which are assumed 50% impervious. It has been assumed that each private parcel will be required to have onsite storage and will be restricted to a maximum release rate of 40 L/s/ha during the 1:5-year design storm.

Table 1 - Model Design Parameters

Description – Design Parameters	Value
Soil Suction (Loam, mm)	88.9
Hydraulic Conductivity (mm/hr)	3.4
Initial Deficit	0.2
Depression Storage – Impervious Surfaces (mm)	1.57
Depression Storage – Pervious Surfaces (mm)	4.67
Manning’s n Roughness – Impervious Surfaces	0.015
Manning’s n Roughness – Pervious Surfaces	0.15

4.2 Computer Model Analysis Results (Major System)

All the runoff flows from the Chinook Industrial Park will be directed to one of two stormwater detention ponds, which will provide the storage required to retain an entire 1:100-year design storm.

The south catchment has a contributing area of approximately 75.5 ha. The existing storm pond in the southeast corner of the study area (Pond 100) will be upgraded to an approximate storage volume of 82,000 m^3, accommodating the larger catchment and increased runoff flows.

The north catchment has a contributing area of approximately 31.8 ha. The north catchment will have a new dedicated detention pond (Pond 200), with an approximate storage capacity of 30,000 m^3, constructed in the northeastern corner of the study area.

Table 2 summarizes the model results for estimated temporary storage volumes required per private parcel, due to the 40 L/s/ha release rate restriction.

Table 2 - Parcel Storage Summary

Drainage Area	Subcatchment		Private Parcel Storage 1-100-year Storm (m^3)
	ID	Area (ha)	
South - Pond 100	**Phase 1 Area**	15.4	6,758
	AP110-1	5.8	2,699
	AP110-2	2.0	1,014
	AP120-1	5.2	2,427
	AP120-2	1.3	687
	AP120-3	2.8	1,359
	AP130-1	2.9	1,256
	AP130-2	2.4	1,053
North - Pond 200	**AP210-1**	7.0	3,474
	AP210-2	2.2	1,156
	AP220-1	0.6	276
	AP220-2	2.1	942
	AP220-3	1.1	527
	AP230-1	1.3	558
	AP230-2	2.0	907
	AP230-3	1.7	802

4.3 Minor System Design

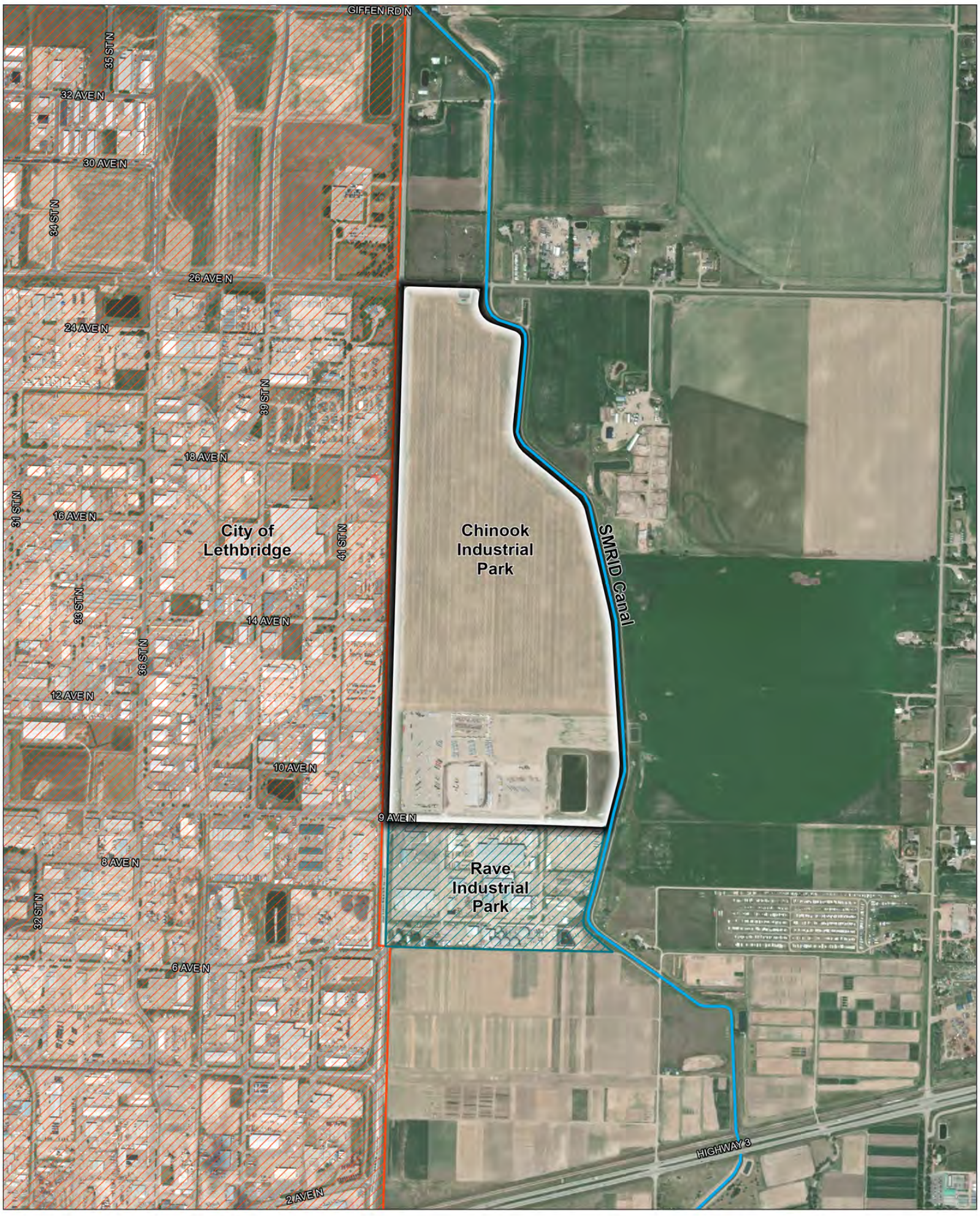
A minor storm sewer system has been designed for a 1:5 year rainfall event using the following unit rates as outlined in this report and the City of Lethbridge Design Standards:

- Roadways: 90L/s/Ha
- Private Parcels: 40L/s/Ha (Restricted 1:5 Year Outflow)

Given the parcel coverage (by buildings) in general industrial areas is typically quite small, large parking and storage areas can be utilized to reduce flows, minimizing the size of downstream infrastructure. For private parcels, this will require that future parcel designs provide some stormwater attenuation and outflow control structures as part of permitting process. Sediment control through the implementation of sumps and or other control measures to collect pollutants should be reviewed at detailed design.

5 Conclusion

The stormwater management concept for the proposed Chinook Industrial Park development provides functional stormwater servicing that can contain a 1:100-year storm, using two detention ponds, without draining into the SMRID canal until conditions meet SMRID requirements. Each of the ponds will require a dedicated lift station to pump into the SMRID canal. A conveyance agreement between Lethbridge County and St. Mary River Irrigation District (SMRID) will be required to manage stormwater in the post-development condition. Restricting private parcels to a 40 L/s/ha release rate will reduce the size of underground sewer infrastructure. The preceding stormwater management plan has been developed to support the overall Chinook Industrial Park Area Structure Plan. The calculated storage volumes and sewer pipe sizes are preliminary at this stage and will be revisited during detailed design.

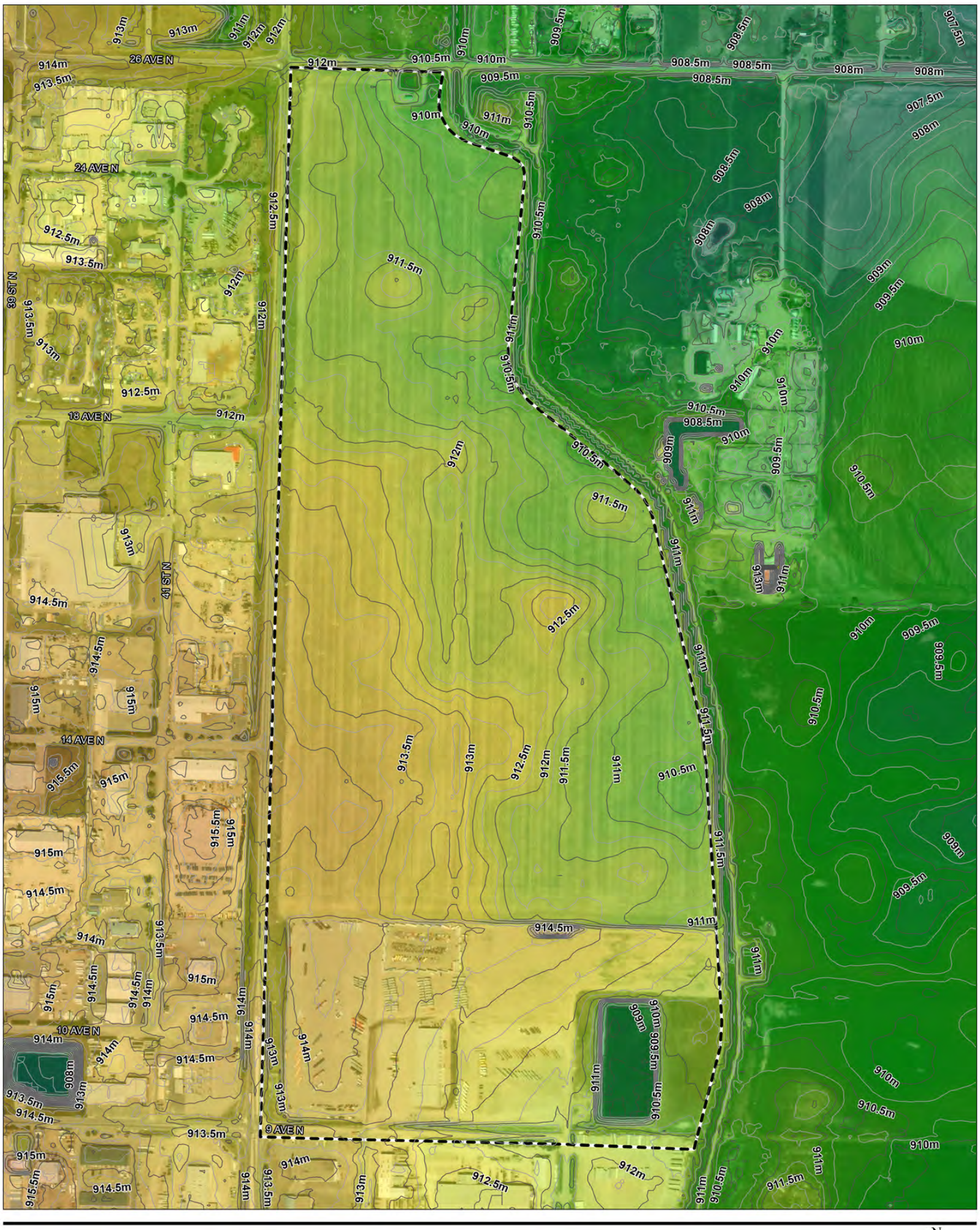


Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Data Sources: City of Lethbridge
3. Background: Lethbridge County, Maxar, Esri Canada, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NRCan, Parks Canada

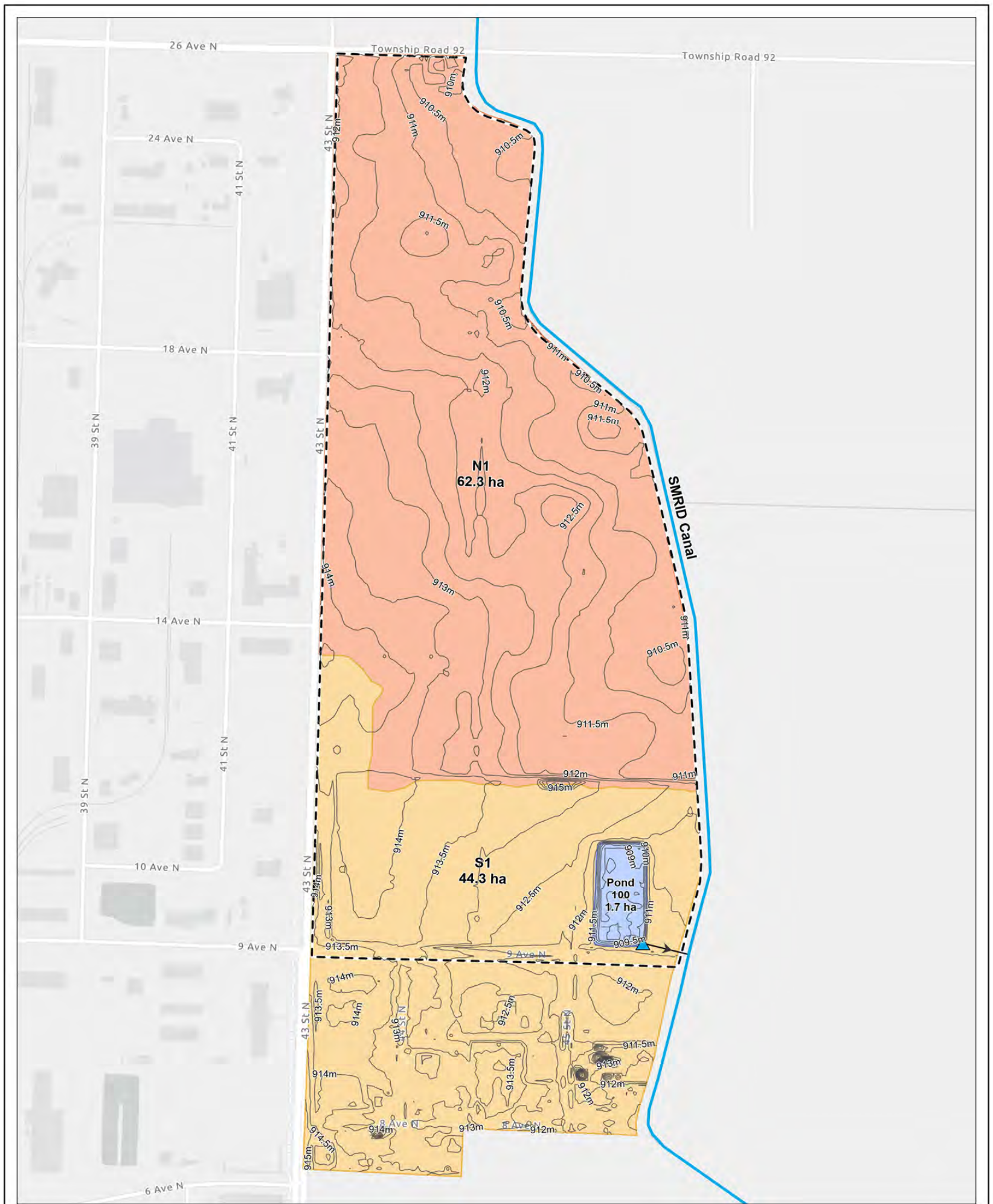
Project Location County of Lethbridge, Alberta	Prepared by EH on 2/3/2023 TR by MA on 2/3/2023 IR by BS on 2/3/2023
Client/Project	116549063
Sumus Chinook Industrial Park ASP Stormwater Management	
Figure No.	
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Title	
Project Location	

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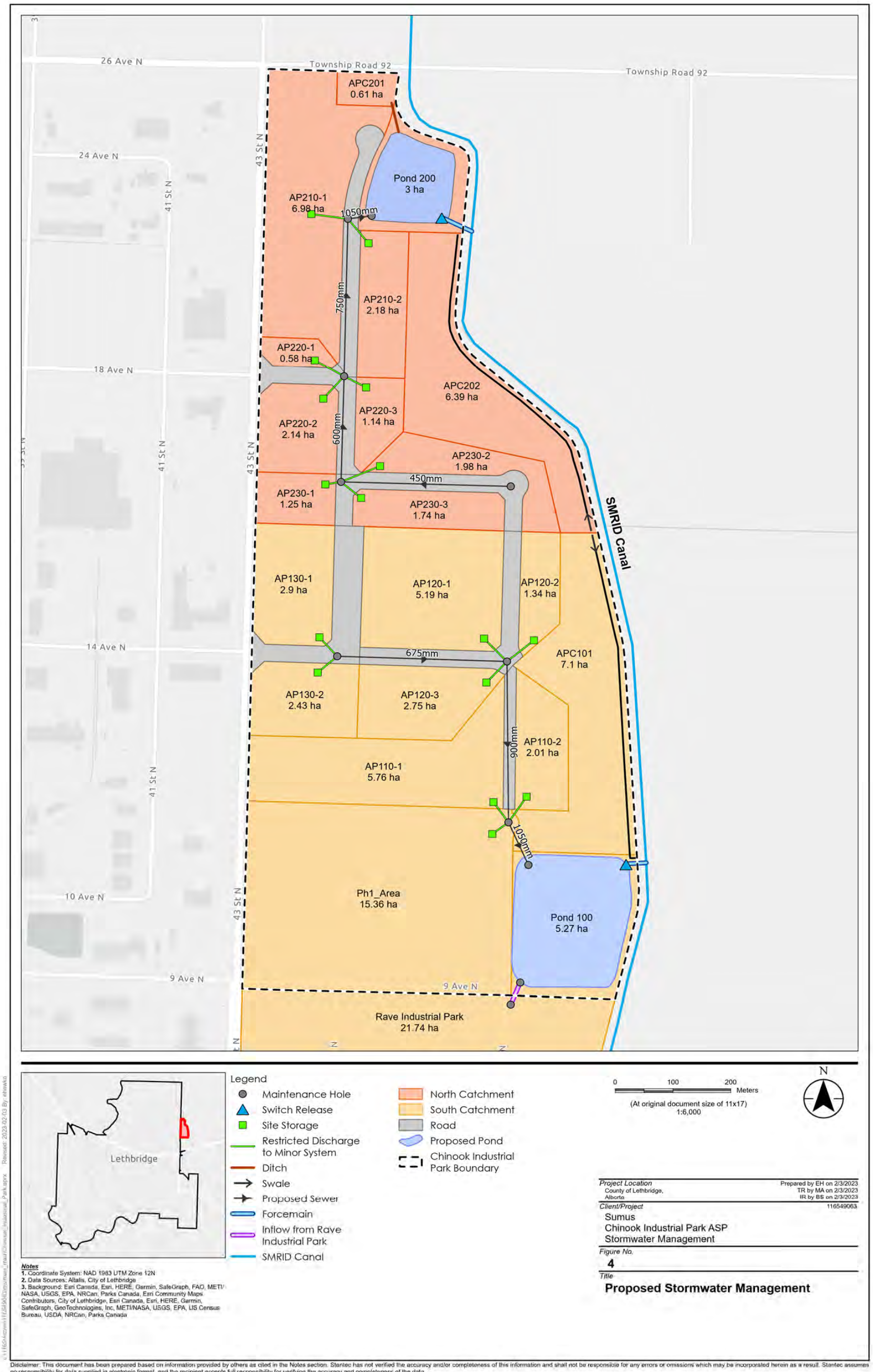
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APPENDIX C

Geotechnical Evaluation
Chinook Industrial Park Area Structure Plan
Within W ½ of Section 10 TWP 9 RGE 21 W4M
Lethbridge County, Alberta



PRESENTED TO
Sumus Property Group Ltd.

APRIL 2023
ISSUED FOR USE
FILE: ENG.LGEO04625-01.001

Tetra Tech Canada Inc.
442 - 10 Street N.
Lethbridge, AB T1H 2C7 CANADA
Tel 403.329.9009 Fax 403.328.8817

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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Sumus Property Group Ltd., and his agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Sumus Property Group Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Tetra Tech's Limitations on Use of this Document are provided in Appendix A of this report.

1.0 INTRODUCTION

This report presents the results of a geotechnical evaluation conducted by Tetra Tech Canada Inc. (Tetra Tech) for the proposed Phase 2 and Phase 3 development of the Chinook Industrial Park Area Structure Plan (ASP) to be located in the Lethbridge County, Alberta (Figure 1).

The objective of this evaluation was to determine the general subsurface stratigraphy and groundwater conditions in the area of the proposed development and to provide general recommendations for the geotechnical aspects of the development. This evaluation has been conducted with limited project details available at this stage and with an understanding that a site-specific geotechnical evaluation will be conducted after further project details become available for each of the proposed building structures.

The scope of work for the geotechnical evaluation was set out in Tetra Tech's proposal (PENG.LGEO04625-01) dated January 17, 2023. The scope of work for this evaluation comprised the drilling of 15 boreholes, a laboratory program to assist in classification of the subsurface soils, and provision of this geotechnical report with the following design and construction recommendations:

- Design parameters for shallow foundations and below-grade structures.
- Design parameters for deep foundation systems.
- Design and installation of floor slabs-on-grade.
- Design and construction of stormwater facilities.
- Site classification for seismic site response.
- Trench excavation and backfill.
- General site grading.
- Volumetric changes of soil due to changes in moisture content and/or frost.
- Mitigation for high water table, if encountered.
- Construction of subgrades, backfill materials, and compaction.
- Concrete type for structured elements in contact with soil.
- Asphalt pavement structure as per the Lethbridge County Engineering Guidelines and Minimum Servicing Standards.

Tetra Tech has also conducted a Phase I Environmental Site Assessment (ESA) for the proposed development. The findings of the Phase I ESA have been provided in a separate report.

Authorization to proceed with the evaluation was provided by Mr. Michael Kelly, of MSK Developments, on behalf of Sumus Property Group Ltd. (Sumus), via a signed Services Agreement dated January 23, 2023.

2.0 PROJECT DESCRIPTION AND SCOPE OF WORK

The proposed Phase 2 and Phase 3 development will be located within the west half of Section 10 TWP 9 RGE 21 W4M. Tetra Tech understands that Phase 2 and Phase 3 are adjacent and to the north of Phase 1A and 1B of the Chinook Industrial Park, which is currently developed and serviced.

Based on the information provided by the client, it is understood that the proposed Phase 2 and Phase 3 project will comprise an industrial/commercial business park with major development including industrial lots, utilities and street infrastructure, as well as stormwater management facilities. The total planned area of Phase 2 and Phase 3 is approximately 60.12 hectares.

It is understood that the proposed development will be designed and constructed to the Lethbridge County Engineering Guidelines and Minimum Servicing Standards.

Further details of the proposed development, including building locations, foundation loads, floor elevations, and locations of the other facilities such as roadways and stormwater management facilities, are not available at the time of preparation of this report.

3.0 GEOLOGY

Based on Tetra Tech's previous experience near the project site and available surficial geological map by Shetsen[1], the native soil at the project site is expected to consist of lacustrine silts and clays which were deposited in the proglacial Lethbridge Lake, underlain by glacial upper till unit that forms the Lethbridge Moraine. The glacial upper till is of even thickness, consisting of unsorted mixture of clay, silt, sand, and gravel with local water-sorted material overlying bedrock. The site assessment results reported herein are generally consistent with the published data; however, bedrock was not encountered in the boreholes up to their termination depths.

4.0 FIELD AND LABORATORY WORK

4.1 Geotechnical Fieldwork

The fieldwork for this evaluation was carried out on February 2 and 3, 2023, using a truck-mounted drilling rig, contracted from Chilako Drilling Services Ltd. of Coaldale, Alberta. The rig was equipped with 150 mm diameter solid stem continuous flight augers. Tetra Tech's field representative was Mr. Syed Alam, E.I.T. Buried utility locating was carried out through Alberta One-Call and a private utility locator, contracted by Tetra Tech (LandScan Locating Ltd.).

During the fieldwork, a total of 15 boreholes, designated as 23BH001 through 23BH015, were drilled within the proposed development footprint to depths varying from 6.6 m to 9.6 m below the existing ground surface. The borehole locations are shown on Figure 2.

The borehole locations were laid out on site by Tetra Tech using a handheld GPS. The borehole ground elevations were surveyed by Tetra Tech via a laser level and a rod. The south side of a survey stake denoted as 'FD.1', located on the southwest corner of the site (and shown on Figure 2), was used as a benchmark; with an assumed elevation of 1000.00 m. The borehole coordinates (with accuracy of ±2 m) and the surveyed ground elevations are presented on the borehole logs in Appendix B and summarized in Table A.

[1] Shetsen 1989. Quaternary Geology, Southern Alberta. Alberta Research Council, Bulletin No. 53.

Table A: Summary of Borehole Depths

Borehole No.	Existing Ground Elevation (m)[2]	Easting (m)[1]	Northing (m)[1]	Borehole Depth Below Existing Ground Surface (m)	Standpipe Depth Below Existing Ground Surface (m)
23BH001	999.61	371849	5508582	9.6	9.6
23BH002	997.44	372128	5508641	6.6	6.6
23BH003	996.71	372397	5508601	9.6	9.6
23BH004	996.60	372340	5508804	6.6	6.6
23BH005	998.40	372087	5508832	6.6	6.6
23BH006	999.49	371894	5508792	6.6	6.6
23BH007	999.13	371835	5509001	6.6	6.6
23BH008	997.70	372126	5509018	9.6	9.6
23BH009	996.20	372360	5508990	6.6	6.6
23BH010	996.93	372159	5509196	6.6	6.6
23BH011	998.04	371906	5509221	6.6	6.6
23BH012	997.26	371849	5509493	6.6	6.6
23BH013	997.22	372083	5509440	9.6	9.6
23BH014	995.95	372080	5509659	6.6	6.6
23BH015	996.41	371926	5509752	9.6	9.6

Notes: [1] Coordinates are based on UTM System Zone 12.
[2] Elevations are not geodetic. They are referenced to a site benchmark.

In all the boreholes drilled, disturbed grab samples were obtained at depth intervals of approximately 600 mm. Standard Penetration Tests (SPT) using an automatic SPT hammer (with an approximate efficiency of 90%) were completed at intervals of 1.5 m. All soil samples were visually classified in the field, and the individual soil strata and the interfaces between them were noted. The borehole logs are presented in Appendix B. An explanation of the terms and symbols used on the borehole logs is also included in Appendix B.

Slotted 25 mm diameter polyvinyl chloride (PVC) standpipes were installed in all the boreholes to monitor the short-term groundwater levels. Auger cuttings were used to backfill around the standpipes and the boreholes were sealed at the ground surface with bentonite chips.

4.2 Laboratory Program

Soil classification tests, including natural moisture content, Atterberg Limits, grain size distribution (hydrometer), soluble sulphate content, moisture-density relationship (proctor), and constant head hydraulic conductivity (also referred to as permeability) tests were subsequently performed in the laboratory on selected samples collected from the boreholes to aid in the determination of engineering properties. The results of the laboratory tests are presented on the borehole logs and the test reports for hydrometer, proctor and permeability are included as Appendix C.

5.0 SITE CONDITIONS

5.1 Location and Surface Features

The project site for Phase 2 and Phase 3 of the Chinook Industrial Park is located within the west half of Section 10 TWP 9 RGE 21 W4M and is bounded by 43 Street North to the west; 9 Avenue North to the south; the St. Mary River Irrigation District (SMRID) Canal to the east; and Township Road 92 to the north.

According to information provided by the client, the proposed Phase 2 and Phase 3 site comprises of two (2) lots in the northern portion of the Chinook Industrial: Lot 5 Block 1 Plan 1113171, and Lot 1 Block 1 Plan 0013201.

Lot 5 Block 1 Plan 1113171 is the larger half, comprising of 59.56 hectares of undeveloped farmland.

The remaining portion is Lot 1 Block 1 Plan 0013201, which is a 0.56-hectare portion of land (i.e., Lethbridge Regional Water Services commission lot) with a small building that primarily houses a water filling station.

The project site is relatively flat with drainage generally tending to the southeast except for the northern portion where there is an existing break in topography with the natural drainage tending in the northeast direction.

At the time of the geotechnical fieldwork, the site was sparsely covered with snow with the upper 0.3 m of the ground estimated to be frozen. This thickness of the frozen ground is expected to vary across the site.

5.2 Historical Aerial Photograph Review

As part of the evaluation, Tetra Tech reviewed historical aerial photographs and Google Earth Pro images of the proposed development site and surrounding area from 1950 to 2023. The following observations were noted:

- The proposed Phase 2 and Phase 3 project site has remained as undeveloped farmland since 1950 to date except for the construction of the water filling station in the northeast corner; estimated to have been constructed between 1999 and 2011.
- A winding irrigation channel exists at the eastern boundary with agricultural lands to the east and north.
- The existing 43 Street North was observed in all of the reviewed aerial photographs; thus, its construction is expected to have undertaken prior to 1950. 43 Street North borders the western boundary of the project site with undeveloped agricultural lands to its west in the 1950s; however, from 1979, industrial/commercial developments were observed in the reviewed photographs on the west side of 43 Street North.
- Additional industrial/commercial developments were observed in aerial photographs after 1979, most notably the Rave Industrial Park located at the south boundary, which was likely developed sometime between 1985 and 1991.
- Between 2012 and 2022, development of industrial lots comprising Phase 1A and 1B of the ASP was observed in the aerial photographs to the south of the Phase 2 and Phase 3 project site, with a stormwater pond in the southeast corner.

5.3 Mining Activity

Tetra Tech reviewed the possible existence of mine workings within the boundary of the proposed development area, including a review of the Alberta Energy Regulator (AER) coal mine mapping archive and other literature contained in Tetra Tech's library. The review indicated that no mine workings exist within the proposed development area.

5.4 Background Geotechnical Review

As part of the site assessment, Tetra Tech reviewed the subsurface conditions of boreholes within 450 m of the project site, available in Tetra Tech's library. The review indicates that subsurface conditions encountered on site, are generally consistent with those encountered earlier in the surrounding areas.

6.0 SUBSURFACE CONDITIONS

The general subsurface stratigraphy of the site comprised of a surficial layer of topsoil underlain by native clay and clay till deposits. The following subsections provide a summary of the stratigraphic units encountered at the specific borehole locations across the site. A more detailed description is provided on the borehole logs attached in Appendix B.

All noted depths in the following subsections refer to depth below the ground surface that existed at the time of the fieldwork.

6.1 Soils

6.1.1 Topsoil

A surficial layer of topsoil was encountered at all the borehole locations, with a thickness ranging from 20 mm to 130 mm. The topsoil was generally described as clay, silty, sandy, frozen to moist, and dark brown with trace rootlets and organics. Due to previous grading activities (agricultural practices) and depositional processes (i.e., wind), the thickness of the topsoil layer is expected to vary across the project site.

6.1.2 Clay

Native clay was encountered in all the boreholes underlying the topsoil and extending to depths ranging from 0.4 m and 2.0 m below ground surface. The clay was generally described as silty, some sand to sandy, damp to very moist, low to medium plastic, firm to very stiff, and brown. Silt and sand lenses/pockets, precipitates, and occasional high plastic clay inclusions were noted in the clay. Moisture contents of the selected clay samples varied from 7.7% to 23.0%. Two (2) Atterberg Limits tests conducted on clay samples indicated Plastic Limits of 14% and 15%; and Liquid Limits of 31% and 35%; indicative of low to medium plasticity. One (1) hydrometer test indicated a particle size distribution of the sand, silt, and clay size as 31%, 48%, and 21%, respectively.

SPT “N” values indicated between 5 and 10 blows per 300 mm of penetration, indicative of firm to stiff consistency.

6.1.3 Clay Till

Clay till was encountered beneath the native clay at depths varying from 0.4 m to 2.0 m below the existing ground surface in all the boreholes and extended to the borehole termination depths. The clay till was generally described as silty, some sand to sandy, trace gravel, damp to very moist, firm to very stiff, low to high plastic, and brown to dark brown with grey mottling. Silt and sand pockets up to 100 mm thick, precipitates, coal and oxide specks/staining or coal fragments were encountered within the clay till. Moisture contents of the selected samples of the clay till varied from 9.9% to 32.0%. Five (5) Atterberg Limits tests conducted on the clay till samples indicated Liquid Limits of 36%, 37%, 36%, 61%, and 29%; and Plastic Limits of 14%, 15%, 15%, 23%, and 12%; indicative of low to high plastic. High plasticity was observed only in sample D6 recovered from an approximate depth of 9.0 m from 23BH013. One (1) hydrometer test indicated a particle size distribution of the sand, silt, and clay size as 31%, 48%, and clay fraction as 21%, respectively.

SPT “N” values in the clay till ranged between 4 and 22 blows per 300 mm of penetration, indicative of firm to very stiff consistency.

Although not encountered in the boreholes, till deposits commonly contain cobbles and occasional boulders, which may be encountered during construction excavation, if any, and during installation of pile foundation.

6.2 Borehole Sloughing and Groundwater Conditions

During the field drilling, minor sloughing was encountered in 23BH009 and 23BH014 at depths of 6.1 m and 6.0 m respectively, below the existing ground. At the time of drilling, groundwater seepage was encountered in 23BH009, 23BH013, and 23BH015 at depths of 1.5 m, 7.8 m, and 6.3 m below the existing ground surface, respectively. Standpipes were installed in all the boreholes after completion of drilling. The groundwater levels were measured in the installed standpipes 7 to 8 days after completion of drilling on February 10, 2023. Table B summarizes the groundwater monitoring data.

Table B: Groundwater Monitoring Data – February 10, 2023

Borehole Number	Depth of Standpipe (m)	Borehole Elevation** (m)	Depth to Groundwater on February 10, 2023* (m)	Groundwater Elevation** (m)
23BH001	9.6	999.61	8.26	991.35
23BH002	6.6	997.44	6.37	991.07
23BH003	9.6	996.71	2.97	993.74
23BH004	6.6	996.60	5.83	990.77
23BH005	6.6	998.40	5.70	992.70
23BH006	6.6	999.49	6.42	993.07
23BH007	6.6	999.13	4.92	994.21
23BH008	9.6	997.70	5.20	992.50
23BH009	6.6	996.20	1.54	994.66
23BH010	6.6	996.93	3.65	993.28
23BH011	6.6	998.04	5.72	992.32
23BH012	6.6	997.26	Dry	-
23BH013	9.6	997.22	3.19	994.03
23BH014	6.6	995.95	2.05	993.90
23BH015	9.6	996.41	4.54	991.87

* February 10, 2023, is approximately 7 to 8 days after the completion of the borehole drilling
**Elevations are not geodetic and are referenced to a site benchmark

Based on the available groundwater information, groundwater levels were measured at depths varying from 1.54 m to 8.26 m below the existing ground surface. Groundwater levels within 3.0 m of the existing ground surface were measured in a total of three boreholes (23BH003, 23BH009, and 23BH014) located along the east boundary of the project site.

The water levels measured in the standpipes may not have stabilized at the time of the last measurement reported above. Groundwater levels may fluctuate seasonally (seasonally high in the late spring and early summer) and in response to climatic conditions; thus, they may be encountered at different depths when construction commences. Higher groundwater levels may be considered in the event construction is to occur during the late spring season and early summer. some of the observed groundwater level/seepage and sloughing noted in the boreholes is expected to be due to the presence of wet/saturated sand or silt seams within the clay or clay till.

7.0 GEOTECHNICAL RECOMMENDATIONS

The following geotechnical recommendations provided in this report are valid for the project details discussed in Section 2.0. The recommendations that follow provide varying options intended to aid in the development of project concepts and specifications.

The following recommendations are based on subsurface conditions encountered in the boreholes drilled at the project site. Note that geological conditions are innately variable. At the time of preparation of this report, information on the subsurface stratigraphy was available only at discreet borehole locations. In order to develop design recommendations from this information, it is necessary to make some assumptions concerning conditions other than those present at the borehole locations.

The recommendations are based on the understanding and condition that Tetra Tech will be retained to review the relevant aspects of the final design (drawings and specifications) and to conduct such field reviews as are necessary to ensure compliance with the geotechnical aspects of the 2019 National Building Code – Alberta Edition (Building Code), Lethbridge County Engineering Guidelines and Minimum Servicing Standards, this report, and the final plans and specifications. Tetra Tech accepts no liability for any use of this report in the event that Tetra Tech is not retained to provide these review services.

Pursuant to Sections 2.2 and 2.4 of the Building Code, the proposed project will require compliance with the professional design and review requirements set out in Section 2.4 of the Building Code. These require that a geotechnical engineer be retained as a Registered Professional of Record to provide such field reviews as are necessary to certify compliance with the Building Code and to ensure that the geotechnical aspects of the project are constructed so as to substantially comply with the plans and specifications, as well as the requirements of this report.

Given that this geotechnical evaluation was completed with a limited number of boreholes and limited project details, it is advised that the recommendations presented in this report be confirmed and/or updated, as required, by conducting a site-specific geotechnical evaluation prior to design and construction of each building/development.

7.1 General

Based on the subsurface conditions encountered in the boreholes, potential geotechnical constraints exist within the site that could impact the proposed design and construction, including:

- The presence of a shallow groundwater table (as shallow as 1.54 m, 2.05 m, 2.97 m, and 3.19 m below the existing ground surface in 23HB009, 23BH014, 23BH003, and 23BH013, respectively).
- The presence of frost-susceptible soils.
- The presence of low to medium plastic clay/clay till (with occasional high plastic) below the topsoil, with firm to very stiff consistency.

On the premise of subsurface conditions encountered in the boreholes, the potential for methane generation is not expected, provided the topsoil containing organics is completely removed from potential building footprint areas and approximately 5.0 m beyond potential building footprint areas.

Considering the groundwater levels measured in the standpipes, temporary and permanent dewatering measures would be required, depending on the depth of excavation, and particularly in areas of shallow groundwater along the east boundary of the project site.

Clay till with high plasticity (i.e., Liquid Limit of 61% and Plasticity Index of 38%) was encountered in 23BH013 at a depth of 9.1 m below the existing ground surface. The high plastic clay typically has relatively higher potential of swelling and shrinkage upon wetting and drying; thus, the performance of settlement-sensitive structures may be impacted if the high plastic clay is present immediately beneath them. The presence of high plastic clay, if any, should be assessed during the site-specific geotechnical evaluation within the footprint of the settlement-sensitive structures.

All foundation design recommendations presented in this report are based on the assumption that an adequate level of monitoring by Tetra Tech will be provided during construction and that all construction will be carried out by suitably qualified contractors, experienced in foundation and earthworks construction. An adequate level of monitoring is considered to be:

- For shallow foundations; inspection of bearing surfaces prior to placement of concrete or mudslab, and design review during construction.
- For deep foundations; full-time monitoring and design review during construction.
- For earthworks; full-time monitoring and compaction testing.

Suitably qualified persons, independent of the contractor, should carry out all such monitoring. One of the purposes of providing an adequate level of monitoring is to check that recommendations, based on data obtained at discrete borehole locations, are relevant to other areas of the site.

7.2 Site Development

7.2.1 Topsoil Depth

The initial topsoil stripping depth should be considered as being of particular importance with regard to site subgrade grading design elevations. Based on the findings of the field drilling program, the surficial topsoil (A Horizon) layer thickness generally varies from 20 mm to 130 mm; however, may be variable in thickness due to historical cultivation practices of the land surface and/or depositional processes (i.e., wind). However, consideration can be given to incorporating the underlying B Horizon layer (organic content <5%) into the fill mass to be removed during general site grading. Full-time monitoring by experienced personnel is recommended in order to avoid over-stripping and to ensure appropriate material mixing and placement. To accurately estimate the topsoil stripping volume (if required), it is recommended that a site-specific field drilling program be conducted.

7.2.2 Lot Grading

The lot grading should be designed and carried out to the current Lethbridge County Engineering Guidelines and Minimum Servicing Standards.

All lots should be graded for drainage at a minimum gradient of 3.0%. Backfill materials and compaction requirements, as to be discussed in Section 7.2.3, should be followed. Where encountered, all organics, localized soft and/or wet soils, or deleterious material must be removed to expose the underlying suitable clay soil. The excavated areas must be backfilled with general engineered fill.

If the development is to consider a raised site grading, additional settlement due to consolidation of the fill and the native soil should be expected and should be considered in the design. After the completion of the raised site grading, the construction of structures supported on raised grade should be delayed to allow for the majority of the consolidation settlement to occur prior to construction.

7.2.3 Backfill Materials and Compaction

The existing site soils comprising the predominantly low to medium plastic clay and clay till are considered suitable for use as both landscape fill and general engineered fill materials, as defined in Appendix D. Any soil containing deleterious materials should be removed from site. Sand, silt, and high plastic clay soils, if any, should be separated and used for landscape fill. The final decision on approved backfill materials should be made during site construction.

The moisture content of the site soil materials is expected to be variable with respect to the optimum moisture content (OMC); therefore, it is anticipated that moisture conditioning will be required at the site for proper backfill placement. The earthworks contractor should make their own estimate of the requirements for moisture conditioning to the recommended standards and should consider such factors as weather and construction procedures. A contingency for importation of general engineered fill is recommended in the event that the site soils cannot be moisture conditioned.

General engineered fill materials should be moisture conditioned to within a range of OMC to +2% of the OMC prior to compaction and compacted to a minimum of 98% Standard Proctor Density (SPD). The compacted thickness of each lift of backfill shall not exceed 150 mm.

Further recommendations regarding backfill materials and compaction are contained in Appendix D.

7.2.4 Construction Excavations

Excavations should be carried out in accordance with Alberta Occupational Health and Safety Regulations. The depth for the trench excavations is unknown at this time and is anticipated to be less than 6 m below existing ground surface for below-grade structures and/or utility infrastructure. The following recommendations notwithstanding, the responsibility of all excavation cutslopes resides with the Contractor, who should take into consideration site-specific conditions concerning soil stratigraphy and groundwater. All excavations should be reviewed by the Contractor and experienced geotechnical personnel prior to working within the base of the excavation.

Based on the findings of the drilling program, firm to very stiff clay soils, in moist to very moist conditions, are generally anticipated to be encountered within 6.0 m below grade during excavation. All excavations which are to be deeper than 1.5 m should have the sides shored and braced or the slopes should be cut back no steeper than 1.0 horizontal to 1.0 vertical (1.0H:1.0V). In areas where seepage is encountered, the cutslope would need to be flattened to 1.5H:1V and dewatering equipment should be on hand. When excavations are open for longer than one month or where the excavation is required deeper than 6.0 m, the slopes should be cut back flatter than 1.0H:1.0V and should be assessed during construction by a qualified geotechnical engineer.

Any encountered groundwater seepage should be directed towards sumps for removal. Conventional construction sump pumps should be capable of groundwater control.

Spoil piles or temporary surcharge loads should not be allowed within a distance equal to the depth of the excavation from an unsupported excavation face, while mobile equipment should be kept back at least 3.0 m. All excavations should be checked regularly for signs of sloughing, especially after rainfall periods. Small earth falls from the sideslopes are a potential danger to workers and must be guarded against by the contractor.

General recommendations regarding construction excavations are contained in Appendix D.

7.2.5 Trench Backfill and Compaction

Trenches must be backfilled in such a way as to minimize the potential differential settlement and/or frost heave movements. A minimum compaction level of 95% of Standard Proctor Maximum Dry Density (SPMDD) is recommended for backfill within the pipe zone of the trench (to 300 mm above the top of pipe). For the remainder of the trench backfill, a minimum compaction standard of 98% of SPMDD should be utilized in all areas. The compacted thickness of each lift of backfill shall not exceed 150 mm. Moisture conditioning to OMC and 2% over OMC of the soils should be specified for general trench backfill. The upper 1.5 m of service trenches should be cut back at a maximum slope of 1.0H:1.0V to avoid an abrupt transition between backfill and in situ soil.

It should be noted that the ultimate performance of the trench backfill is directly related to the uniformity of the backfill compaction. In order to achieve the uniformity, the lift thickness and compaction criteria should be strictly enforced.

General recommendations regarding backfill materials and compaction are contained in Appendix D.

7.3 Foundations

The following foundation recommendations have been provided assuming that no significant site grading would be undertaken at the project and foundation design recommendations would be confirmed/updated by conducting a site-specific geotechnical evaluation.

Based on the available borehole logs, firm to very stiff clay or clay till (with SPT blow count varying from 4 to 10 in the majority of the boreholes) was generally encountered at/near the anticipated depth of shallow foundation (i.e., within the upper 2.1 m below the existing ground surface). Considering the soil conditions encountered in the boreholes, shallow foundations are considered suitable to support only lightly loaded structures. Further recommendations and parameters for the design of shallow foundations are provided in Section 7.3.2.

Alternatively, deep foundation systems consisting of bored cast-in-place (CIP) concrete piles or Continuous Flight Auger (CFA) concrete piles founded in stiff to very stiff clay/clay till may be used to support the proposed development. Helical piles may also be considered to support the structures of the proposed developed; however, helical piles should be used to support only static loads (i.e., no dynamic loads). Further recommendations for bored CIP piles and CFA piles are provided in Sections 7.3.3 and 7.3.4, respectively.

7.3.1 Limit States Design

For the Limit States Design (LSD) methodology, in order to calculate the factored load capacity, the appropriate Soil Resistance Factors must be applied to each loading condition as follows:

Factored Capacity = Ultimate Capacity x Soil Resistance Factors

In general, the following soil resistance factors must be incorporated into the foundation design. These factors are considered to be in accordance with the Canadian Foundation Engineering Manual (CFEM) (2006) as well as the Building Code.

Table C: Soil Resistance Factors

Description		Resistance Factor
Shallow Foundations		
Bearing resistance		0.5
Passive resistance		0.5
Horizontal resistance (sliding)		0.8
Deep Foundations		
Resistance to Axial Compressive Load	From Semi-Empirical Analysis	0.4
	From Static Loading Test Results	0.6
	From Dynamic Monitoring Results (i.e., Pile Driver Analyzer Testing)	0.5
Uplift Resistance	From Semi-Empirical Analysis	0.3
	From Loading Test Results	0.4
Horizontal Load Resistance		0.5

Under LSD methodology, foundations are to be designed with consideration to both the factored Ultimate Limit State (ULS) and Serviceability Limit States (SLS).

7.3.2 Shallow Foundations

Shallow foundations consisting of strip, spread, or mat foundations bearing on firm to stiff clay may be used to support lightly loaded structures, provided other recommendations of this report are followed. Shallow footings should be constructed to a minimum of 1.4 m below the final design ground surface (frost protection requirement for footings under heated structures). For unheated structures, the footings should be constructed a minimum of 2.1 m below grade. All footings should be founded on firm to stiff native soils only. Any fill (except for the general engineered fill) and deleterious materials must be removed from the building footprint areas to expose native subgrade soils.

The future site grading plan is unknown at this time which may require footings to be placed within general engineered fill. It is noted that placement of foundations on engineered fill with thicknesses greater than 2.0 m requires special consideration regarding long-term consolidation of the fill and underlying native soils and subsequent performance issues with the foundations/floor slabs-on-grade. Recommendations and parameters for the design of the shallow foundations within the engineered fill, if any, should be assessed during site-specific geotechnical evaluation considering the grading details.

Footings should be founded on native firm to stiff native soils only. The ultimate and factored static bearing resistance may be taken as 150 kPa and 75 kPa, respectively, subject to other recommendations in this report and confirmation/update during the site-specific geotechnical evaluation. Footing dimensions should be in accordance with the minimum requirements of the Building Code.

Specific bearing certification by a geotechnical engineer in conjunction with a site-specific geotechnical evaluation is recommended for each industrial structure to ensure that the shallow foundations are placed on competent native soils. Any soft/wet/loose/weak soils encountered at footing level, should be replaced with low strength lean mix concrete. Alternatively, it may be possible to lower the footing elevation to more competent native soils, but this should be looked at on a case-by-case basis.

It is recommended to use a smooth edge-trimming bucket or Grade-All for final excavation to the foundation subgrade elevation to minimize disturbance of the founding soils. A minimum 50 mm concrete mudslab should be placed immediately following excavation and inspection, to protect the bearing surface from disturbance and inclement weather.

Gradients of 1H:1V or flatter should be maintained between the bases of adjacent footings at different elevations to avoid load transfer from one to the other.

Foundations subjected to significantly inclined, eccentric, or dynamic loading require special considerations and should be geotechnically assessed on an individual basis.

Considering the groundwater levels measured in the standpipes, groundwater seepage may be encountered during foundation excavation in some areas of the project site.

Recommendations for minimum depth of cover for footings are presented under the heading 'Frost Protection' in Section 7.10. Further recommendations regarding shallow foundations are given in Appendix D.

7.3.3 Bored Cast-in-Place Piles

As an alternative to shallow foundation, bored CIP piles may be considered to support the proposed structures.

Bored CIP piles, founded in stiff to very stiff native clay till, may be designed to resist axial compressive loads on the basis of the shaft and the base resistance parameters provided in Table D. The parameters provided in Table D should be confirmed/updated based on the site-specific geotechnical evaluation.

Table D: Bored Cast-in-Place Concrete Pile Design Parameters (for Compressive Loads)

Depth Below Existing Ground Surface (m)	Ultimate Shaft Resistance (kPa)	Factored Shaft Resistance (kPa)	Ultimate Base Resistance (kPa)	Factored Base Resistance (kPa)
0.0 to 2.0	0	0	N/A	N/A
2.0 to 6.0 (Native Clay / Clay Till)	40	16	N/A	N/A
6.0 to 9.6 (Clay till)	60	24	900	360

Straight shaft piles should have an overall concreted pile length not less than 6.0 m below final grade and a minimum shaft diameter of 400 mm. Longitudinal reinforcement in straight shaft piles should extend a minimum of 6.0 m below final grade to provide adequate uplift resistance against frost jacking.

Bored CIP piles should be spaced no closer than 2.5 times the base diameter (measured centre-to-centre). Bells of the CIP piles, where chosen to be constructed, should also be spaced 2.5 times the bell diameter (measured centre-to-centre).

The shaft and base resistances presented in Table D are based on the assumption that mechanical cleaning of the pile sides and bases will be undertaken during installation. Soft, loose, or wet soils, and accumulated water, if any, should be removed from the base and the side of the pile bore immediately prior to the placement of concrete. Base resistance should only be considered in the design where base cleaning can be verified during construction.

Under-reaming or belling of bored CIP piles in clay till should only be considered if a pile bell free of groundwater seepage can be constructed, and if sloughing of the pile bell is not encountered. The feasibility of construction of bell piles in clay till should be assessed and confirmed by the piling contractor prior to construction. Difficulty in bell

construction may occur where silty, sandy, or gravelly clay till is encountered at the bell elevation or where groundwater seepage is encountered at the bell elevation. Accordingly, an alternate design option should also be prepared and implemented where belled piles cannot be constructed.

Bell diameters should be two to three times the shaft diameter. End-bearing should not be used for small diameter (less than 760 mm base diameter) piles because of the difficulties associated with ensuring a clean base. For bored CIP belled piles, shaft resistance should be neglected over the height of the bell and for a height of one shaft diameter above the top of the bell. A minimum depth of cover of 2.5 times the base or bell diameter has been assumed to determine the base resistances provided in Table D. Should less cover be provided, the base resistance would have to be reduced.

Pile bells cannot be formed within sloughing layers such as silt, sand, gravel, and gravelly layers of the clay till. To provide adequate support for the roof of a bell where wet sloughing layers are encountered, the minimum distance from the underside of a sloughing layer to the top of the roof of a bell should be 0.6 m.

It is noted that the clay till will require confirmation of soil conditions at pile bottom elevations for piles with base resistance consideration, as local weaker layers may be encountered during pile installation. Where weaker layers are encountered at the pile bases, additional measures considering the design details of the piles would be required.

Groundwater seepage is expected to be encountered during pile installation at the project site, primarily where wet/saturated sand/silt seams or perched groundwater are intercepted.

Temporary casing should be on hand before drilling starts and used to seal off groundwater and to prevent sloughing of the pile bore. The piling contractor should make their own estimate of temporary casing requirements and should consider such factors as construction procedures and bore diameter.

The piling contractor selected should be experienced in the placement of concrete below water using tremie pipes in light of the potential for groundwater inflows to be encountered during pile installation. The contractor should have all required and/or reasonably anticipated equipment on site prior to the construction of any pile.

Difficult drilling conditions of the bored CIP piles and bell formation in the clay till, if chosen, may be encountered due to potential presence of cobbles and/or boulders. Such drilling difficulties should be assessed by the piling contractor.

Field adjustments of pile dimensions (i.e., length and/or diameter) based on the encountered subsurface conditions may be required and should be included in contract documents.

General recommendations for the design and construction of bored CIP piles are provided in Appendix D.

7.3.4 Continuous Flight Auger Concrete Piles

As an alternative to bored CIP piles, CFA concrete piles, also known as auger-cast piles, are considered feasible for the proposed development. CFA piles are formed by drilling a continuous flight hollow stem auger into the ground, followed by pressure injection of concrete and simultaneous extraction of the auger. The sides of the hole are supported at all times by the auger, eliminating the need for temporary casing or drilling slurry. Reinforcement is placed immediately after withdrawal of the auger.

CFA piles may be designed on the basis of shaft resistance and base resistance provided in Table E.

Table E: Continuous Flight Auger Pile Design Parameters (for Compressive Loads)

Depth Below Existing Ground Surface (m)	ULS Ultimate Shaft Resistance (kPa)	ULS Factored Shaft Resistance (kPa)	ULS Ultimate Base Resistance (kPa)	ULS Factored Base Resistance (kPa)
0 to 2.0	0	0	N/A	N/A
2.0 to 6.0 (Native Clay / Clay Till)	40	16	N/A	N/A
6.0 to 9.6 (Clay till)	60	24	900	360

The base resistances provided in Table E are based on the assumption that stiff to very stiff clay till soils and a clean base are to be expected. It is impractical to confirm the base soil conditions with a clean base during pile installation, due to the CFA installation method; therefore, precautions, including, but not limited to, those discussed below, would need to be taken and should be included in the contract documents. Additional boreholes or trial CFA piles may be required prior to, or during, construction to further delineate the subsurface conditions.

Prior to design and construction, the suitability of CFA piles should also be confirmed by the designer and the contractor for the project site, considering the subsurface conditions and the potential variations. Installation records of CFA piles, such as concrete volume, concrete pressure, installation depth, pile profile, etc., should be provided by the piling contractor during construction monitoring for review. Based on the review of installation records, Pile Integrity Tests and/or Pile Driving Analyzer (PDA) tests may be required on selected CFA piles to confirm their capacities or integrities.

Pile reinforcement must be adequate to withstand all vertical, lateral, and tensile forces within the pile. A minimum pile diameter of 400 mm is recommended.

A minimum centre-to-centre pile spacing of 2.5 pile diameters is recommended. Short length (up to 10.0 m) reinforcing cages can be installed by the manual means of pushing the cage into the wet concrete, but longer cages will require the use of a vibrator, in which case it is essential that the reinforcement cages are welded. Centralizers are recommended to ensure adequate concrete cover of the reinforcing steel cages.

An important feature in the formation of CFA piles is the use of comprehensive instrumentation to monitor the performance of the rig at the time of boring. The piling rig must be capable of continuous pile monitoring using computerized technology (i.e., Pile Installation Recorder) to verify the pile cross-sectional area, concrete injection pressures, auger rotation per unit depth, boring rate, and the pressure in the rig hydraulic system. The capacity of CFA piles is highly dependent on the concrete injection pressure and on the properties of the soil into which the concrete is being injected. Continuous monitoring during pile installation is recommended to document the details of each CFA pile installed.

7.3.5 Serviceability Limit State Design for Cast-in-Place and Continuous Flight Auger Piles

The SLS must be addressed in addition to analyzing the ULS resistance of a foundation. The SLS is an analysis of the amount of settlement that a foundation element would undergo using unfactored structural loads.

Elastic compression of the pile shaft must be considered, regardless of whether the pile is designed on the basis of shaft resistance and/or base resistance. Note that the elastic compression of the pile shaft is typically small compared to the amount of compression of the soil at the base of the pile that is required to fully mobilize either the shaft resistance or base resistance.

For piles designed primarily on the basis of shaft resistance, the ultimate shaft resistance is typically mobilized after a relatively small pile displacement (approximately 5 mm to 10 mm). Full mobilization of the shaft resistance occurs prior to full mobilization of the base resistance (i.e., additional settlement is required to mobilize the base resistance).

The following expression should be used to estimate the settlement of a pile under SLS conditions, using unfactored structural loads:

$$S = (K)x\ (P/B\ E)$$

Where:

S = Foundation settlement (m).

K = 0.91.

P = Unfactored structural load (live load plus dead load, kN) applied at the pile base.

B = Pile base diameter (m).

E = Elastic modulus of the foundation soil, use 26,000 kPa at depths 6.0 m to 9.6 m below the existing ground surface.

The pile base diameter used in the above expression should be determined from the analysis of factored (ULS) structural loads and factored (ULS) base resistance for each loading case. If the calculated settlement is higher than tolerable for the structure, SLS may govern the pile design. Under such conditions, Tetra Tech should be contacted to provide further direction regarding suitable methods of settlement control. The above expression is anticipated to provide an estimate of the settlement, excluding the elastic compression of the pile.

7.3.6 Helical Piles

Helical piles are considered as an alternative option for this development, particularly preferred for lightly loaded structures. It is recommended that helical piles be considered only for statically loaded foundations (i.e., no dynamic load component). Design and construction recommendations for helical piles are provided in this section; however, it is noted that for the final design of this type of pile consideration should be given to the installation methodology of the specialty contractor, as the design capacity of helical piles is a function of the pile installation methodology.

Tetra Tech recommends using the CFEM (2006) design method for helical piles (CFEM Section 18.2.1.4). Using this methodology, the geotechnical parameters required to calculate the ultimate foundation capacity are provided in Table F. A minimum recommended depth for the upper helix is 2.1 m below the existing grade.

Table F: Geotechnical Parameters for Helical Piles

Depth (m)	Bulk Unit Weight (kN/m³)	Avg. Undrained Shear Strength Cu (kPa)	Drained Friction Angle* (Degrees)
0 to 2.0	19	-	-
2.0 to 6.0	19	50	26
6.0 to 9.6	19	100	28

*Only for long-term strength consideration with zero cohesion; friction angle should not be used together with undrained shear strength.

The total helical pile capacity is presented in the CFEM (Equation 18.10) as follows:

$$R = Q_t + Q_f$$

Where:

R = Total ultimate capacity of the pile (kN).

Q_t = Total ultimate multi-helix pile capacity (kN).

Q_f = Ultimate capacity due to pile shaft skin friction (kN) (for pile shafts greater than 100 mm diameter only).

To calculate the multi-helix bearing capacity, the individual bearing method presented in CFEM Equations 18.11 and 18.12 should be used, provided the helical bearing plates are spaced a minimum of three times the diameter of the largest helix. Otherwise, the cylinder shear method should be used, with consideration of overlapping stress zones between helices. This method sums up the bearing capacity of the bottom plate and the cylindrical shear capacity developed between the upper and lower plate(s).

The factored geotechnical capacity for each pile may be determined as follows, using the soil resistance factors presented in Section 7.3.1:

- Factored Pile Compression Capacity = 0.4R
- Factored Pile Uplift Capacity = 0.3R

For helical piles, the helix or helices should be founded in competent clay till and below the depth of frost penetration. Vertically installed helical piles generally require an enlarged shaft diameter in order to adequately resist lateral loads, where applicable. For bottom helices with load influence depths lower than the maximum borehole termination depth of 9.6 m, a field drill program should be conducted to confirm the soil conditions in depth. Should any of these parameters become limiting factors in the design, Tetra Tech should be contacted for more detailed review and analysis.

Construction of helical piles should consider, but not be limited to, the following recommendations:

- As the helical piles are installed, the rate of rotation and advancement should match the pitch of the helix plate. This will help to avoid “churning” of the foundation soils. It is critical that the foundation bearing soil is not excessively disturbed in order to minimize the risk of excessive foundation settlement.
- An estimate of pile capacity may be obtained by correlating capacity to installation torque. This method requires that an appropriate torque factor be selected by the pile designer (in consultation with the piling contractor). Torque factors are selected based on soil type as well as pile shaft size and shape. This method of estimating pile capacity should be used as a quality control check only and is not suitable to replace proper design procedures. Installation torque should be recorded using calibrated equipment, and the piling contractor should provide a recent calibration certificate (conducted a maximum of 1 year from pile installation) for each piling setup used on site.
- It should be noted that a high torque value can sometimes mislead estimation of bearing capacity. The occurrence of soft zones beneath the final pile depth are not represented in the recorded torque value but may adversely impact the load carrying capacity of the helical pile.
- Pile load testing is recommended. The results of the pile load tests can be correlated to the measured installation torque to develop site-specific installation criteria. In addition, a higher geotechnical resistance factor for compressive loading of 0.6 can be used if pile load testing is conducted prior to construction.

If lateral loading is considered critical to the pile performance, care must be taken during pile installation to identify voids developing around the pile shaft. Due to the nature of the pile installation process, it is common to develop

voids that can significantly influence lateral loading on a pile. If voids develop, they should be backfilled with granular fill, sand, fillcrete, or grout depending on the size of the voids.

7.3.7 Laterally-Loaded Piles (Modulus of Horizontal Subgrade Reaction)

The resistance of vertical piles to horizontal load involves soil-structure interaction and is commonly analyzed using computer structural analysis software. If required, detailed lateral analysis can be carried out by Tetra Tech using commercially available software to confirm the results of structural analysis. Additional information pertaining to foundations (including but not limited to loading conditions, size, depth, and spacing) would be required prior to completing the detailed lateral analysis. Alternatively, lateral pile performance may be analyzed using a modulus of horizontal subgrade reaction (k_s) and spring constant (K).

In the event that the soil conditions do not provide adequate lateral foundation capacity for a vertical pile, battered piles may be considered. Battering or inclining piles significantly increases the resistance of a laterally-loaded pile; however, the potential impacts of ground deformation should be considered in the decision to use battered piles.

The modulus of the horizontal subgrade reaction has been estimated based on the soil properties at the project site. It is recommended that the design k_s value increase linearly from zero at the ground surface to the value calculated from the formula provided at a depth of 2.0 m below the ground surface. Below this depth, the modulus of horizontal subgrade reaction may be assumed to be constant for a given soil layer.

The SLS modulus of horizontal subgrade reaction for a pile diameter 'B' is calculated as follows:

$$k_s = k'_s/B \ (\mathrm{Mpa/m})$$

Where:

k'_s	=	Coefficient of horizontal subgrade reaction (MPa).
	=	10 MPa for the native soil from 2.0 m to 6.0 m below the existing grade.
	=	20 MPa for the native soil from 6.0 m to 9.6 m below the existing grade.
B	=	Pile diameter (m).

The spring constant (K) for use in modelling lateral pile capacity may be obtained as follows:

$$K = k'_s L \ (\mathrm{MN/m})$$

Where:

L	=	Length of pile segment (m).

7.4 Foundation Perimeter Drainage Requirements

It is recommended that a weeping tile and sump system be constructed around the outside perimeter of the buildings (at the base of the footings or grade beam to maintain a relatively consistent moisture profile of the subgrade soils beneath the floor slabs). The weeping tile system should comprise a perforated weeping tile, in turn surrounded with a minimum of 150 mm thick blanket of washed rock (maximum size 20 mm) with the granular layer wrapped in non-woven geotextile. The weeping tile should have a minimum 0.5% slope leading to a sump.

7.5 Surface Grading and Drainage

Drainage of surface water away from proposed structures should be maintained during and after construction. The finished grade of the proposed development should be designed so that surface water is drained away from structures by the shortest route. All drains should discharge well clear of structures. For construction of roof drains, caution should be taken where downspouts discharge due to the high probability of ice forming in the winter. Downspouts may be discharged onto landscaped areas, provided the water is carried, by means of a concrete splash pad or extendable section so the point of discharge of the water is at least 2 m from the structures. Landscaped surfaces adjacent to buildings should be graded to slope away from the building at a gradient of at least 5% within 2 m of the building structures' perimeter. General landscaped areas should have grades of no less than 2% to minimize ponding.

7.6 Floor Slab System

7.6.1 Floor Slabs-on-Grade

Construction of slabs-on-grade (not including basements) must consider the following precautions and construction recommendations.

In native soil areas, following removal of topsoil, soft, loose, wet, or disturbed portions of the native soils the subgrade should be scarified to a minimum depth of 300 mm, and moisture conditioned to a range of optimum to 2% over OMC and re-compacted to minimum 98% of SPMDD. High plastic clay, if any, observed on the subgrade should be removed and replaced with low to medium plastic clay, compacted to minimum 98% of SPMDD. In areas of general engineered fill placed during site grading, a minimum depth of 150 mm subgrade preparation is recommended; if weathering is evident, 300 mm subgrade preparation is required. In areas where general engineered fill is placed during site grading, a waiting period (dependent on fill thickness) prior to installation of floor slabs should be provided to reduce the potential settlement after construction. The minimum compaction should be 98% of SPMDD. The prepared subgrade should be proof-rolled and any soft or loose pockets detected should be reconditioned as recommended above or over-excavated and replaced with general engineered fill.

A levelling course of clean well-graded crushed gravel, at least 150 mm in compacted thickness, is recommended directly beneath the slabs-on-grade, unless a thicker course is required for structural purposes. The subgrade beneath slabs-on-grade should be protected at all times from moisture, frost or exposure which may cause softening or disturbance of the subgrade soils. This applies during and after the construction period (and before and after replacement of the required general engineered fill). Should the exposed surface become saturated or disturbed, it should be reworked to achieve the above standards.

If the subgrade is properly prepared as noted above, floor slab movements should be limited to less than approximately 25 mm. Slabs-on-grade should be separated from bearing members to allow some differential movement. If this range of differential movement is unacceptable, the owner should consider a structurally supported floor.

Recommended procedures for backfill materials, and further recommendations for slabs-on-grade construction are included in Appendix D.

7.6.2 Structural Slabs

If slab movements cannot be tolerated, a structurally supported floor slab system is recommended as the preferred option for this development; however, with a structurally supported floor slab system, there is a risk of ground movement relative to the slab. This relative movement can lead to problems if piping and other utilities that are connected to the slab are embedded within the ground beneath the slab. Utilities beneath the structurally supported

floor slabs should be protected from differential movement by placing utilities within boxes suspended from the structural slab. In addition, a void form is recommended below the floor slab in order to prevent transfer of uplift pressures due to swelling clay soil

7.7 Below-Grade Walls

All below-grade walls, if any, should be designed to resist lateral earth pressures in an “at-rest” condition. This condition assumes a triangular pressure distribution and may be calculated using the following expression:

$$P_o = K_o (\gamma H+Q)$$

Where:

P_o = Lateral earth pressure “at-rest” condition (no wall movement occurs at a given depth).

K_o = Coefficient of earth pressure “at-rest” condition (use 0.5 for cohesive backfill and 0.45 for sand and gravel backfill).

γ = Bulk unit weight of backfill soil (use 19 or 21 kN/m³ for cohesive or granular backfill, respectively).

H = Depth below final grade (m).

Q = Surcharge pressure at ground level (kPa).

Installation of a weeping tile system along the base of the below-grade walls is recommended to avoid build-up of hydrostatic pressures. The weeping tile should have a minimum 0.5% slope leading to a sump. The preferred method would be to have provision to tie the sump into the property’s on-site drainage system.

Backfill around concrete walls should not commence before the concrete has reached a minimum two-thirds of its design strength and first floor framing is in place or the walls are laterally braced. Only hand-operated compaction equipment should be employed within 600 mm of the concrete walls. Caution should be used when compacting backfill to avoid high lateral loads caused by excessive compactive effort. A compaction standard of 95% of SPMDD is recommended. To avoid differential wall pressures, the backfill should be brought up evenly around the walls. A minimum 600 mm thick clay cap should be placed at the ground surface to reduce the infiltration of surface water.

7.8 Pavement Structures

7.8.1 Subgrade Preparation

Subgrade preparation should be undertaken prior to pavement construction. In native soil areas, topsoil, soft, loose, wet, or disturbed portions of the existing soils, and soils containing organics should be removed from the subgrade areas. The recommended compaction standard for subgrade preparation is a minimum of 98% of SPMDD. Cohesive soils should be compacted at optimum to 2% over the OMC. Granular soils (granular base and sub-base layers) should be compacted with moisture content within ±1% of the OMC. A minimum depth of subgrade preparation of 600 mm within clay fill (subject to a proof-roll) or 300 mm within the native clay is recommended for all paved areas.

Backfill to raise these areas to subgrade level should be general engineered cohesive fill materials, as defined in this report, moisture conditioned and compacted as noted previously. Proof-rolling of the prepared surface is recommended to identify localized soft areas and for an indication of overall subgrade support characteristics. Where soft subgrade conditions exist below the design subgrade elevation, these materials should be subexcavated and replaced with general engineered fill.

Depending on the construction scheduling for placement of the granular sub-base and base layers, and the asphalt concrete pavement surface, further subgrade preparation may be required if the placed subgrade materials dry out or weather. This should be determined prior to the placement of the pavement structure. Should the subgrade materials be shown to deteriorate from construction completion, a minimum 300 mm of subgrade preparation is recommended prior to pavement structure placement.

It is recommended to include a contingency for woven geotextile, should localized areas of subgrade instability be encountered. Use of a woven geotextile should not be considered as a substitute for subgrade preparation, but as an option for improvement should subgrade instability exist after subgrade preparation. The woven geotextile should have a minimum grab tensile strength of 890 N.

The subgrade should be prepared and graded to allow drainage towards stormwater facilities. It is imperative that positive surface drainage be provided to prevent ponding of water within the pavement structure and subsequent softening and loss of strength of the subgrade materials. Surrounding landscaping should be such that runoff water is prevented from ponding beside paved areas in order to avoid softening and premature failure of the pavement surface.

7.8.2 Pavement Design and Construction

The minimum materials required for the pavement structures of roadways for this project should meet the Lethbridge County Engineering Guidelines and Minimum Servicing Standards. Specific roadway pavement structures should be reviewed by the Transportation Business Unit based on the following: roadway use, traffic volumes, heavy vehicles, and equivalent single-axle loads. This information was not available at the time of writing this report.

For asphalt pavement structure, all asphalt paving lifts should be compacted to a minimum of Marshall Design Density, as per current Lethbridge County Engineering Guidelines and Minimum Servicing Standards.

The pavement design should include provisions for subsurface drainage of the pavement granular layers. Subdrains will provide a means of evacuating water that infiltrates the pavement structure, either through cracks and vertical details (i.e., face of gutter), or from peripheral surface runoff. The subdrain should comprise a perforated flexible plastic drainpipe (100 mm diameter), complete with filter sock. The drain should be placed along the edge of the pavement section in a recessed area of the prepared subgrade.

7.9 Concrete Type

For this development, two (2) tests were conducted to determine the water-soluble sulphate content of the soil samples recovered from the project site. The test results indicated sulphate concentrations of 0.008% and 0.075% in the soil samples recovered from 23BH005 and 23BH013, respectively. These results indicate the potential degree of a sulphate attack on the concrete as “negligible”.

Accordingly, there are no specific requirements for the concrete related to the sulphate exposure from the site soils.

A more stringent exposure classification may be required due to structural requirements of other exposure considerations (Refer to CSA A23.1-19, Table 1).

Imported fill, if placed in contact with concrete should be tested for water-soluble sulphate content and the above recommendations should be re-evaluated.

7.10 Frost Protection

For protection against frost action, all perimeter footings must be placed a minimum of 1.4 m below final grade for heated structures. All the footings for unheated structures should be placed at a depth minimum depth 2.1 m below surrounding final grade.

Deep foundation system including CIP concrete piles, CFA piles, and helical piles, if considered and exposed to frost action, should be drilled to a minimum depth of 6.0 m and should have full-length steel reinforcement. Grade beams spanning concrete piles should have a minimum 100 mm void space on the underside of the grade beam and around the pile caps to reduce the risk of interaction with the underlying soil.

It is also preferable to backfill the final 600 mm of the exterior of the grade beam with a medium-plastic clay in order to prevent infiltration of excessive moisture and softening of the soils adjacent to the grade beam.

Pipes buried with less than 2.1 m of soil cover should be protected with insulation to avoid frost effects that might cause damage to, or breakage of, the pipes. Rigid insulation placed under areas subject to vehicular wheel loadings should be provided with a minimum thickness of 600 mm of compacted granular base.

7.11 Seismic Design

In accordance with the Building Code and based on soil stratigraphy, the project site can generally be classified as Class D for seismic site response.

7.12 Stormwater Pond Development

7.12.1 General

In the preparation of the recommendations provided in this report for the geotechnical aspects of design and construction of the stormwater management facility, Tetra Tech reviewed pertinent sections of "*Design and Construction of Liners for Municipal Wastewater Stabilization Ponds*" prepared by Komex Consultants Ltd. for the Municipal Engineering Branch of Alberta Environmental Protection (AEP), and the "*Stormwater Management Guidelines for the Province of Alberta*", dated March 2013, prepared by the Municipal Program Development Branch of AEP.

It is understood that a wet pond is being considered for this development, to be located in the northeast corner of the site, in the vicinity of 23BH014. Such facilities are normally constructed as an excavation below ground surface to provide overland stormwater storage, in accordance with the applicable municipal regulations/guidelines. Further details of the wet pond including its base elevation, normal water elevation, and high water elevation have not been provided.

7.12.2 Availability of Suitable Clay Liner Materials

As discussed in the previous sections, the subsurface stratigraphy of the site generally comprises lacustrine clay overlying glacial clay till.

Constant head hydraulic conductivity (permeability) testing was conducted on one (1) remoulded sample recovered from 23BH014, representing the clay till material at 1.5 m to 3.0 m below ground surface, within the proposed pond area. The test sample was compacted to 98% of SPMDD with a moisture content between OMC and +2% of OMC. The test result indicates a hydraulic conductivity (K Value) of 1.6 x 10^{-8} cm/sec. The laboratory test reports are included in Appendix C.

Based on the AEP publications (referenced above) and assuming a minimum liner thickness of 1.0 m, the maximum hydraulic conductivity of compacted clay liners soils should be 1.7 x 10^{-7} cm/sec or less permeable. As recommended by the AEP publications, the liner design should be based on a K value (in situ or design) that is one order of magnitude greater than the average K value (laboratory). Based on the one (1) test result, the design hydraulic conductivity value of 1.6 x 10^{-7} cm/sec is slightly lower than the minimum K value of 1.7 x 10^{-7} cm/sec. Given that the result of hydraulic conductivity test barely meets the design requirement, additional testing is recommended to be conducted during the site-specific geotechnical evaluation, considering the design details of the pond.

Any localized silts, sands, or low plastic clay soils encountered, should be removed and cannot be use as clay liner materials. Additional hydraulic conductivity testing should be completed on the potential clay liner material prior to, and during, construction to confirm their suitability as clay liner material.

Alternate liner types, such as geosynthetics, may be used but are expected to be substantially more expensive.

7.12.3 Stormwater Management Facility Concept and Design

Based on Tetra Tech's understanding of a typical stormwater management facility design, a typical wet pond might have a base elevation ranging between 3 m and 5 m below final ground surface.

Once the operational water level elevation of the wet pond is designed, it is recommended that the proposed interior sideslopes be between 5.0H:1.0V to 7.0H:1.0V for the pond in the active storage zone and 4.0H:1.0V to 5.0H:1.0V for above the active storage zone. The maximum exterior sideslopes should be 3.0H:1.0V. All the interior and the exterior sideslope should also follow the applicable municipal guidelines. Slope stability of the pond's sideslope should be confirmed prior to construction, once pond design become available.

Based on the site soil conditions, laboratory test results, and Tetra Tech's experience with the permeability of local clay till soils, it is recommended that a preliminary thickness for the remoulded compacted clay liner be 0.6 m along the base of the wet pond and 1.2 m along the sidewalls of the pond, up to design highwater elevation (minimum recommended).

Assuming the embankment between the normal water level and high water level is constructed with an engineered clay liner, the potential for erosion from wave action should be considered. Slope protection comprising rip-rap designed for potential wave erosion or other means of erosion control should be given consideration for the sideslope. The use of a filter fabric median between the native soils and rip-rap is also recommended. Design recommendations for this type of protection are beyond the scope of this report.

Given that shallow groundwater was encountered in 23BH014 at a depth of 2.05 m below ground surface, dewatering may be necessary during construction. Groundwater seepage, where encountered during construction, should be directed towards sumps for removal from the excavation. Conventional construction sump pumps should be capable of providing groundwater control.

Considering the groundwater levels measured in 23BH014 (i.e., at a depth of 2.05 m below the existing ground surface), installation of a permanent perimeter drainage below the pond's liner may be required to avoid damage to liner from groundwater's hydrostatic pressure, particularly when the pond is emptied for maintenance/cleaning or for other reasons.

The liner material should typically comprise remoulded medium- to high-plastic clay till soil. Care should be taken to reject all significant silty, low to non-plastic, local sand layers, gravel with particle size greater than 50 mm, and other deleterious materials from the liner material source. Full-time on-site construction monitoring is required to identify and reject pockets of unsuitable material if the initial liner lift comprises clay till soil that is reworked in situ.

Large pockets of silt or sand soils exhibiting seepage may be encountered during pond sideslope excavation, resulting in short-term cutslope instabilities that may require localized drainage and re-grading during construction. As well, additional temporary and permanent drainage control may also be required if vigorous seepage characteristics are observed within the exposed pond sideslopes prior to liner construction.

The liner should be placed in lifts with maximum compacted thickness of 150 mm. If compacted lift surfaces become too smooth to facilitate a good bond with the subsequent lift, they should be scarified to a minimum depth of 50 mm and moisture conditioned, as necessary, prior to placement of the subsequent lift.

The feasibility of liner placement considering the proposed pond sideslope should be confirmed by the contractor prior to construction.

The liner material should be compacted to a minimum of 98% of SPMDD at moisture content varying from 1% to 3% of the OMC.

Liner materials that freeze, dry out, or become excessively wet during construction should be rejected and removed.

The liner should be protected from construction activities and post-construction damages, as necessary. Placement of a gravel layer with a minimum thickness of 250 mm is recommended to protect the liner after its placement.

All penetrating structures into the liner should be sealed with bentonite chips or powder. Pinholes from nuclear densometer tests in the liner should be filled with bentonite powder.

Field and laboratory testing is recommended to confirm the hydraulic conductivity of the liner during and after construction. Conformance testing of on-site soils excavated within the pond area and selected for use as clay liner material must be confirmed by further laboratory testing to verify acceptable hydraulic conductivities at the time of construction.

Pipe connections to the pond including all the inlets and the outlets should be provided with clay plug to control exfiltration from the pond.

8.0 DESIGN AND CONSTRUCTION GUIDELINES

General design and construction guidelines are provided in Appendix D, under the following supplemental headings:

- Shallow Foundations
- Bored Cast-in-Place Concrete Piles
- Floor Slabs-on-Grade
- Construction Excavations
- Backfill Materials and Compaction

These guidelines are intended to present standards of good practice. Although supplemental to the main text of this report, they should be interpreted as part of the report. Design recommendations presented herein are based on the premise that these guidelines will be followed. The design and construction guidelines are not intended to represent detailed specifications for the works although they may prove useful in the preparation of such specifications. In the event of any discrepancy between the main text of this report and Appendix D, the main text should govern.

9.0 REVIEW OF DESIGN AND CONSTRUCTION

Tetra Tech should be given the opportunity to review details of the design and specifications related to geotechnical aspects for the project site prior to construction.

Full-time monitoring and compaction testing should be undertaken during subgrade preparation and fill placement to ensure that suitable subgrade conditions are prepared and that suitable fill materials are placed and properly compacted. Qualified persons, independent of the contractor, should undertake this monitoring.

10.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully Submitted,
Tetra Tech Canada Inc.

PROFESSIONAL ENGINEER ALBERTA
DEEPAK KUMAR
M86686
2023-04-14

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Prepared by:
Victor Okwodu, B.A.Sc., E.I.T.
Geotechnical Engineer-in-Training
Engineering Practice, Prairie Region
Direct Line: 403.359.6526
victor.okwodu@tetratech.com

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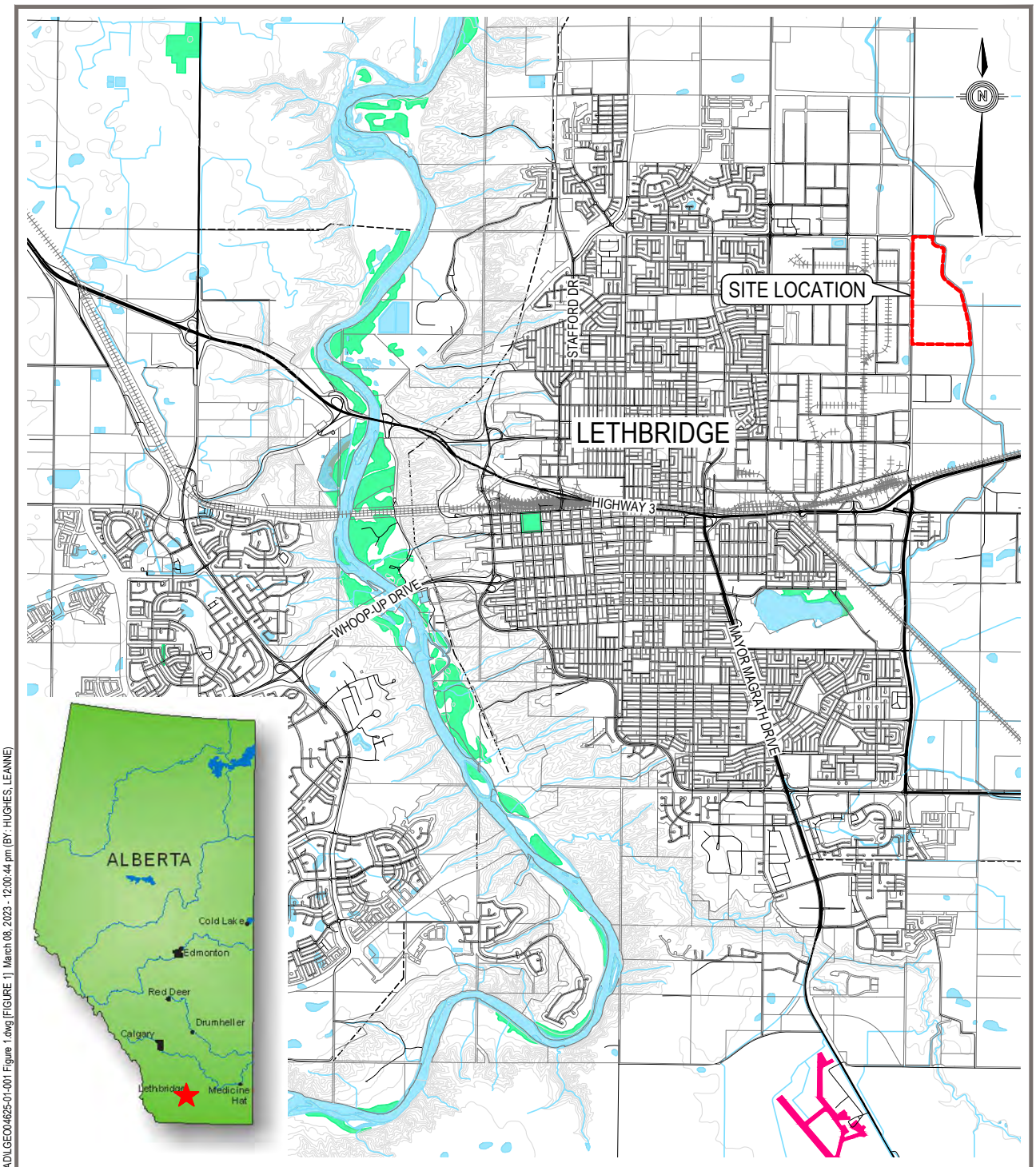
Reviewed by:
Deepak Kumar, M.Sc., P.Eng.
Senior Geotechnical Engineer
Engineering Practice, Prairie Region
Direct Line: 403.723.6944
deepak.kumar@tetratech.com

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DATE: _____
PERMIT NUMBER: P013774
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

FIGURES

Figure 1 Site Location Plan
Figure 2 Borehole Location Plan



NOTES
DRAWING PROVIDED BY "© Department of Natural Resources Canada. All rights reserved."

0 3,000m
Scale: 1:60,000 @ 8.5"x11"

CLIENT
Sumus Property Group Ltd.

GEOTECHNICAL EVALUATION
CHINOOK INDUSTRIAL PARK ASP
W1/2 10-009-21 W4M LETHBRIDGE COUNTY

SITE LOCATION PLAN

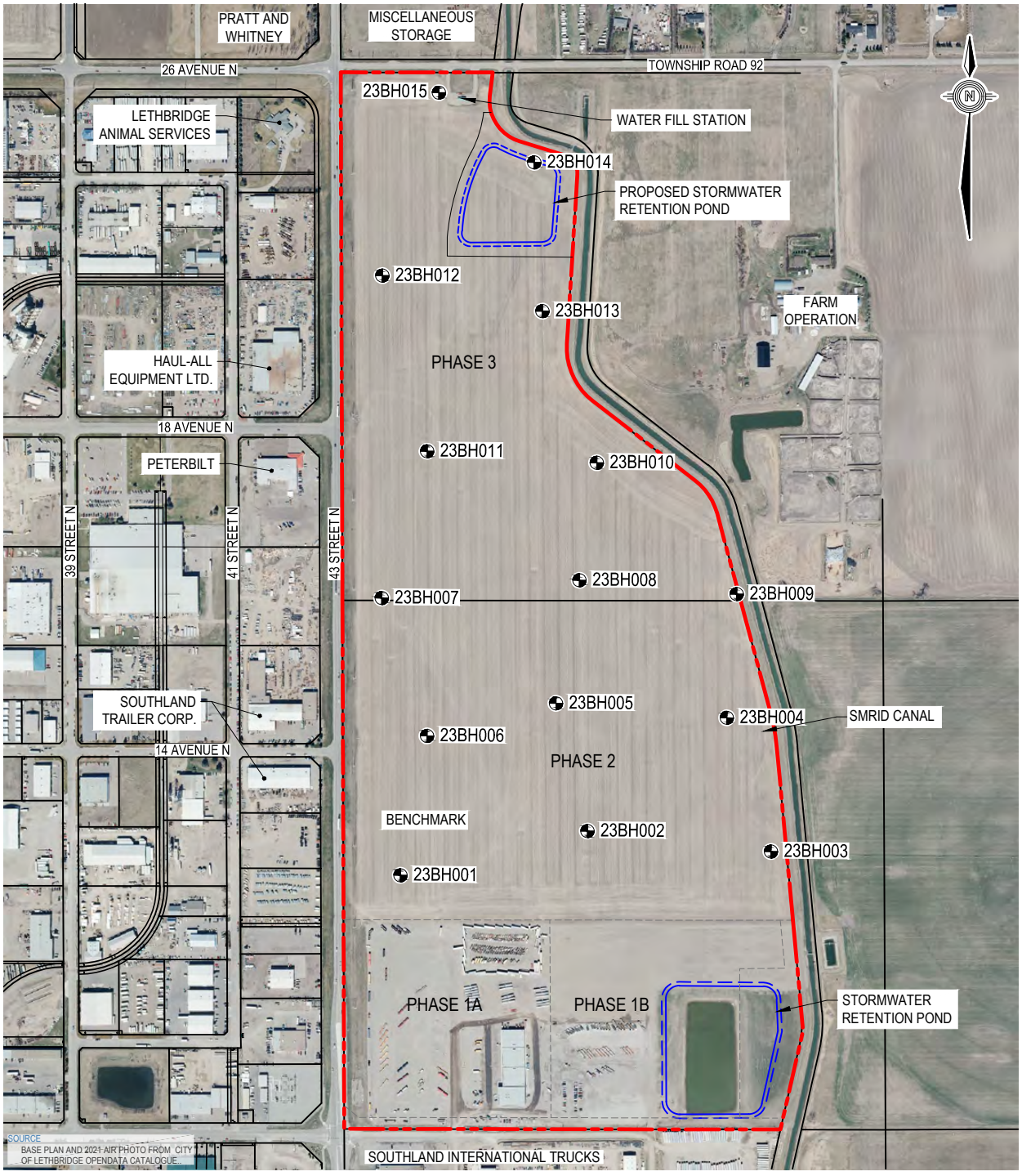
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OFFICE	DATE
Tt Leth	March 2023

Figure 1

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LEGEND

SITE BOUNDARY

BOREHOLE LOCATION

0 500m

Scale: 1:10,000 @ 8.5"x11"

CLIENT

Sumus Property Group Ltd.

GEOTECHNICAL EVALUATION
CHINOOK INDUSTRIAL PARK ASP
W1/2 10-009-21 W4M LETHBRIDGE COUNTY

BOREHOLE LOCATION PLAN

TETRA TECH

PROJECT NO.	DWN	CKD	REV
LGEO04625-01-001	LCH	VO	0

OFFICE	DATE
Tt Leth	March 2023

Figure 2

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APPENDIX A
LIMITATIONS ON USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the “Professional Document”).

The Professional Document is intended for the sole use of TETRA TECH’s Client (the “Client”) as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the “Contract” herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

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The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH’s professional work product and shall remain the copyright property of TETRA TECH.

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Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH’s “Instruments of Professional Service”), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH’s Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH’s Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this document, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to explore, address or consider and has not explored, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems, methods and standards employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historical environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional exploration and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

Construction activity can impact structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques, and construction sequence are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, and the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function. Where temporary or permanent drainage systems are installed within or around a structure, these systems must protect the structure from loss of ground due to mechanisms such as internal erosion and must be designed so as to assure continued satisfactory performance of the drains. Specific design details regarding the geotechnical aspects of such systems (e.g. bedding material, surrounding soil, soil cover, geotextile type) should be reviewed by the geotechnical engineer to confirm the performance of the system is consistent with the conditions used in the geotechnical design.

1.16 DESIGN PARAMETERS

Bearing capacities for Limit States or Allowable Stress Design, strength/stiffness properties and similar geotechnical design parameters quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition used in this report. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions considered in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

1.18 APPLICABLE CODES, STANDARDS, GUIDELINES & BEST PRACTICE

This document has been prepared based on the applicable codes, standards, guidelines or best practice as identified in the report. Some mandated codes, standards and guidelines (such as ASTM, AASHTO Bridge Design/Construction Codes, Canadian Highway Bridge Design Code, National/Provincial Building Codes) are routinely updated and corrections made. TETRA TECH cannot predict nor be held liable for any such future changes, amendments, errors or omissions in these documents that may have a bearing on the assessment, design or analyses included in this report.

APPENDIX B
BOREHOLE LOGS

TERMS USED ON BOREHOLE LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on 0.075mm sieve): Includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as inferred from laboratory or in situ tests.

DESCRIPTIVE TERM	RELATIVE DENSITY	N (blows per 0.3m)
Very Loose	0 TO 20%	0 to 4
Loose	20 TO 40%	4 to 10
Compact	40 TO 75%	10 to 30
Dense	75 TO 90%	30 to 50
Very Dense	90 TO 100%	greater than 50

The number of blows, N, on a 51mm O.D. split spoon sampler of a 63.5kg weight falling 0.76m, required to drive the sampler a distance of 0.3m from 0.15m to 0.45m.

FINE GRAINED SOILS (major portion passing 0.075mm sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as estimated from laboratory or in situ tests.

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH (KPA)
Very Soft	Less than 25
Soft	25 to 50
Firm	50 to 100
Stiff	100 to 200
Very Stiff	200 to 400
Hard	Greater than 400

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil.

GENERAL DESCRIPTIVE TERMS

Slickensided - having inclined planes of weakness that are slick and glossy in appearance.
Fissured - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated - composed of thin layers of varying colour and texture.
Interbedded - composed of alternate layers of different soil types.
Calcareous - containing appreciable quantities of calcium carbonate.;
Well graded - having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly graded - predominantly of one grain size, or having a range of sizes with some intermediate size missing.

Data presented hereon is for the sole use of the stipulated client. Tetra Tech EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of EBA. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, EBA will provide it upon written request.

MODIFIED UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION
COARSE-GRAINED SOILS More than 50% retained on 75 µm sieve*	GRAVELS 50% or more of coarse fraction retained on 4.75 mm sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes 4.75 mm sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (by behavior) 50% or more passes 75 µm sieve*	SILTS Liquid limit <50		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands of slight plasticity
	SILTS Liquid limit >50		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit <30		CL	Inorganic clays of low plasticity, gravelly clays, sandy clays, silty clays, lean clays
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit 30-50		CI	Inorganic clays of medium plasticity, silty clays
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit >50		CH	Inorganic clays of high plasticity, fat clays
	ORGANIC SILTS AND CLAYS Liquid limit <50		OL	Organic silts and organic silty clays of low plasticity
	ORGANIC SILTS AND CLAYS Liquid limit >50		OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA

Classification on basis of percentage of fines

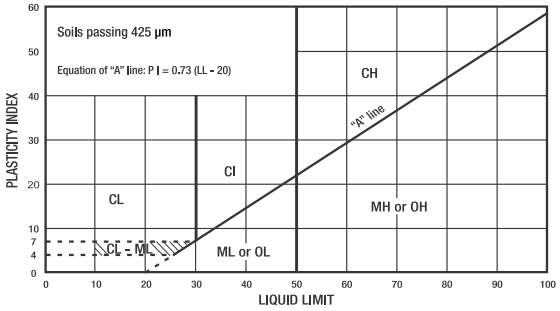
Less than 5% Pass 75 µm sieve
More than 12% Pass 75 µm sieve
5% to 12% Pass 75 µm sieve

GW, GP, SW, SP
GM, GC, SM, SC
Borderline Classification requiring use of dual symbols

$C_U = D_{60} / D_{10}$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$	Greater than 4 Between 1 and 3	
Not meeting both criteria for GW		
Atterberg limits plot below "A" line or plasticity index less than 4		Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
Atterberg limits plot above "A" line or plasticity index greater than 7		
$C_U = D_{60}/D_{10}$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$	Greater than 6 Between 1 and 3	
Not meeting both criteria for SW		
Atterberg limits plot below "A" line or plasticity index less than 4		Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
Atterberg limits plot above "A" line or plasticity index greater than 7		

For classification of fine-grained soils and fine fraction of coarse-grained soils.

PLASTICITY CHART



*Based on the material passing the 75 mm sieve
Reference: ASTM Designation D2487, for identification procedure see D2488. USC as modified by PFRA

SOIL COMPONENTS

FRACTION	SIEVE SIZE PASSING	SIEVE SIZE RETAINED	DEFINING RANGES OF PERCENTAGE BY MASS OF MINOR COMPONENTS PERCENTAGE	DESCRIPTOR
GRAVEL			>35 %	"and"
coarse	75 mm	19 mm		
fine	19 mm	4.75 mm	21 to 35 %	"y-adjective"
SAND				
coarse	4.75 mm	2.00 mm	10 to 20 %	"some"
medium	2.00 mm	425 µm		
fine	425 µm	75 µm	>0 to 10 %	"trace"
SILT (non plastic) or CLAY (plastic)	75 µm		as above but by behavior	

OVERSIZE MATERIAL

Rounded or subrounded

COBBLES	75 mm to 300 mm
BOULDERS	> 300 mm

Not rounded

ROCK FRAGMENTS	>75 mm
ROCKS	> 0.76 cubic metre in volume

Tt_Modified Unified Soil Classification.cdr

TETRA TECH

BOREHOLE KEYSHEET

Water Level Measurement

 Measured in standpipe, piezometer or well

 Inferred

Sample Types

 A-Casing

 Core

 Disturbed, Bag, Grab

 HQ Core

 Jar

 Jar and Bag

 NQ Core

 No Recovery

 Split Spoon/SPT

 Tube

Backfill Materials

 Asphalt

 Bentonite

 Cement/ Grout

 Drill Cuttings

 Grout

 Gravel

 Sand

 Slough

 Topsoil Backfill

Lithology - Graphical Legend[1]

 Asphalt

 Bedrock

 Cobbles/Boulders

 Clay

 Coal

 Concrete

 Fill

 Gravel

 Limestone

 Mudstone

 Organics

 Peat

 Sand

 Sandstone

 Shale

 Silt

 Siltstone

 Till

 Topsoil

1. The graphical legend is an approximation and for visual representation only. Soil strata may comprise a combination of the basic symbols shown above. Particle sizes are not drawn to scale

TETRA TECH

Sumus Property Group Ltd.

Borehole No: **23BH001**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 999.61 m
Lethbridge County, AB	UTM: 371849 E; 5508582 N; Z 12

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.									999
		CLAY - silty, some sand, damp, very stiff, medium plastic, light brown, sand pockets.				B1		8.8			
1		... silt lenses.				B2		15.1			
		... damp to moist, stiff, white precipitates.				D1	10				998
2		CLAY (TILL) - silty, some sand, trace gravel, moist, very stiff, medium plastic, brown with dark brown mottling, coal and oxide specks, sand pockets throughout.				B3		14			
		... sandy, low plastic for 150 mm.				B4		15.2			
		... silt lenses.									997
3		... very moist, firm, dark brown with grey mottling, oxide staining, with stiff clay layers.		CI		D2	5	15.2			
		... heavy oxide staining.				B5					996
4	Solid stem auger										
		... moist, stiff.				B6					
		... occasional very moist and firm spots.				D3	9	18.1			995
5						B7					
						B8					994
6											
		... brown to dark brown, sand pockets.				D4	10	16			
		... very stiff.				B9					993
7											
		... coal fragments.				B10					
						D5	12	17.5			992
8		... coal smearing.				B11					
						B12					991
9											
						D6	11	16.8			990
		End of Borehole @ 9.6 m.									
10		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 9.6 m. Indicated Water Level Measured on 2/10/2023.									989
11											

2/10/2023

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 9.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH002**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 997.44 m
Lethbridge County, AB	UTM: 372128 E; 5508641 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.							997
		CLAY - silty, some sand, damp to moist, very stiff, medium plastic, light brown, sand pockets.		B1		14.4			
1		... white precipitates, oxide specks.		B2		10.3			996
		CLAY (TILL) - silty, some sand, trace gravel, damp to moist, very stiff, medium plastic, brown to dark brown, coal and oxide specks, white precipitates, sand pockets.		D1	14	11.5			
2		... grey mottling, white precipitates throughout.		B3					
				B4		14.3			995
3	Solid stem auger	... coal fragments.		D2	16	15.1			
		... moist, heavy sand inclusions for 100 mm.		B5					994
4		... oxide staining.		B6					
		... stiff to very stiff.		D3	10	16			993
5				B7					
				B8					992
6				D4	11	16.5			
	2/10/2023	End of Borehole @ 6.6 m.							991 2/10/2023
7		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Indicated Water Level Measured on 2/10/2023.							990
8									989
9									988
10									987
11									

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH003**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 996.71 m
Lethbridge County, AB	UTM: 372397 E; 5508601 N; Z 12

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.									
		CLAY - silty, some sand, moist, very stiff, medium plastic, brown, silt lenses.				B1		17.3			996
1		... damp to moist, sand pockets.		CL-CI		B2		14.6			
		... some sand to sandy, very moist, firm, low to medium plastic, white precipitates.				D1	5				995
2		CLAY (TILL) - silty, some sand, trace gravel, very moist, firm to stiff, medium plastic, brown, coal and oxide specks, sand pockets.				B3		15.3			
						B4		17.1			994
3		... oxide staining.				D2	6	17.7			
		... sand inclusions.				B5					993
4						B6		20			
	Solid stem auger	... stiff, grey mottling, occasional high plastic clay inclusions.				D3	9	17.7			992
5						B7					
		... oxide staining.				B8					991
6				CI		D4	7	21.3			
		... stiff to very stiff.				B9					990
7						B10					
						D5	8	18.1			989
8		... very stiff.				B11					
						B12					988
9						D6	14	20.1			
		End of Borehole @ 9.6 m.									987
10		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 9.6 m. Indicated Water Level Measured on 2/10/2023.									
11											986

2/10/2023 (Depth)

2/10/2023 (Elevation)

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 9.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH004**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 996.6 m
Lethbridge County, AB	UTM: 372340 E; 5508804 N; Z 12

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.									996
		CLAY - silty, some sand, damp, very stiff, medium plastic, brown, white precipitates, sand pockets.				B1		13			
1						B2		12.6			995
		... stiff, silt pockets.		CI		D1	6	12.9			
2		CLAY (TILL) - silty, some sand, trace gravel, moist, stiff, medium plastic, brown, coal and oxide specks, sand pockets throughout.				B3					
						B4		15.8			994
		... coal fragments.									
3						D2	8	16.9			
		... sand pockets throughout.									993
4						B5					
						B6					992
						D3	9	17.9			
5		... very stiff, grey mottling, oxide staining.				B7					
						B8					991
6						D4	17	16.9			
		End of Borehole @ 6.6 m.									990
7		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Indicated Water Level Measured on 2/10/2023.									989
8											988
9											987
10											986
11											

Solid stem auger

2/10/2023

2/10/2023

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH005**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 998.4 m
Lethbridge County, AB	UTM: 372087 E; 5508832 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.							998
		CLAY - silty, some sand to sandy, damp, very stiff, medium plastic, brown, sand pockets.		B1		12.7			
1		... light brown, white precipitates.							
		...soluble sulfate content = 0.008% @ 1.2 m.		B2		9.8			997
		... stiff.		D1	9				
2		CLAY (TILL) - silty, trace to some sand, trace gravel, moist, very stiff, medium to high plastic, light brown, coal specks.		B3		32			
		... some sand, medium plastic, silt and sand pockets.		B4		18.9			996
3									
		... moist to very moist, firm to stiff, high plastic clay inclusions.		D2	6	19			
	Solid stem auger			B5					995
4									
		... very moist, oxide staining.		B6					994
		... trace to some sand, moist, stiff, medium to high plastic.		D3	8	23.8			
5				B7					
									993
		... sand pockets.		B8					
6									992
		... some sand, medium plastic, occasional high plastic clay inclusions.		D4	9	18.4			
		End of Borehole @ 6.6 m.							
7		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Indicated Water Level Measured on 2/10/2023.							991
8									
									990
9									
									989
10									
									988
11									

2/10/2023

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH006**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 999.49 m
Lethbridge County, AB	UTM: 371894 E; 5508792 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.							999
		CLAY - silty, some sand, damp, very stiff, medium plastic, brown, sand pockets.		B1		12			
1				B2		8.1			998
		CLAY (TILL) - silty, some sand, trace gravel, damp to moist, very stiff, medium plastic, brown, coal and oxide specks, white precipitates throughout, sand pockets.		D1	12	12			
2				B3					
		... brown with dark brown mottling.		B4		14.6			997
3				D2	10	14.5			
		... moist, stiff to very stiff, coal fragments.		B5					996
4		... grey mottling, oxide staining.		B6					
		... sand pockets.		D3	10	15			995
5				B7					
				B8					994
6		... grey brown.		D4	13	15.1			
		End of Borehole @ 6.6 m.							993
7		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Indicated Water Level Measured on 2/10/2023.							992
8									
									991
9									
									990
10									
									989
11									

2/10/2023

Solid stem auger

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH007**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 999.13 m
Lethbridge County, AB	UTM: 371835 E; 5509001 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.							999
		CLAY - silty, some sand to sandy, damp, very stiff, medium plastic, light brown, sand pockets.		B1		13.5			
1		... stiff, high plastic clay inclusions.		B2		20.5			998
				D1	9				
2		CLAY (TILL) - silty, some sand, trace gravel, moist, stiff to very stiff, medium plastic, brown with dark brown mottling, coal and oxide specks, high plastic clay inclusions, white precipitates.		B3		14			997
		... silt lenses, oxide staining.		B4		15.3			
3	Solid stem auger	... moist to very moist, firm to stiff, grey mottling.		D2	6	16.6			996
				B5					
4		... very moist.		B6		20.6			995
		... coal fragments.		D3	6				
5		... sand pockets throughout.		B7		21.8			994
		... moist to very moist, stiff.		B8					
6		... moist, very stiff.		D4	14	16			993
		End of Borehole @ 6.6 m.							
7		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Indicated Water Level Measured on 2/10/2023.							992
8									991
9									990
10									989
11									

2/10/2023

2/10/2023

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH008**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 997.7 m
Lethbridge County, AB	UTM: 372126 E; 5509018 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.							997.7
1		CLAY - silty, some sand, damp to moist, very stiff, medium plastic, brown, sand pockets.		B1		16.6			
		... damp, light brown.		B2		11.2			
2		CLAY (TILL) - silty, some sand, trace gravel, damp, stiff, medium plastic, light brown, coal and oxide specks, low blow count probably due to less moisture (brittle).		D1	7				996
				B3		13.9			
		... stiff to very stiff, brown, sand pockets.		B4		13.5			
		... white precipitates.							
3									995
		... moist, stiff, dark brown mottling.		D2	10	15			
				B5					
4									994
				B6					
5	Solid stem auger	... grey mottling and oxide staining.		D3	8	16.8			993
				B7					
	2/10/2023			B8					992
6									
		... very stiff.		D4	12	17.1			
		... occasional very moist and firm spots (pp = 0.75~1.25)		B9					991
7									
				B10					
				D5	17	15.2			990
8		... low pocket pen reading probably due to frequent sand inclusions.		B11					
				B12					989
9									
				D6	14	15			
		End of Borehole @ 9.6 m.							988
10		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 9.6 m. Indicated Water Level Measured on 2/10/2023.							
11									987

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 9.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH009**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 996.2 m
Lethbridge County, AB	UTM: 372360 E; 5508990 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen, dark brown, trace rootlets and organics.							996
		CLAY - silty, some sand, very moist, firm, medium plastic, brown, sand pockets.		B1		23			
1		... moist to very moist, stiff, grey brown, silt lenses.		B2		22.4			995
		... firm, sand pockets throughout, trace free water.		D1	5				
2		CLAY (TILL) - silty, some sand, trace gravel, very moist, firm, medium plastic, brown, coal and oxide specks.		B3		21.3			
		... sand pockets, coal fragments.		B4		20.3			994
3		... moist, stiff, sand pockets throughout.		D2	8	16.7			993
				B5					
4				B6					992
5		... moist to very moist, firm to stiff, grey mottling.		D3	5	17.5			
				B7					991
		... moist, very stiff, grey brown.		B8					
6		... sand inclusions throughout.		D4	16	15			990
		End of Borehole @ 6.6 m.							
7		Seepage at 1.5 m, Sloughing at 6.1 m. Slotted 1" PVC Pipe Installed to 6.1 m. Indicated Water Level Measured on 2/10/2023.							989
8									988
9									987
10									986
11									

2/10/2023

Solid stem auger

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 2, 2023
Logged By: SA	Completion Date: February 2, 2023
Reviewed By: JZ	Page 1 of 1

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Sumus Property Group Ltd.

Borehole No: **23BH010**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 996.93 m
Lethbridge County, AB	UTM: 372159 E; 5509196 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen to moist, dark brown, trace rootlets and organics.							996.93
		CLAY - silty, some sand, damp, very stiff, medium plastic, light brown, sand pockets.		B1		9.9			
1		CLAY (TILL) - silty, some sand, trace gravel, damp, very stiff, medium plastic, light brown, coal and oxide specks, sand pockets, white precipitates.		B2		18.4			996
		... moist, brown.							
		... damp to moist, stiff, grey mottling, white precipitates.		D1	9				
2				B3		12.6			995
				B4		14.2			
3	Solid stem auger								994
		... very moist, firm, oxide staining.		D2	5	17.4			
		... firm to stiff, sand pockets throughout.		B5					
4									993
				B6					
		... coal fragments.		D3	6	17.2			
5		... moist, stiff.		B7		16.1			992
		... heavy oxide staining.		B8					
6									991
		... gypsum crystals.		D4	10	17.1			
		End of Borehole @ 6.6 m.							
7		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Indicated Water Level Measured on 2/10/2023.							990
8									989
9									988
10									987
11									986

2/10/2023

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 3, 2023
Logged By: SA	Completion Date: February 3, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH011**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 998.04 m
Lethbridge County, AB	UTM: 371906 E; 5509221 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen to moist, dark brown, trace rootlets and organics.							998
		CLAY - silty, some sand, damp, very stiff, medium plastic, light brown, silt and sand pockets.		B1		7.8			
1				B2		7.7			997
		CLAY (TILL) - silty, some sand, trace gravel, moist, stiff, medium plastic, brown, coal and oxide specks, white precipitates.		D1	8				
2		... stiff to very stiff, sand pockets.		B3		17.3			996
				B4		18.2			
3	Solid stem auger	... coal fragmnets.		D2	10	16.5			995
		... grey mottling.		B5					
4				B6					994
		... coal smearing.		D3	9	17.7			
5				B7					993
		... moist, very stiff.		B8					
6		... oxide staining.		D4	15	16.8			992
		End of Borehole @ 6.6 m.							
7		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Indicated Water Level Measured on 2/10/2023.							991
8									990
9									989
10									988
11									

2/10/2023

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 3, 2023
Logged By: SA	Completion Date: February 3, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH012**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 997.26 m
Lethbridge County, AB	UTM: 371849 E; 5509493 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen to moist, dark brown, trace rootlets and organics.							997
		CLAY - silty, some sand, damp, very stiff, medium plastic, light brown, silt and sand pockets.		B1		9.4			
1				B2		9.4			996
		... brown.		D1	10				
		CLAY (TILL) - silty, some sand, trace gravel, moist, stiff to very stiff, medium plastic, brown with dark brown mottling, coal and oxide specks, white precipitates, sand pockets throughout.		B3		16.1			
2				B4		11.2			995
		... sandy, low plastic for 300 mm, coal fragments.							
	Solid stem auger	... some sand, medium plastic, sand pockets.		D2	10	14.5			
3				B5					994
				B6					
4		... oxide staining, coal smearing, occasional very moist and firm spots.		D3	10	17.1			993
				B7					
5		... trace gravel up to 50 mm.		B8					992
				D4	15	14.8			
6									991
		End of Borehole @ 6.6 m.							
7		No Seepage or Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Water Level Measured as DRY on 2/10/2023							990
8									989
9									988
10									987
11									

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 3, 2023
Logged By: SA	Completion Date: February 3, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH013**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 997.22 m
Lethbridge County, AB	UTM: 372083 E; 5509440 N; Z 12

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen to moist, dark brown, trace rootlets and organics.									997
		CLAY - silty, some sand to sandy, damp, very stiff, low to medium plastic, light brown, silt inclusions throughout.				B1		11.1			
1		CLAY (TILL) - silty, some sand, trace gravel, moist, very stiff, medium plastic, brown, coal and oxide specks, sand pockets.				B2		21.8			996
		...soluble sulfate content = 0.075% @ 1.5 m.		CI		D1	4	16			
		... very moist, firm, grey mottling.									
2		... moist, very stiff for 300 mm, white precipitates.				B3		15.2			995
		... very moist to moist, firm to stiff.				B4		17.4			
3											
2/10/2023		... moist, stiff, brown with grey mottling, coal fragments.				D2	8	17.9			994
						B5					
4	Solid stem auger										993
		... oxide staining.				B6					
		... occasional sand pockets.				D3	8	15.4			
5						B7					992
						B8					
6											
		... occasional very moist and firm spots, heavy oxide staining, sand pockets throughout.				D4	8	18.8			991
						B9					
7											
						B10					990
		... heavy sand inclusions for 100 mm, trace free water.				D5	5	19.7			
8						B11					989
						B12		16.7			
9											
		... high plastic, light grey.		CH		D6	22	18.5			988
		End of Borehole @ 9.6 m.									
10		Seepage at 7.8 m, No Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 9.6 m. Indicated Water Level Measured on 2/10/2023.									987
11											

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 9.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 3, 2023
Logged By: SA	Completion Date: February 3, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH014**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 995.95 m
Lethbridge County, AB	UTM: 372080 E; 5509659 N; Z 12

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen to moist, dark brown, trace rootlets and organics.									
		CLAY - silty, some sand, moist, stiff, medium plastic, brown, silt and sand pockets.				B1		20.7			
1						B2		17.8			995
		CLAY (TILL) - silty, some sand, trace gravel, very moist, firm, medium plastic, brown, coal and oxide specks, sand pockets, white precipitates.				D1	4	22.4			
2		... coal fragments.				B3					
2/10/2023						B4		16			994
3	Solid stem auger	... some sand to sandy, firm to stiff, low to medium plastic, trace gravel up to 30 mm.		CL-CI		D2	6	14.6			993
		... some sand, medium plastic, occasional stiff spots.				B5					
4		... sand pockets distributed throughout.				B6		16.2			992
		... moist, stiff, grey mottling.				D3	8	17.4			
5		... heavy oxide staining.				B7					991
		... stiff to very stiff.				B8					
6						D4	10	16.4			990
		End o Borehole @ 6.6 m.									
7		No Seepage, Sloughing at 6.0 m upon Completion. Slotted 1" PVC Pipe Installed to 6.6 m. Indicated Water Level Measured on 2/10/2023.									989
8											988
9											987
10											986
11											985

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 6.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 3, 2023
Logged By: SA	Completion Date: February 3, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

Sumus Property Group Ltd.

Borehole No: **23BH015**

Project: Chinook Industrial Park ASP	Project No: 704-ENG.LGEO04625-01
Location: 10-9-21-W4M	Ground Elev: 996.41 m
Lethbridge County, AB	UTM: 371926 E; 5509752 N; Z 12

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	Elevation (m)
0		TOPSOIL - clay, silty, sandy, frozen to moist, dark brown, trace rootlets and organics.							
		CLAY - silty, some sand, damp, very stiff, medium plastic, light brown, sand pocket.		B1		12.2			996
1				B2		11.8			
		CLAY (TILL) - silty, some sand, trace gravel, moist, stiff to very stiff, medium plastic, brown to dark brown, sand pockets, white precipitates.		D1	8	15.2			995
2		... coal fragments.		B3		17.7			
				B4					994
3		... moist to very moist, stiff.		D2	6	18			
				B5					993
4				B6		16.7			
	Solid stem auger	... very moist, firm, heavy oxide staining, sand pockets distributed throughout.		D3	5	25.3			992
5		... firm to stiff.		B7					
		... moist, stiff to very stiff, dark brown to grey.		B8					991
6									
		... trace free water.		D4	9	18.6			990
				B9					
7									
				B10					989
				D5	13	16.9			
8				B11					
				B12					988
9									
				D6	15	16.5			987
		End of Borehole @ 9.6 m.							
10		Seepage at 6.3 m, No Sloughing upon Completion. Slotted 1" PVC Pipe Installed to 9.6 m. Indicated Water Level Measured on 2/10/2023.							986
11									

2/10/2023

TETRA TECH

Contractor: Chilako Drilling	Completion Depth: 9.6 m
Equipment Type: 150 mm Solid Stem	Start Date: February 3, 2023
Logged By: SA	Completion Date: February 3, 2023
Reviewed By: JZ	Page 1 of 1

GEOTECHNICAL 704-ENG.LGEO04625-01.GPJ EBA.GDT 4/14/23

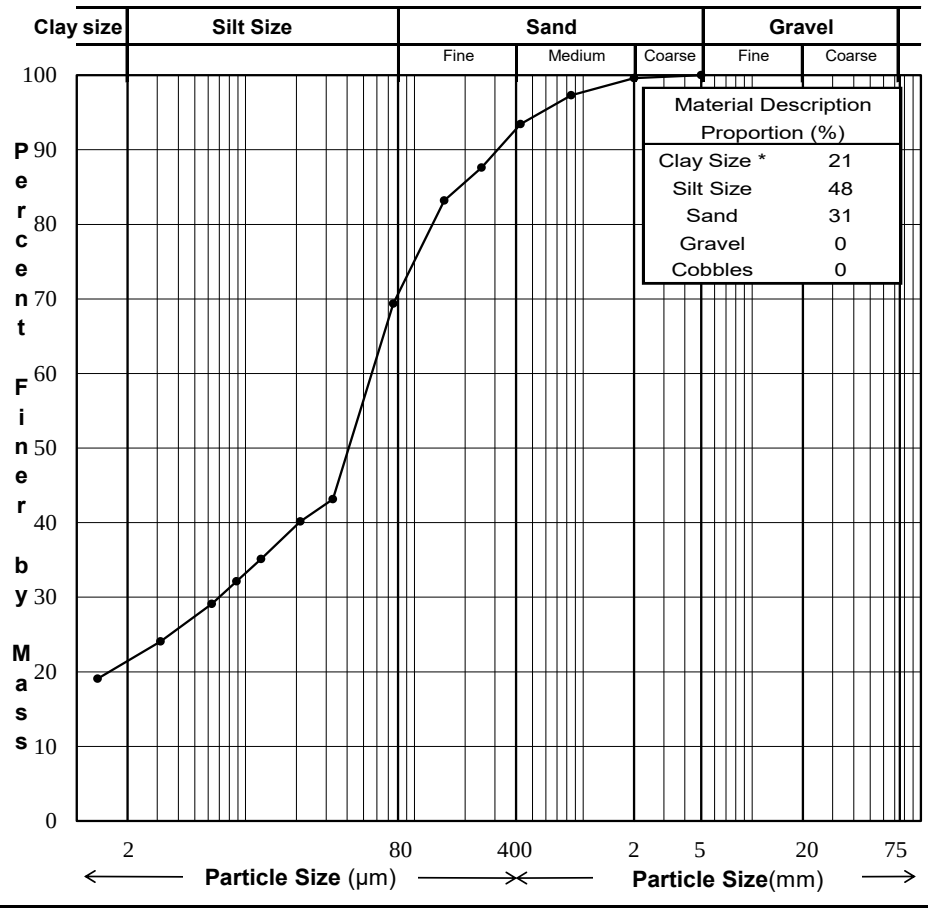
APPENDIX C
LABORATORY RESULTS

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	Chinook Industrial Park - ASP	Sample No.:	
Client:	Sumus Property Group Ltd.	Borehole/ TP:	23BH001
Project No.:	ENG.LGEO04625-01	Depth:	D2 (3.0 - 3.45 m)
Location:		Date Tested	February 13, 2023
Description **:	CLAY - silty, sandy.	Tested By:	SA

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
13 mm	
10 mm	
5 mm	100
2 mm	100
850 µm	97
425 µm	93
250 µm	88
150 µm	83.2
75 µm	69.4
33 µm	43.2
21 µm	40.1
12 µm	35.1
9 µm	32.1
6 µm	29.1
3 µm	24.1
1 µm	19.1



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is behaviour based & subject to Tetra Tech description protocols.

Reviewed By: _____ P.Eng.

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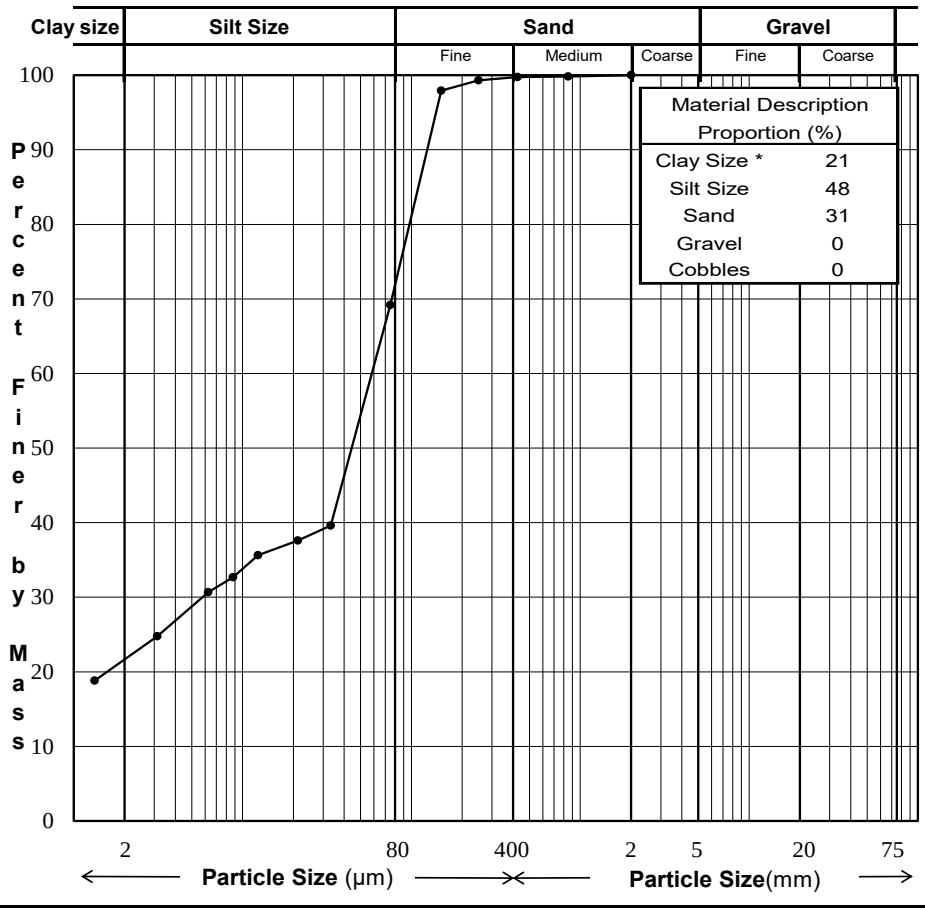
TETRA TECH

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	Chinook Industrial Park - ASP	Sample No.:	
Client:	Sumus Property Group Ltd.	Borehole/ TP:	23BH003
Project No.:	ENG.LGEO04625-01	Depth:	B2 (1.2 m)
Location:		Date Tested	February 13, 2023
Description **:	CLAY - silty, sandy.	Tested By:	SA

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
13 mm	
10 mm	
5 mm	
2 mm	100
850 µm	100
425 µm	100
250 µm	99
150 µm	97.9
75 µm	69.2
33 µm	39.6
21 µm	37.6
12 µm	35.6
9 µm	32.7
6 µm	30.7
3 µm	24.7
1 µm	18.8



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is behaviour based & subject to Tetra Tech description protocols.

Reviewed By: _____ P.Eng.

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TETRA TECH

CONSTANT HEAD HYDRAULIC CONDUCTIVITY TEST REPORT

ASTM D5084

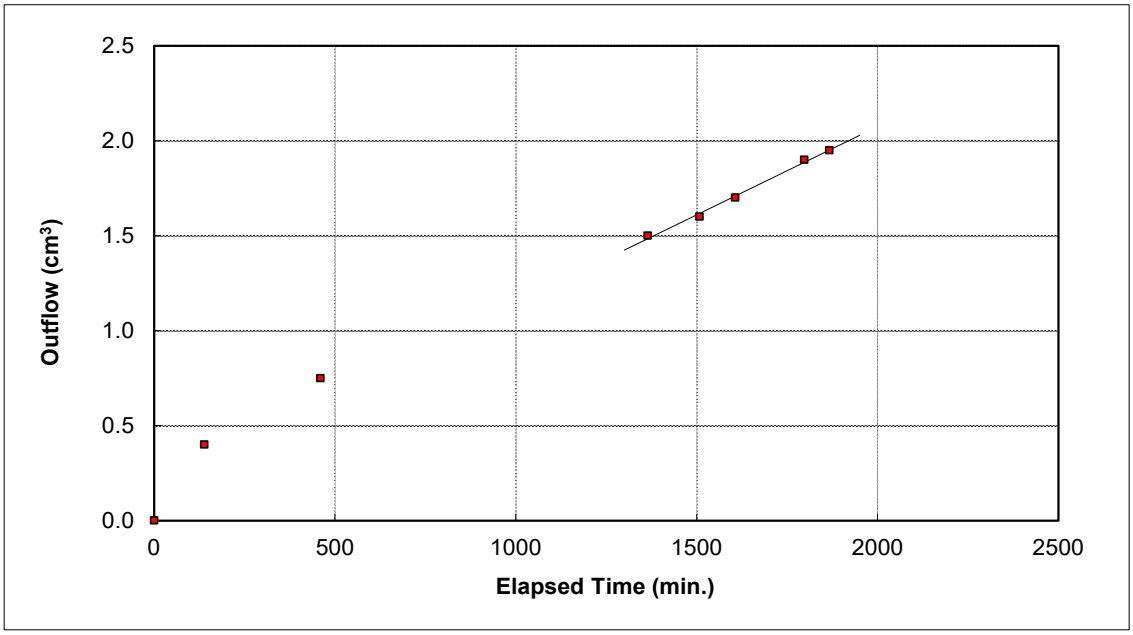
Project:	Chinook Industrial Park ASP	Sample No.:	L-24 (P-1)
Project No.:	ENG.LGEO04625-01	Borehole No.:	23BH-014
Client:	Sumus Property Group Ltd.	Depth:	1.5-3.0 m
Attention:	Michael Kelly	Date Tested:	February 17, 2023
		Tested By:	TD

Soil Description: CLAY, silty, some sand, brown

	Initial	Final
Moisture Content (%)	15.0	16.9
Dry Density (kg/m3)	1824	1835
Compaction SPD (if applicable)	97.6%	98.1%

Sample Height =	5.14	cm
Sample Diameter =	7.08	cm
Head Differential =	14	kPa
Flow Q =	1.8E-05	cm^3/sec
Hydraulic Gradient i =	27.78	
Area of Sample A =	39.39	cm^2

Hydraulic Conductivity k_{20} = **1.6E-08 cm/sec**



Remarks: Remolded Sample

Reviewed By: V.O P.Eng.

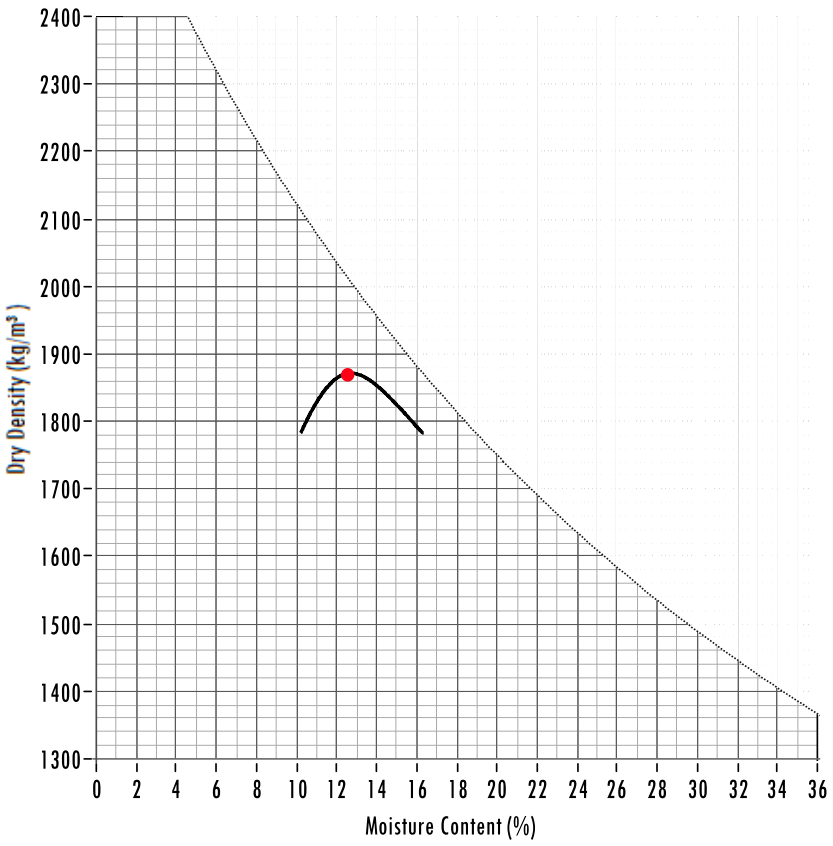
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TETRA TECH

Moisture-Density Relationship - Proctor Report

ASTM D698

Proj No:	LGE004625-01	Sample #:	L-24		
Project:	Chinook Industrial Park ASP	Site:	Densities	Rpt #:	1
Client:	Sumus Property Group Ltd	Date Received:	Feb 03,2023	By:	SA
Address:	PO Box 932 (MSK Developments), Lethbridge Alberta T1J3Z8	Date Tested:	Feb 13,2023	By:	MS
Description:	Clay, silty, some sand				
Soil Source:	Native	Location:	23BH-014 @ 1.5-3.0m		
Attention:	Michael Kelly				



Maximum Density: 1870 kg/m³
Optimum Moisture: 12.5 %

as-Received Moisture: 17.3 %

Method: ☑ A ☐ B ☐ C

Compaction: Manual

Zero Air Voids SG: 2.70

Reviewed by: Christa Toles

Christa Toles, C.E.T.

Remarks:

cc:

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APPENDIX D
DESIGN AND CONSTRUCTION GUIDELINES

SHALLOW FOUNDATIONS

Design and construction of shallow foundations should comply with relevant Building Code requirements.

The term ‘shallow foundations’ includes strip and spread footings, mat slab, and raft foundations.

Minimum footing dimensions in plan should be in accordance with the applicable design code of the local jurisdiction.

No loose, disturbed or sloughed material should be allowed to remain in open foundation excavations. Hand cleaning should be undertaken to prepare an acceptable bearing surface.

Foundation excavations and bearing surfaces should be protected from rain, snow, freezing temperatures, excessive drying, and the ingress of free water before, during, and after footing construction.

Footing excavations should be carried down into the designated bearing stratum.

After the bearing surface is approved, a mud slab should be poured to protect the soil against inclement weather and provide a working surface for construction.

All constructed foundations should be placed on unfrozen soils, which should be at all times protected from frost penetration.

All foundation excavations and bearing surfaces should be inspected by a qualified geotechnical engineer to check that the recommendations contained in this report have been followed.

Where over-excavation has been carried out through a weak or unsuitable stratum to reach into a suitable bearing stratum or where a foundation pad is to be placed above stripped natural ground surface such over-excavation may be backfilled to subgrade elevation utilizing either structural fill or lean-mix concrete. These materials are defined below:

- “Structural engineered fill” should comprise clean, well-graded granular soils.
- “Lean-mix concrete” should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa.

BORED CAST-IN-PLACE CONCRETE PILES

Design and construction of piles should comply with relevant Building Code requirements.

Piles should be installed under full-time inspection of qualified geotechnical personnel. Pile design parameters should be reviewed in light of the findings of the initial bored shafts drilled on a site. Further design review may be necessary if conditions observed during site construction do not conform to design assumptions.

Where fill material or lenses or strata of sand, silt or gravel are present within the designed pile depth, these may be incompetent and/or water bearing and may cause sloughing. Casing should be on hand before drilling starts and be used, if necessary, to seal off water and/or prevent sloughing of the bore.

If piles are to be underreamed (belled), the underreams should be formed entirely in self-supporting soil and entirely within the competent bearing stratum. Where sloughing occurs at design elevation it may be necessary to extend the base of the pile bell to a greater depth. Piles may be constructed with bells having outside diameters up to approximately three times the diameters of their shafts. Piles with shaft diameters of less than 400 mm should not be underreamed due to difficulties associated with ensuring a clean base.

Prior to pouring concrete, bottoms of pile bells or of straight shaft end bearing piles should be mechanically cleaned of all disturbed material.

Pile bores should be visually inspected after completion to ensure that disturbed materials and/or water are not present on the base so that recommended allowable bearing and skin friction parameters may apply.

Other procedures to inspect the pile shafts may be used where shaft diameters of less than 760 mm (30 inch) are constructed, such as, inspection with a light or with the use of a downhole camera.

For safety reasons, where hand cleaning and/or 'down shaft' inspection by personnel are required, the pile shaft must be cased full length prior to personnel entering the shaft.

Reinforcing steel should be on hand and should be placed as soon as the bore has been completed and approved.

Longitudinal reinforcing steel is recommended to counteract the possible tensile stresses induced by frost action and should extend to a minimum depth of 3.5 m. A minimum steel of 0.5 percent of the gross shaft area is recommended or per applicable building code requirements.

Where a limited quantity of water is present on the pile base (<50 mm), it should be removed. Where significant quantities of water are present (>50 mm), and it is impracticable to exclude water from the pile bore, concrete should be placed by tremie techniques or a concrete pump.

A "dry" pile should be poured by "free fall" of concrete only where impact of the concrete against the reinforcing cage, which can cause segregation of the concrete, will not occur. A hopper should be used to direct concrete down the centre of the pile base and to prevent impact of concrete against reinforcing steel.

Concrete used for "dry" uncased piles should be self-compacting and should have a target slump of 125 mm. Where casing is required to prevent sloughing or seepage, the slump should be increased to 150 mm. The casing should be filled with concrete and then the casing should be withdrawn smoothly and continuously. Sufficient concrete should be placed to allow for the additional volume of the casing and reduction in level of the concrete as the casing is withdrawn. Concrete should not be poured on top of previously poured concrete, after the casing is withdrawn. In order to comply with maximum water:cement ratios for the concrete, the use of chemicals (or superplasticizers) to temporarily increase the slump may be required. Concrete for each pile should be poured in one continuous operation and should be placed immediately after excavation and inspection of piles, to reduce the opportunity for the ingress of free water or deterioration of the exposed soil or rock.

If piles cannot be formed in dry conditions then the concrete should be placed by tremie tube or concrete pump. Concrete placed by tremie should have a slump of not less than 150 mm. A ball or float should be used in the tremie tube to separate the initial charge of concrete from the water in the pile bore. The outlet of the tremie tube should be maintained at all times 1.0 m to 2.0 m below the surface of the concrete. The diameter of the tremie tube should be at least 200 mm. The tube should be water tight and not be made of aluminum. Smaller diameter pipes may be used with a concrete pump. The surface of the concrete should be allowed to rise above the cut off level of the pile, so that when the temporary casing is withdrawn and the surface level of the concrete adjusts to the new volume, the top of the uncontaminated concrete is at or above the cut off level. The concrete should be placed in one continuous smooth operation without any halts or delays. Placing the lower portion of the pile by tremie tube and placing the upper portion of the pile by "free fall" should not be permitted, to ensure that defects in the pile shaft at the top of the tremie concrete do not occur. As the surface of the concrete rises in the pile bore the water in the pile bore will be displaced upwards and out of the top of the pile casing.

When concreting piles by tremie techniques, allowance should be made for the removal of contaminated or otherwise defective concrete at the tops of the piles.

An accurate record of the volume of concrete placed should be maintained as a check that a continuous pile had been formed.

Concrete should not be placed if its temperature is less than 5°C or exceeds 30°C, or if it is more than two hours old.

Where tension, horizontal or bending moment loading on the pile is foreseen, steel reinforcing should be extended and tied into the grade beam or pile cap. The steel should be designed to transfer loads to the required depth in the pile and to resist resultant bending moments and shear forces.

Void formers should be placed beneath all grade beams to reduce the risk of damage due to frost effects or soil moisture changes.

Where the drilling operation might affect the concrete in an adjacent pile (i.e., where pile spacing is less than approximately three diameters) drilling should not be carried out before the previously poured pile concrete has set for at least 24 hours.

Where a group of four or more piles are used the allowable working load on the piles may need to be modified to allow for group effects.

Piles should be spaced no closer than 2.5 times the pile shaft diameter, measured centre-to-centre. Strict control of pile location and verticality should be exercised to provide accurate locations and spacings of piles. In general, piles should be constructed within a tolerance of 75 mm plan distance in any direction and within a verticality of 1%.

A detailed record should be kept of pile construction; the following information should be included, pile number, shaft/base diameter, date and time bored, date and time concreted, elevation of piling platform, depths (from piling platform level) to pile base and to concrete cut off level, length of casing used, details of reinforcement, details of any obstructions, details of any groundwater inflows, brief description of soils encountered in the bore and details of any unusual occurrences during construction.

If a large number of piles are to be installed, it may be possible to optimize the design on the basis of pile load tests or conducting high strain dynamic pile testing.

FLOOR SLABS-ON-GRADE

All soft, loose or organic material should be removed from beneath slab areas. If any local 'hard spots' such as old basement walls or abandoned pile foundation are revealed beneath the slab area, these should be over-excavated and removed to not less than 0.9 m below underside of slab level. The exposed soil should be proof-rolled and the final grade restored by engineered fill placement. If proof-rolling reveals any soft or loose spots, these should be excavated and the desired grade restored by engineered fill placement. The subgrade should be compacted to a depth of not less than 0.3 m to a density of not less than 98 percent Standard Proctor Maximum Dry Density (ASTM Test Method D698).

If, for economic reasons, it is considered desirable to leave low quality material in-place, such as existing fills, beneath a slab-on-grade, special ground treatment procedures may be considered, Tetra Tech could provide additional advice on this aspect if required.

A levelling course of well graded granular fill (with maximum size of 20 mm), at least 150 mm in compacted thickness, is recommended directly beneath all slabs-on-grade. The type of granular fill should be selected based on the design floor loadings. Alternatively a minimum thickness of 150 mm of 80 mm pit-run gravel overlain by a minimum thickness of 50 mm of 20 mm crushed gravel may be used. Coarse gravel particles larger than 25 mm diameter should be avoided directly beneath the slab-on-grade to limit potential stress concentrations within the slab. All levelling courses directly under floor slabs should be compacted to 100 percent of Standard Proctor Maximum Dry Density (ASTM Test Method D698).

Engineered fill, pit-run gravel and crushed gravel are defined under the heading 'Backfill Materials and Compaction' elsewhere in this Appendix.

The excavated subgrade beneath slabs-on-grade should be protected at all times from rain, snow, freezing temperatures, excessive drying and the ingress of free water. This applies before, during, and after the construction period.

CONSTRUCTION EXCAVATIONS

Construction should be in accordance with good practice and comply with the requirements of the responsible regulatory agencies.

All excavations greater than 1.5 m deep should be sloped or shored for worker protection.

Shallow excavations up to about 3 m depth may use temporary sideslopes of 1H:1V. A flatter slope of 2H:1V should be used if groundwater is encountered. Localized sloughing can be expected from these slopes.

Deep excavations or trenches may require temporary support if space limitations or economic considerations preclude the use of sloped excavations.

For excavations greater than 3 m depth, temporary support should be designed by a qualified geotechnical engineer. The design and proposed installation and construction procedures should be submitted to Tetra Tech for review.

The construction of a temporary support system should be monitored. Detailed records should be taken of installation methods, materials, in situ conditions and the movement of the system. If anchors are used, they should be load tested. Tetra Tech can provide further information on monitoring and testing procedures if required.

Attention should be paid to structures or buried service lines close to the excavation. For structures, a general guideline is that if a line projected down, at 45 degrees from the horizontal from the base of foundations of adjacent structures intersects the extent of the proposed excavation, these structures may require underpinning or special shoring techniques to avoid damaging earth movements. The need for any underpinning or special shoring techniques and the scope of monitoring required can be determined when details of the service ducts and vaults, foundation configuration of existing buildings and final design excavation levels are known.

No surface surcharges should be placed closer to the edge of the excavation than a distance equal to the depth of the excavation, unless the excavation support system has been designed to accommodate such surcharge.

BACKFILL MATERIALS AND COMPACTION (GENERAL)

1.0 DEFINITIONS

“Landscape fill” is typically used in areas such as berms and grassed areas where settlement of the fill and noticeable surface subsidence can be tolerated. “Landscape fill” may comprise soils without regard to engineering quality.

“General engineered fill” is typically used in areas where a moderate potential for subgrade movement is tolerable, such as asphalt (i.e., flexible) pavement areas. “General engineered fill” should comprise clean, granular or clay soils.

“Select engineered fill” is typically used below slabs-on-grade or where high volumetric stability is desired, such as within the footprint of a building. “Select engineered fill” should comprise clean, well-graded granular soils or inorganic low to medium plastic clay soils.

“Structural engineered fill” is used for supporting structural loads in conjunction with shallow foundations. “Structural engineered fill” should comprise clean, well-graded granular soils.

“Lean-mix concrete” is typically used to protect a subgrade from weather effects including excessive drying or wetting. “Lean-mix concrete” can also be used to provide a stable working platform over weak subgrades. “Lean-mix concrete” should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa.

Standard Proctor Density (SPD) as used herein means Standard Proctor Maximum Dry Density (ASTM Test Method D698). Optimum moisture content is defined in ASTM Test Method D698.

2.0 GENERAL BACKFILL AND COMPACTION RECOMMENDATIONS

Exterior backfill adjacent to abutment walls, basement walls, grade beams, pile caps and above footings, and below highway, street, or parking lot pavement sections should comprise “general engineered fill” materials as defined above.

Exterior backfill adjacent to footings, foundation walls, grade beams and pile caps and within 600 mm of final grade should comprise inorganic, cohesive “general engineered fill”. Such backfill should provide a relatively impervious surficial zone to reduce seepage into the subsoil against the structure.

Backfill should not be placed against a foundation structure until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction. During compaction, careful observation of the foundation wall for deflection should be carried out continuously. Where deflections are apparent, the compactive effort should be reduced accordingly.

In order to reduce potential compaction induced stresses, only hand-held compaction equipment should be used in the compaction of fill within 1 m of retaining walls or basement walls. If compacted fill is to be placed on both sides of the wall, they should be filled together so that the level on either side is within 0.5 m of each other.

All lumps of materials should be broken down during placement. Backfill materials should not be placed in a frozen state, or placed on a frozen subgrade.

Where the maximum-sized particles in any backfill material exceed 50% of the minimum dimension of the cross-section to be backfilled (e.g., lift thickness), such particles should be removed and placed at other more suitable locations on site or screened off prior to delivery to site.

Excavation and construction operations expose materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration of performance. Unless otherwise specifically indicated in this report, the walls and floors of excavations, and stockpiles, must be protected from the elements, particularly moisture, desiccation, frost, and construction activities. Should desiccation occur, bonding should be provided between backfill lifts. For fine-grained materials the previous lift should be scarified to the base of the desiccated layer, moisture-conditioned, and recompacted and bonded thoroughly to the succeeding lift. For granular materials, the surface of the previous lift should be scarified to about a 75 mm depth followed by proper moisture-conditioning and recompaction.

3.0 COMPACTION AND MOISTURE CONDITIONING

“Landscape fill” material should be placed in compacted lifts not exceeding 300 mm and compacted to a density of not less than 90% of SPD unless a higher percentage is specified by the jurisdiction.

“General engineered fill” and “select engineered fill” materials should be placed in layers of 150 mm compacted thickness and should be compacted to not less than 98% of SPD. Note that the contract may specify higher compaction levels within 300 mm of the design elevation. Cohesive materials placed as “general engineered fill” or “select engineered fill” should be compacted at 0 to 2% above the optimum moisture content. Note that there are some silty soils which can become quite unstable when compacted above optimum moisture content. Granular materials placed as “general engineered fill” or “select engineered fill” should be compacted at slightly below (0 to 2%) the optimum moisture content.

“Structural engineered fill” material should be placed in compacted lifts not exceeding 150 mm in thickness and compacted to not less than 100% of SPD at slightly below (0 to 2%) the optimum moisture content.

4.0 “GENERAL ENGINEERED FILL”

Cohesive or granular soils are considered acceptable for use as “general engineered fill,” providing the soils are inorganic and free of deleterious materials.

5.0 “SELECT ENGINEERED FILL”

Low to medium plastic clay with the following range of plasticity properties is generally considered suitable for use as “select engineered fill”:

Liquid Limit	= 20 to 40%
Plastic Limit	= 10 to 20%
Plasticity Index	= 10 to 30%

Test results should be considered on a case-by-case basis.

“Pit-run gravel” and “fill sand” are generally considered acceptable for use as “select engineered fill.” See exact project or jurisdiction for specifications.

The “pit-run gravel” should be free of any form of coating and any gravel or sand containing clay, loam or other deleterious materials should be rejected. No material oversize of the specified maximum sieve size should be tolerated. This material would typically have a fines content of less than 10%.

The materials above are also suitable for use as “general engineered fill.”

6.0 "STRUCTURAL ENGINEERED FILL"

Crushed gravel used as "structural engineered fill" should be hard, clean, well graded, crushed aggregate, free of organics, coal, clay lumps, coatings of clay, silt, and other deleterious materials. The aggregates should conform to the requirement when tested in accordance with ASTM C136 and C117. See exact project or jurisdiction for specifications. This material would typically have a fines content of less than 10%.

In addition to the above, further specification criteria identified below should be met:

"Structural Engineered Fill" – Additional Material Properties

Material Type	Percentage of Material Retained on 5 mm Sieve having Two or More Fractured Faces	Plasticity Index (<400 μm)	L.A. Abrasion Loss (percent Mass)
Various sized Crushed Gravels	See exact project or jurisdiction for specifications	See exact project or jurisdiction for specifications	See exact project or jurisdiction for specifications

Materials that meet the grading limits and material property criteria are also suitable for use as "select engineered fill."

7.0 DRAINAGE MATERIALS

"Coarse gravel" for drainage or weeping tile bedding should be free draining. Free-draining gravel or crushed rock generally containing no more than 5% fine-grained soil (particles passing No. 200 sieve) based on the fraction passing the 3/4-inch sieve or material with sand equivalent of at least 30.

"Coarse sand" for drainage should conform to the following grading limits:

"Coarse Sand" Drainage Material – Percent Passing by Weight

Sieve Size	Coarse Sand*
10 mm	100
5 mm	95 – 100
2.5 mm	80 – 100
1.25 mm	50 – 90
630 μm	25 – 65
315 μm	10 – 35
160 μm	2 – 10
80 μm	0 – 3

* From CSA A23.1-09, Table 10, "Grading Limits for Fine Aggregate", Class FA1

Note that the "coarse sand" above is also suitable for use as pipe bedding material. See exact project or jurisdiction for specifications.

8.0 BEDDING MATERIALS

The "Coarse Sand "gradation presented above in Section 7.0 is suitable for use as pipe bedding and as backfill within the pipe embedment zone, however see exact project or jurisdiction for specifications.

APPENDIX D

Phase I Environmental Site Assessment
Chinook Industrial Park ASP
Portions of West ½ Section 10 TWP 9 RGE 21 W4M
Lethbridge County, Alberta



PRESENTED TO
Sumus Property Group Ltd.

FEBRUARY 28, 2023
ISSUED FOR USE
FILE: ENG.LGEO04625-01.002

Tetra Tech Canada Inc.
442 – 10 Street North
Lethbridge, AB T1H 2C7 CANADA
Tel 403.329.9009 Fax 403.328.8817

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EXECUTIVE SUMMARY

Foreword

Sumus Property Group Ltd., care of MSK Developments, retained Tetra Tech Canada Inc. (Tetra Tech) to conduct a Phase I environmental site assessment (ESA) on the Chinook Industrial Park, located within the west half of Section 10, Township 9, Range 21, West of the Fourth Meridian (W1/2 10-009-21 W4M).

Tetra Tech understands this Phase I ESA is being conducted for due diligence in support of an area structure plan (ASP) for the Chinook Industrial Park (Phase 2 and Phase 3). Phase 2 and Phase 3 of the ASP are adjacent to the north of Phase 1A and 1B of the ASP. The proposed land consists of two legal properties: Plan 1113171, Block 1, Lot 5, and Plan 0013201, Block 1, Lot 1.

The objective of the Phase I ESA is to comment on whether any past or present land use, either offsite or onsite, may have a potential to cause environmental impairment to the site.

The Phase I ESA was completed in general accordance with the Alberta Environment and Parks Alberta Environmental Site Assessment Standard and with the methods outlined in the document titled "*Canadian Standards Association Standard (CSA) Z768-01 Phase I ESA*", published by the CSA (reaffirmed 2022).

Findings and Conclusions

In general terms, there are two distinct types of potential environmental risk to any property. The first type of risk is from potential contamination from on-site land use. This would include potential accidental spills or site practices that may contaminate the property directly. The second type of risk is from contamination caused by adjacent property owners, which might then be transported through the subsurface soils by groundwater, or in overland runoff onto the site.

Potential for Impairment from On-Site Source(s)

There were no on-site sources that might have a potential to cause environmental impairment to the site through historical and/or current land use.

Potential for Impairment from Off-Site Source(s)

There were no off-site sources that might have a potential to cause environmental impairment to the site through historical and/or current land use.

Further Action/Rendering an Opinion

Based on the present study, Tetra Tech recommends that no further environmental investigation is required at this time.

Tetra Tech recommends the following for consideration:

- If buried debris or staining are encountered during future investigation or ground disturbance, a qualified environmental professional should be contacted.
- If soils containing organics are encountered during future investigation or ground disturbance, they should be removed from building footprints and not be reburied; a qualified environmental professional should be contacted.

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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Sumus Property Group Ltd. and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Sumus Property Group Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in Appendix A or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

1.1 General

Sumus Property Group Ltd. care of MSK Developments retained Tetra Tech Canada Inc. (Tetra Tech) to conduct a Phase I environmental site assessment (ESA) for the Chinook Industrial Park, located within the west half of Section 10, Township 9, Range 21, West of the Fourth Meridian (W1/2 10-009-21 W4M).

Tetra Tech understands this Phase I ESA is being conducted for due diligence in support of an area structure plan (ASP) for the Chinook Industrial Park (Phase 2 and Phase 3). Phase 2 and Phase 3 of the ASP are adjacent and to the north of Phase 1A and 1B of the ASP. The proposed land consists of two legal properties: Plan 1113171, Block 1, Lot 5, and Plan 0013201, Block 1, Lot 1.

The objective of the Phase I ESA is to comment on whether any past or present land use, either offsite or onsite, may have a potential to cause environmental impairment to the site.

The Phase I ESA was completed in general accordance with the 2016 Alberta Environment and Parks Alberta Environmental Site Assessment Standard and with the methods outlined in the document titled "*Canadian Standards Association Standard (CSA) Z768-01 Phase I ESA*", published by the CSA (reaffirmed 2022).

1.2 Authorization

Michael Kelly of MSK Developments provided written authorization to proceed with the present study to Tetra Tech on January 23, 2023.

1.3 Scope of Work

Tetra Tech conducted the following scope of work for the Phase I ESA:

- Conducted a records review for the site and surrounding properties, for a minimum search distance of 100 m. The records review included the following current and historical information searches:
  - Provincial regulatory information including the Alberta Safety Codes Authority (ASCA); Alberta Energy Regulator (AER) via Abacus Datagraphics Database (AbaData); Alberta Environment and Protected Areas (AEPA) ESA Repository (ESAR), Online Water Well Database, Authorization Viewer; Historical Environmental Enforcement Search; and the Alberta Land Titles Spatial Information System (SPIN2).
  - Regional and municipal regulatory information, including Lethbridge County.
  - Historical information sources including business directories, fire insurance plans, land titles, and historical aerial photographs.
  - Geological and hydrogeological information including published topographic, geologic, soil, and groundwater maps and reports.
- Conducted a site visit to evaluate the extent and manner that current and historical surrounding activities may impact upon the site and the environment. Sampling was not included as part of the Phase I ESA scope of work.
- Conducted interviews with persons familiar with the site and surrounding properties.
- Evaluated the results and prepared this report discussing the site history and identified any potential for environmental concerns resulting from past or present land use on site and in the surrounding area.

1.4 Qualifications of Assessors

Jaymes Going, B.Sc., EP, conducted the site visit, historical review, and wrote this report. Jaymes is an Environmental Scientist with Tetra Tech's Environment and Water Practice and has over 15 years of experience in the environmental industry.

Henri Carriere, P.Eng., M.N.R.M., provided the senior review of this report. Henri is a Senior Project Engineer with Tetra Tech's Environment and Water Practice in Calgary, Alberta. He has more than 30 years of experience in the environmental industry.

1.5 General Site Details

The irregular shaped site consists of two legal properties and is approximately 60.12 hectares (ha) in size. The site is located adjacent to the east municipal boundary of the City of Lethbridge, within Lethbridge County. The site consists of cultivated agricultural cropland with the exception of a small building/structure located on the northern portion of the site that houses a water fill station. The water fill station is within one of the two legal properties (Plan 0013201, Block 1, Lot 1). An electrical transmission line is also present on the west site boundary.

The site is bound to the north by Township Road 92 (TWP RD 92), to the east by a St. Mary River Irrigation District (SMRID) irrigation canal, to the south by Phase 1A and Phase 1B of the Chinook Industrial Park and to the west by 43 Street North.

Adjacent to the north of the site beyond TWP RD 92 is a rural property with miscellaneous storage (irrigation pipes and various equipment), to the northeast by a rural residence and to the northwest by Pratt & Whitney. Beyond the SMRID canal to the east is agricultural land and a farm operation including numerous corrals. South of the site within Phase 1A and Phase 1B of the Chinook Industrial Park are Southland International Trucks and trailer storage and a stormwater retention pond. West of the site is the Churchill Industrial Park located within the City of Lethbridge. Adjacent commercial/industrial properties to the west of the site include the City of Lethbridge Animal Services, Haul-All Equipment Ltd., Peterbilt Lethbridge, Southland Trailer Corp., and miscellaneous storage associated with the industrial businesses.

Figure 1 shows the site location plan and Figure 2 shows the detailed site plan showing surrounding land use. Photographs of the site are provided in Appendix B.

2.0 RECORDS REVIEW

The results of regulatory searches are provided in Appendix C. Records were reviewed for the site and for adjacent properties within a minimum distance of 100 m from the site boundary.

2.1 Location, Size, and Ownership

The site is located in Lethbridge County, Alberta. The legal description, legal land description, size, and ownership are summarized in Table A.

Table A: Legal Description, Legal Land Description, Size, and Ownership

Legal Description	Legal Land Description	Size (ha)*	Ownership*
Plan 1113171, Block 1, Lot 5	W 10-009-21 W4M	59.56	1000824 Alberta Ltd.
Plan 0013201, Block 1, Lot 1	NW 10-009-21 W4M	0.56	Lethbridge Regional Water Services Commission

* Size and ownership were obtained from the current land title.

2.2 Historical Records Review

A historical records review was undertaken for the site. The review dates were based on available records.

2.2.1 Historical Land Title Records

A historical and current land title search was initiated for the site. The results of the historical land title search had not been received at the time of report issuance. Should the review of the historical land tiles change the findings, an addendum letter will be issued. The current land titles are included in Appendix C.

Table B: Land Titles Summary

Year(s) of Ownership	Owner(s)	Tetra Tech Evaluation
Plan 1113171, Block 1, Lot 5		
2011 to present	1000824 Alberta Ltd.	Based on the name, there is no obvious potential for environmental concern.
Plan 0013201, Block 1, Lot 1		
2002 to present	Lethbridge Regional Water Services Commission	Based on the name, there is no obvious potential for environmental concern.

2.2.2 Aerial Photographs

Aerial photographs provide visual evidence of site occupancy, operational activities, and general site details. Aerial photographs capture a view of the site and the surrounding areas at a given time. The results of the aerial photograph review are summarized in Table C.

Table C: Historical Aerial Photo Summary

Year	Scale	Observations
1950	1:40,000	**On-site:** Site appears as agricultural cropland.
		Off-site: The surrounding land is predominantly agricultural cropland. Linear features are visible to the west (43 Street North), north (TWP RD 92), and east (SMRID canal). Structures are also visible to the east at the location of the farm operation.
1961	1:31,680	**On-site:** Similar to the previous aerial photograph.
		Off-site: Similar to the previous aerial photograph.
1970	1:31,680	**On-site:** Similar to the previous aerial photograph.
		Off-site: Similar to the previous aerial photograph.
1979	1:31,680	**On-site:** Similar to the previous aerial photograph.
		Off-site: Generally similar to the previous aerial photograph although corrals have been constructed to the east at the farm operation location and a building has been constructed to the west (current Haul-All Equipment Ltd.). Outdoor storage is also visible to the north of Haul-All Equipment Ltd.
1991	1:30,000	**On-site:** Similar to the previous aerial photograph.
		Off-site: Similar to the previous aerial photograph.
1999	1:30,000	**On-site:** Similar to the previous aerial photograph.
		Off-site: Additional structures have been constructed to the west of the site at the current location of Southland Trailer Corp. Additional outside storage is visible to the west of the site.

Table C: Historical Aerial Photo Summary

Year	Scale	Observations
2011	*	**On-site:** Similar to the previous aerial photograph although the building and access for the water fill station has been constructed on the northern portion of the site.
		Off-Site: Additional structures have been constructed to the west of the site at the current location of Peterbilt and the Lethbridge Animal Services.
2022	*	**On-site:** Similar to the previous aerial imagery.
		Off-Site: South of the site a building has been constructed (Southland International Trucks) and trailer storage is visible. The stormwater retention pond has also been constructed south of the site.

Notes:
To be read in conjunction with the accompanying report.
The aerial photographs are enlarged (where possible) for the review.
* Aerial photograph was obtained from Google Earth's satellite image archive.

Based on the aerial photograph review, the site has been agricultural land since 1950 with the only change being the construction of the water fill station between 1999 and 2011.

The surrounding area has also been predominantly agricultural land since 1950 with development occurring to the west of the site within the City of Lethbridge since 1979 and most recently with the development to the south of the site with Phase 1A and Phase 1B of the ASP prior to 2022.

2.2.3 Museum Archives

Tetra Tech inquired with the Galt Museum and Archives for indications of historical land use at the site and the surrounding area. Museum personnel indicated that there was no information specific to the site.

2.2.4 Business Directories

No business directories were available for Tetra Tech to review for the site.

2.2.5 Fire Insurance Plans

No fire insurance plans were available for Tetra Tech to review for the site.

2.2.6 Other Archival Records

No additional archival records were reviewed by Tetra Tech for the site.

2.3 Provincial Regulatory Information

This section describes the results of provincial regulatory searches. Copies of the search results and correspondence are provided in Appendix C.

2.3.1 Alberta Safety Codes Authority

Tetra Tech contacted the Alberta Safety Codes Authority (ASCA) regarding the potential for registered petroleum storage tanks (PSTs) at the site (Plan 1113171, Block 1, Lot 5 and W1/2 10-009-21 W4M and Plan 0013201, Block 1, Lot 1 and NW 10-009-21 W4M) and at the location of Haul-All Equipment Ltd. (4115 – 18 Avenue North; NE 09-009-21 W4M) due to the age of this property dating to the late 1970s.

The ASCA indicated that no records exist for the site or for the location of Haul-All Equipment Ltd.

The ASCA requires that all underground storage tanks (USTs) be registered; however, only above-ground storage tanks (ASTs) with a capacity greater than 2,500 L require registration. The database is based on a limited survey conducted in 1992 and voluntary information submitted thereafter; therefore, it is not considered a comprehensive inventory of PSTs in Alberta.

2.3.2 Alberta Energy Regulator

2.3.2.1 AbaData Database

Tetra Tech acquires AER database information through AbaData. The AbaData database was searched to determine if oil/gas wells and/or pipelines exist or have existed at the site and on the surrounding properties. The information provided by the AER indicated that there are available records for two high pressure gas lines owned and operated by ATCO Gas and Pipelines Ltd. (one active and one to be constructed) near the western and eastern site boundaries.

The operating high pressure gas line (natural gas) is oriented north to south along 43 Street North and the yet to be constructed high pressure gas line is proposed to the east of the SMRID canal.

No other records for oil/gas wells and/or pipelines and spills/complaints were identified within 100 m of the site boundaries. AbaData also shows a buried cable right-of-way (ROW) transecting the approximate middle of the site in a diagonal direction. No additional information on the ROW was available.

Several low-pressure gas lines (owned by ATCO Gas) are identified offsite and within 100 m of the site boundaries to the north and east that service rural properties.

High-pressure pipeline and well information provided by AbaData is current to January 1, 2023 and information on low-pressure pipelines is current to December 20, 2022.

The Coal Mine Atlas was reviewed, and it was determined that no abandoned or active coal mines are present at the site or within 100 m of the site.

2.3.3 Alberta Environment and Parks

2.3.3.1 Environmental Site Assessment Repository

The AEP ESAR is an online, searchable database that provides scientific and technical information about assessed sites throughout Alberta. The search of ESAR indicated that there were no records available for the site or within 100 m from the site boundary. Several records were available greater than 100 m to the east and west of the site.

2.3.3.2 Online Authorization Viewer

The AEP Online Authorization Viewer allows the public to view approvals, licenses, registrations and permits issued under the Water Act and EPEA. There were no records available for the site by the legal description (Plan 1113171, Block 1, Lot 5 or Plan 0013201, Block 1, Lot 1), however, six records were available for the section in which the site is located (10-009-21 W4M). The available records are for the Lethbridge Regional Water Distribution System, the Rave Industrial Area Storm Drainage System, and for the Coaldale/Management/Lethbridge County (stormwater drainage).

2.3.3.3 Water Well Information Database

The AEP Water Well Database was searched to view records of water wells within the site or within an approximate 1,000 m radius from the approximate centre of the site. The search identified no records of water wells located on or offsite within a 1,000 m radius.

2.3.4 Alberta Government – Alberta Land Titles Spatial Information System

The SPIN2 website map for the site and surrounding area shows the legal property boundaries for the site and surrounding area including the ROW for the SMRID irrigation canal adjacent to the east of the site. The SPIN2 map also shows a buried cable ROW transecting the approximate middle of the site.

2.3.5 Historical Environmental Enforcement Search

The historical environmental enforcement search provides records taken against a company or individual related to AEP's legislation. The search was conducted for each of the current site owners as per the land title records listed in Section 2.2.1. The search resulted in no records for the individuals or companies listed.

2.4 Regional and Municipal Regulatory Information

This section describes the results of regional and municipal regulatory searches. Copies of the search results and correspondence are provided in Appendix C.

2.4.1 Lethbridge County

Tetra Tech requested a site inquiry with Lethbridge County for information on the site (W1/2 10-009-21 W4M). The response indicated that there are no records of storage tanks, chemical storage, spills, fires or landfills for the site including Phase 1A and Phase 1B of the ASP (located within the W1/2 10-009-21 W4M). It was also indicated that existing development approvals for the area exist.

A copy of the letter from Lethbridge County is presented in Appendix C.

2.5 Land Forms and Geology

2.5.1 Topography

Surface topography can influence the direction of migration of contaminants at the soil surface. The local topography is the topography at the site, whereas regional topography is the overall expression of the surface in a given region. The local topography of the site was generally flat with no overall surface drainage pattern observed. Regional topography in the area is generally flat to undulating, and slopes northerly towards the Oldman River valley.

2.5.2 Surficial and Bedrock Geology

The surficial geology in the area is characterized by moraine till deposits with sporadic lenses of gravel, sand, and silt (Shetsen 1981).

The stratigraphy of the Lethbridge area is generally comprised of 65 m to 70 m of surficial deposits overlying bedrock. Bedrock in the Lethbridge area consists of strata from the upper Oldman Formation and the lower Bearpaw Formation, both of the late Cretaceous Age (Tokarsky 1974). The bedrock has a relatively flat surface dipping

slightly to the northwest and is locally encountered at about geodetic elevation 843 m. The bedrock strata consist of thin beds of predominantly weak mudstones, siltstones, and sandstones with occasional bentonite and coal seams.

2.5.3 Hydrogeology

Groundwater has the potential to be of significance as a means of contaminant transport. Regional groundwater flow is the overall direction of groundwater flow in a given region. Groundwater in a local area within the region, may travel in a different direction from the regional flow, due to influence by local topography and/or subsurface soil conditions.

There are currently no surface water bodies located at the site. The nearest surface water body is the SMRID canal adjacent to the east of the site. There is also a stormwater retention pond approximately 100 m south of the site (within Phase 1B of the ASP) and a dugout located east of the SMRID canal at the farm operation. The Oldman River is located approximately 6 km northwest of the site.

Regional groundwater flow is expected to be northerly toward the Oldman River. Perched groundwater tables are common and have been encountered in many areas of southern Alberta. The depth to these perched tables can vary from approximately 2 m below ground level to considerable depths within gravel, sand, and/or silt seams. The flow of these perched tables can differ from regional flow direction, or be relatively stagnant, depending on the geometry and the extent of the sand and/or silt seams.

It should be noted that topography, geologic materials, land development (including the irrigation canal), and soil disturbances can also cause localized variances in groundwater movement and pattern. Also, groundwater levels will fluctuate seasonally and in response to climatic conditions.

2.6 Previous Reports

No previous environmental reports were available to review for the site.

2.7 Other Information Sources

There were no other information sources reviewed for the site.

3.0 SITE VISIT

Jaymes Going, of Tetra Tech, visited the site on February 14, 2023. Full access to all outdoor areas of the site was granted, however, the water fill station building was not accessed. Weather conditions were favorable (i.e., no snow cover) and the site was walked over with visual observations made of adjacent properties from the site boundaries.

3.1 Building Details and Site Servicing

There is currently one building on the site. The building is for the water fill station and was constructed between 1999 and 2011.

The following table describes the site servicing.

Table D: Site Servicing

Item	Present	Type	Comments
Water Supply	Yes	Potable	The water fill station building owned and operated by the Lethbridge Regional Water Services Commission provides a source of potable water.
Storm Sewer	No	Not applicable	Overland surface drainage would follow the local topography; however, no specific site drainage patterns were observed.
Sanitary Sewer	No	None	There was no indication of sanitary sewer services located at the site.
Other Storage	No	Not applicable	No storage areas were observed at the site.
Pits	No	Not applicable	No pits were observed on the site.
Lagoons	No	Not applicable	No lagoons were observed on the site.

3.2 Special Attention Items

Some construction materials contain compounds that may be hazardous to building occupants or users of the site. The following table summarizes these special attention items; further background information on these materials is provided in Appendix D.

Table E: Special Attention Items

Item	Presence/ Potential	Comments
Asbestos	Low	Based on age of the building at the site (after 1999), there is a low potential that the building contains asbestos and/or lead.
Lead	Low	
Urea Formaldehyde Foam Insulation (UFFI)	Low	No indication of UFFI at the site was observed. If this type of insulation was used, the fugitive emissions were likely the most harmful within two years of installation.
Ozone-depleting Substances (ODS)	Low	Based on the nature of the site building, it is unlikely that ODS are located at the site.
Polychlorinated Biphenyls (PCBs)	Low	Pole mounted transformers were observed at the site near the water fill station. Transformers are owned and maintained by the utility company.
Radon	Moderate to High	There was no radon gas testing reported for the site; however, natural radon concentrations are considered moderate to high in Alberta. A radon test was not completed by Tetra Tech as part of this investigation. There were no anthropogenic sources of radon gas identified.
Methane	Low	There was no methane gas testing reported for the site. Based upon information collected during this investigation (i.e., aerial photograph review, site reconnaissance), there is no evidence of deposits of buried organics at the site that could produce methane. Refer to Section 3.3.5 regarding potential fill areas.
Electromagnetic (EM)	Low	A high voltage transmission line is present on the west site boundary which could generate EMFs. No EMF assessment was completed by Tetra Tech for the site.
Noise and Vibration	Low	There were no major sources of noise or vibration on or adjacent to the site during the site visit.

The above evaluation is based on building age and basic site observations. Intrusive investigation and sampling are not within the scope of a Phase I ESA.

3.3 Site Observations

This section describes observations made of the site during the site visit on February 14, 2023.

3.3.1 Surficial Stains

There were no surficial stains observed during the site visit.

3.3.2 Vegetation

Vegetation at the site was predominantly agricultural cropland with some weedy species expected in disturbed areas such as near the SMRID canal and near adjacent roadways. There was no evidence of stressed vegetation at the site, however, the site visit was conducted outside the growing season when vegetation was dormant.

3.3.3 Ponding of Water

There was no ponded water observed on the site at the time of the site visit.

3.3.4 Washouts and Erosion

There were no washouts or indications of erosion observed.

3.3.5 Fill Areas and Soil Conditions

There was no evidence of fill materials having been brought to the site. The potential for methane generation is described in Section 3.2.

Further information on soil conditions are presented in the geotechnical evaluation report completed at the site by Tetra Tech (Tetra Tech 2023, currently not issued).

3.3.6 Oil/Gas Wells and Pipelines

There were no well sites observed at the time of the site visit.

Refer to Section 2.3.2 for AER information.

3.3.7 Chemical Storage

There were no hazardous chemicals or large drums observed at the site during the site visit.

3.3.8 Transformers

There was a pole-mounted electrical transformer observed near the water fill station. Generally, pole-mounted transformers are owned and maintained by the utility companies.

3.3.9 Hydraulic Elevators and Hoists

There were no hydraulic elevators or hoists observed at the site visit.

3.3.10 Vent Pipes and Underground Storage Tanks

There were no vent pipes or USTs identified during the site visit.

3.3.11 Above-Ground Storage Tanks and Drum Storage

No ASTs or drum storage were present at the site during the site visit.

3.3.12 Waste Storage

No waste storage areas were observed at the site during the site visit.

3.3.13 General Housekeeping

The general housekeeping of the site was in good condition and no obvious evidence of negligent acts or illegal dumping were observed during the site visit.

3.4 Off-Site Observations

The following table summarizes the surrounding land use.

Table F: Surrounding Land Use

Direction	Zoning*	Observations	Tetra Tech Evaluation
North	Lethbridge Urban Fringe	Agricultural land	No obvious concerns which may cause environmental impairment to the site were identified.
East		SMRID canal, agricultural land, and farm operation	
South		Southland International Trucks and trailer storage and stormwater retention pond	
West	General Industrial	Various commercial and industrial properties	

*Land use obtained from Lethbridge County (Lethbridge County - Online Maps (lethcounty.ca)) and the City of Lethbridge (Property Information WebMAP (lethbridge.ca)).

The surrounding land is primarily agricultural with commercial and industrial properties to the west within the City of Lethbridge. Key surrounding land use is indicated on Figure 2.

4.0 PERSONNEL INTERVIEWS

Due to the land use being primarily agricultural from 1950 to current, no personnel interviews were conducted.

5.0 DISCUSSION AND CONCLUSIONS

5.1 General

In general terms, there are two distinct types of potential environmental risk to any property. The first type of risk is from potential contamination from on-site land use. This would include potential accidental spills or site practices that may contaminate the property directly. The second type of risk is from contamination caused by adjacent property owners, which might then be transported through the subsurface soils by groundwater, or in overland runoff onto the site.

5.2 Potential for Impairment from On-Site Source(s)

There were no on-site sources that might have a potential to cause environmental impairment to the site through historical and/or current land use.

5.3 Potential for Impairment from Off-Site Source(s)

There were no off-site sources that might have a potential to cause environmental impairment to the site through historical and/or current land use.

6.0 FURTHER ACTION/RENDERING AN OPINION

Based on the present study, Tetra Tech recommends that no further environmental investigation is required at this time.

Tetra Tech recommends the following for consideration:

- If buried debris or staining are encountered during future investigation or ground disturbance a qualified environmental professional should be contacted.
- If soils containing organics are encountered during future investigation or ground disturbance, they should be removed from building footprints and not be reburied; a qualified environmental professional should be contacted.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

FILE: ENG.LGEO04625-01.002
FILE: ENG.LGEO04625-01.002
FILE: ENG.LGEO04625-01.002

Prepared by:
Jaymes Going, B.Sc., EP
Environmental Scientist
Environment & Water Practice
Direct Line: 403.308.4293
Jaymes.Going@tetratech.com

FILE: ENG.LGEO04625-01.002
FILE: ENG.LGEO04625-01.002
FILE: ENG.LGEO04625-01.002

Reviewed by:
Henri Carriere, P.Eng., M.N.R.M.
Senior Project Engineer
Environment & Water Practice
Direct Line: 403.993.4176
Henri.Carriere@tetratech.com

/jmt

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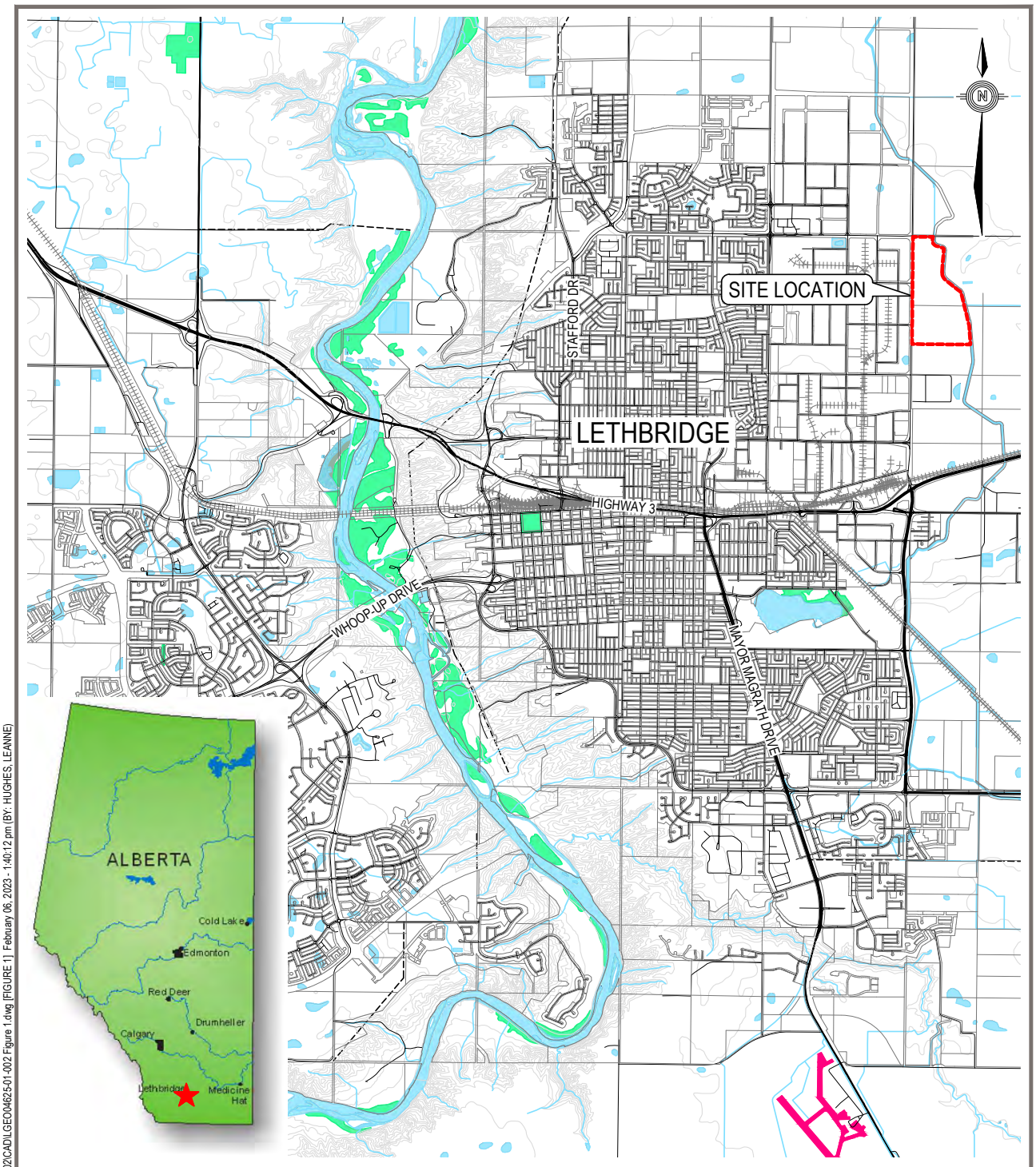
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FIGURES

Figure 1 Site Location Plan
Figure 2 Detailed Site Plan Showing Surrounding Land Use



NOTES

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0 3,000m

Scale: 1:60,000 @ 8.5"x11"

CLIENT

Sumus Property Group Ltd.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
CHINOOK INDUSTRIAL PARK ASP
W1/2 10-009-21 W4M LETHBRIDGE COUNTY

SITE LOCATION PLAN

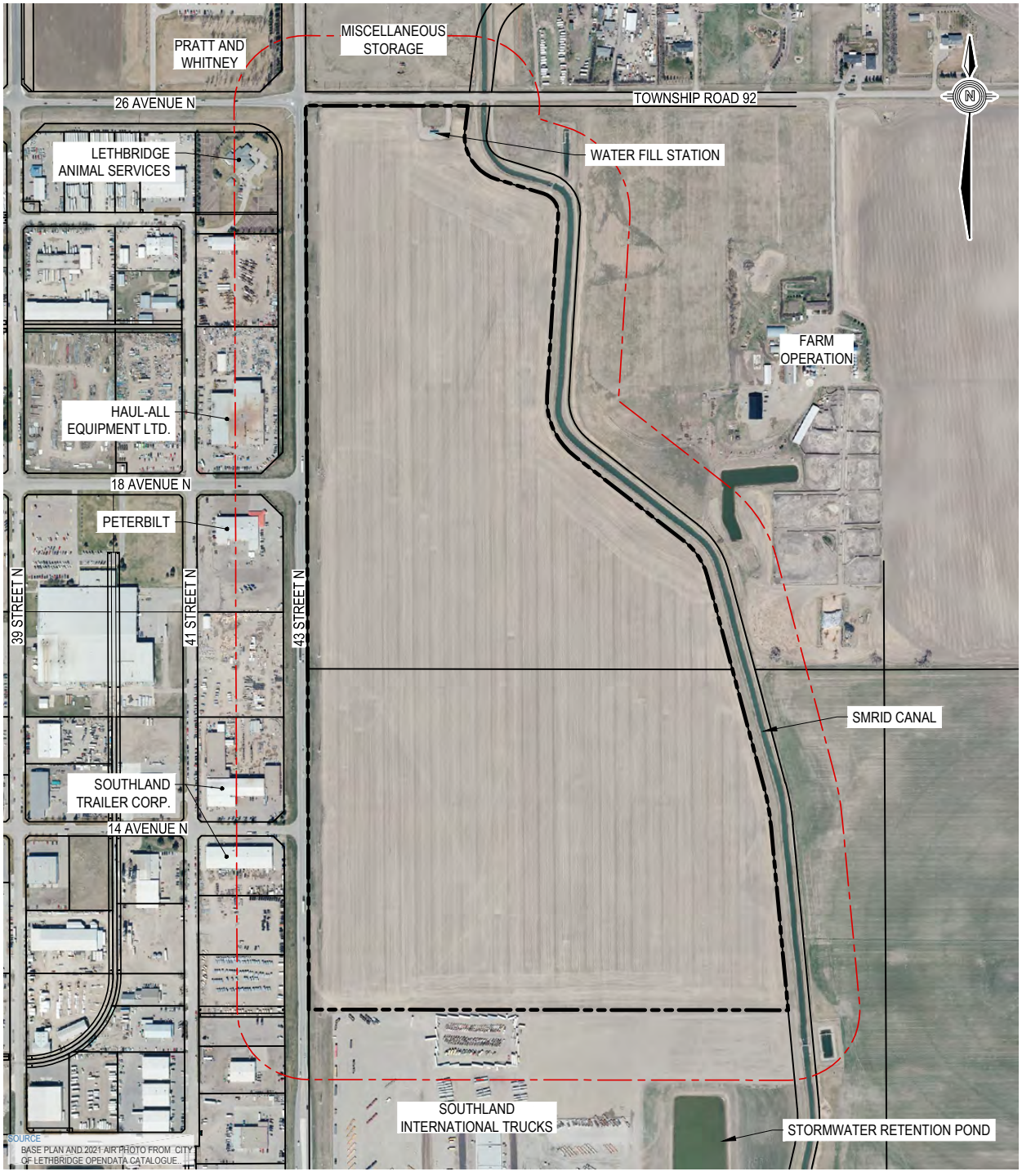
TETRA TECH

PROJECT NO.	DWN	CKD	REV
LGEO04625-01-002	LCH	JG	0

OFFICE	DATE
Tt Leth	February 2023

Figure 1

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LEGEND

SITE BOUNDARY

100 m BOUNDARY

0 250m

Scale: 1:7,500 @ 8.5"x11"

CLIENT

Sumus Property Group Ltd.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
CHINOOK INDUSTRIAL PARK ASP
W1/2 10-009-21 W4M LETHBRIDGE COUNTY

DETAILED SITE PLAN SHOWING SURROUNDING LAND USE

TETRA TECH

PROJECT NO.	DWN	CKD	REV
LGEO04625-01-002	LCH	JG	0

OFFICE	DATE
Tt Leth	February 2023

Figure 2

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APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

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If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

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TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

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In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX B

SITE PHOTOGRAPHS



Photo 1: View looking west at the approximate south site boundary.



Photo 2: View looking northwest at the site from the approximate southeast corner of the site.



Photo 3: View looking southwest at the site from near the middle of the east site boundary.



Photo 4: View looking south at the site from near the northeast corner of the site. The SMRID canal and access road are visible.



Photo 5: View looking west at water fill station located on the northern portion of the site.



Photo 6: View of adjacent property to the north beyond Township Road 92.



Photo 7: View of adjacent property to the east beyond the SMRID canal.



Photo 8: View of adjacent land use to the south; stormwater retention pond located within Phase 1B of the ASP.



Photo 9: View of one of the commercial/industrial businesses (Haul-All Equipment Ltd.) to the west of the site beyond 43 Street North.



Photo 10: View of one of the commercial/industrial businesses (Southland Trailer Corp.) to the west of the site beyond 43 Street North.

APPENDIX F

GEOTECHNICAL INVESTIGATION

PROPOSED RME DEVELOPMENT
W½ 10-09-21 W4M
LETHBRIDGE, ALBERTA
PMEL FILE NO. 21903
SEPTEMBER 23, 2024



PREPARED FOR:
Rocky Mountain Equipment LP

ATTENTION: Jason Carter, Facility Manager

P.MACHIBRODA ENGINEERING LTD.

P.MACHIBRODA ENGINEERING LTD.

PROJECT: Geotechnical Investigation
Proposed RME Development
W½ 10-09-21 W4M
Lethbridge, Alberta
PMEL File No. 21903
September 23, 2024

PREPARED FOR: Rocky Mountain Equipment LP
3345 8th Street South East
Calgary, Alberta
T2G 3A4

ATTENTION: Jason Carter, Facility Manager

DISTRIBUTION: Rocky Mountain Equipment LP – Digital Copy
P. Machibroda Engineering Ltd. – Digital Copy

806-48th Street East, Saskatoon, SK S7K 3Y4
P: 306.665.8444 | **F**: 306.652.2092 | **E**: pmel.sk@machibroda.com
www.machibroda.com

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Appendix B CPTu Plots
Appendix C Grain Size Distribution Analysis Test Results

1 INTRODUCTION

1.1 GENERAL

The following report has been prepared on the subsurface soil conditions existing at the site of the proposed Rocky Mountain Equipment (RME) development to be constructed within W½ 10-09-21 W4M in Lethbridge, Alberta.

The terms of reference for this investigation were presented in P. Machibroda Engineering Ltd. (PMEL) Proposal No. 21903, dated August 7, 2024. Authorization to proceed with this investigation was provided in the signed consulting agreement between Rocky Mountain Equipment LP and PMEL dated August 8, 2024.

1.2 SITE LOCATION AND DESCRIPTION

The proposed RME development site is located within W½ 10-09-21 W4M in Lethbridge, Alberta The site is bound by 43 Street N to the west, Township Road 92 to the north, a man-made drainage channel to the east and agricultural land to the south. The study area is relatively flat-lying agricultural land (general gradual slope to the east), located at the northeast corner of Lethbridge. A Site Plan showing the study area has been shown on Drawing No. 21903-1.

2 FIELD INVESTIGATION

The field investigation was conducted between August 27 and 29, 2024.

The coordinates and approximate ground surface elevation (+/- 1 m) at each test location were determined with a handheld GPS.

2.1 FIELD DRILLING PROGRAM

Twenty-five boreholes, located as shown on the Site Plan, Drawing No. 21903-1, were dry drilled using our truck-mounted, continuous flight auger drilling rig. The boreholes were 150 mm in diameter and extended to depths of 4.5 to 15.4 m below the existing ground surface. Borehole logs, as shown on the attached Drawing Nos. 21903-2 to 26, inclusive, were compiled during test drilling to record the soil stratification, the groundwater conditions, the position of unstable sloughing soils and the depths at which cobblestones and/or boulders were encountered.

Disturbed samples of auger cuttings, collected during test drilling, were sealed in plastic bags to minimize moisture loss. The soil samples were taken to our laboratory for analysis.

Standard penetration tests (SPT), utilizing a safety hammer with automatic trip were performed during test drilling.

Monitoring wells (slotted, 50 mm diameter PVC pipe) were installed BH's 24-3, 24-14, 24-15, 24-21 and 24-23. Groundwater monitoring was conducted on September 10, 2024.

2.2 PIEZOCONE PENETRATION TESTING

Three piezocone penetration tests (CPTu) were conducted during the field investigation, located as shown on the Site Plan, Drawing No. 21903-1. The CPTu soundings were extended to depths of 16.5 to 18.4 m below existing ground surface, at which depth practical system refusal was encountered (i.e., hard pushing and/or bending rods).

The CPTu's consisted of pushing a cone, on the end of a series of rods, into the ground at a constant rate while near continuous measurements were recorded at the cone tip (i.e., qt). Local side friction resistance measurements (i.e., fs) were recorded on a friction sleeve located directly behind the cone tip. Pore-water pressure response (u) generated from the advancement of the cone into the soil was measured via a pore pressure filter located between the cone tip and friction sleeve. The piezocone tip had an apex angle of 60° and a 15 cm2 base area. The friction sleeve had a perimeter area of 225 cm2.

The equipment and procedures for conducting the cone penetration testing were undertaken in accordance with ASTM D-5778, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Testing of Soils".

The test plots recorded during the cone soundings have been presented in Appendix B.

3 SOIL AND GROUNDWATER CONDITIONS

3.1 SOIL PROFILE

The general soil profile consisted of a thin veneer of topsoil overlying silt (0.6 to 1.8 m), followed by an extensive deposit of glacial till, which extended to a depth of at least 18.4 m, the maximum depth investigated. Clay was encountered between the topsoil/silt and till (to depths of about 1.0 to 4.7 m) in BH's 24-4, 24-5, 24-8, 24-11, 24-15, 24-17, 24-19, 24-24 and 24-25. Silt was encountered within the till in the zone from about 2.4 to 3.4 m in BH 24-1. Saturated inter/intra till sand layers were encountered at various depths throughout the till.

The silt was medium plastic, stiff to very stiff and damp to moist (typically damp). The clay was firm to stiff, medium plastic and moist. The till was medium plastic, moist and firm to very stiff initially (typically stiff), becoming very stiff then hard with depth. The inter/intra till sand layers were saturated (groundwater seepage/sloughing zones).

3.2 GROUNDWATER CONDITIONS, SLOUGHING

Groundwater seepage and sloughing/squeezing conditions were encountered during test drilling, as shown on the borehole logs. A summary of the groundwater levels recorded in the monitoring wells installed during this investigation has been presented in Table I.

TABLE I RECORDED GROUNDWATER LEVELS

Monitoring Well	Monitoring Well Rim Elevation[1] (m)	Ground Surface Elevation[1] (m)	Groundwater Depth (m)	Groundwater Elevation[1] (m)
			September 10, 2024	September 10, 2024
24-3	913.7	912.7	Dry (>3 m)	Dry (<909.7)
24-14	911.7	910.7	2.0	908.7
24-15	912.9	911.9	Dry (>4.5 m)	Dry (<907.4 m)
24-21	910.8	909.8	3.0	906.8
24-23	914.0	913.0	Dry (>4.5)	Dry (<908.5)

[1]Approximate elevation only (+/- 1 m).

A review of Table I revealed that the groundwater level was measured at depths of 2 to greater than 4.5 m below existing ground surface on September 10, 2024. Higher water levels could be encountered, particularly during and/or following spring snowmelt and/or periods of precipitation.

3.3 COBBLESTONES AND BOULDERS

Glacial till consists of a heterogeneous mixture of gravel, sand, silt and clay-sized particles. Glacial till inherently contains sorted deposits of the above particle sizes as well as a random distribution of larger particle sizes in the cobblestone range (60 to 200 mm) and boulder-sized range (larger than 200 mm). Inter/intra till deposits of cobblestones, boulders, boulder pavements and isolated deposits of saturated sand or gravel should be anticipated.

It should be recognized that the statistical probability of encountering cobbles/boulders in the small diameter boreholes drilled at this site was low. The frequency of encountering such deposits will increase proportionately with the volume of soil excavated and number/depth of piles installed.

4 LABORATORY ANALYSIS

The soil classification and index tests performed during this investigation consisted of a visual classification of the soil, moisture contents, unit weights, Atterberg limits, grain size distribution analysis and water-soluble sulphate contents.

The results of the soil classification and index tests conducted on representative samples of soil have been plotted on the borehole logs alongside the corresponding depths at which the samples were recovered, as shown on Drawing Nos. 21903-2 to 26, inclusive.

The results of the grain size distribution analyses have been shown plotted in Appendix C.

5 DESIGN RECOMMENDATIONS

Based on the foregoing outline of soil test results, the following foundation considerations and design recommendations have been presented.

5.1 DESIGN CONSIDERATIONS

It is understood that the project will include the development of 84 acres of land. The northern 16 acres will be developed to include a building and associated traffic/staging areas (exact details are currently unknown) while the southern 68 acres will be reserved for future development (including roads, utilities and overland drainage; details for future developments are currently unknown). The site will also include a large stormwater pond to collect site drainage.

The subsurface soil conditions consisted of silt overlying glacial till. Clay was encountered between the silt and till at several locations. Saturated inter/intra till sand layers were encountered throughout the till. Groundwater seepage and sloughing conditions were encountered during test drilling. The groundwater level was measured at depths of 2 to greater than 4.5 m below existing ground surface on September 10, 2024. Higher water levels should be expected during and/or following spring snowmelt and/or periods of precipitation.

A deep foundation system consisting of drilled, straight shaft, cast-in-place concrete piles and/or belled piles should perform satisfactorily at this site. Construction difficulties associated with saturated sand deposits (and potentially cobbles/boulders) should be expected at some locations. Temporary casing will likely be required to complete the installation of some drilled piles, and coring may be required at some locations.

Alternate pile foundations could also be considered (i.e., driven piles or helical screw piles); recommendations can be prepared upon request.

The subgrade soils are considered frost susceptible, and the potential depth of frost penetration could range from approximately 1.2 to 2 m, depending on surface cover, severity of winter and heat loss affects beneath/adjacent buildings; the depth of frost penetration will be greater where granular fills/soils are present.

Recommendations have been prepared for site preparation; excavations and dewatering; limit states resistance factors and serviceability; deep foundations; grade-supported concrete slabs; soil retaining walls; foundation drainage; foundation concrete; site classification for seismic site response; traffic structures; and, stormwater pond.

5.2 SITE PREPARATION

All topsoil, organics and deleterious materials should be removed from the construction area. Staining and root intrusion from the original/overlying organic material and roots may be encountered during excavation within the subsurface mineral soils. If these conditions are suspected, a representative of the Geotechnical Consultant should inspect the site during excavation to verify the depth of organic topsoil which should be removed in preparation of the site for construction.

The general intent of initial site preparation is to make the subgrade suitably stable for construction activities. It is recommended that the subgrade soils within the development footprint are compacted to the following densities:

Building Areas	98 percent standard Proctor density at optimum moisture content;
Traffic Areas	96 percent standard Proctor density at optimum moisture content;
Landscape Areas	90 percent standard Proctor density at optimum moisture content.

Soils which meet the required compaction level should be stable to support construction activities. It is anticipated that conventional site preparation (scarifying, moisture conditioning and re-compacting the soils) will suffice at this site. Soils which are unstable during site preparation and fail to achieve the required compaction will require additional treatment, which may include over-excavation and replacement and/or geosynthetic stabilization. The need for additional treatment should be reviewed by the Geotechnical Consultant during the field construction with respect to the actual conditions and project requirements.

In areas with variable subgrade soils, proof rolling may be an acceptable alternative to density testing and should be reviewed by the Geotechnical Consultant.

All proposed fill materials should be approved by the Geotechnical Consultant prior to placement. The fill should be placed in thin lifts (maximum 150 mm loose) and uniformly compacted to the above-mentioned densities. Fill will be susceptible to settlement, the magnitude of which will be directly related to the level of compaction and fill thickness. Well compacted fills will settle a small percentage of the fill thickness whereas poorly compacted fills can settle appreciably, particularly if frozen soils are utilized/incorporated in the fill.

The site should be graded to provide positive site drainage away from all work areas and structures prior to, during and following construction.

This report has been prepared on the premise that significant alterations to the site will not occur (i.e., appreciable cut/fill activities). If appreciable quantities of fill will be placed on the site, settlement of the fill and underlying soils will occur which may affect the long-term performance of foundations, slabs, pavements etc. If site alterations are planned as part of site development, PMEL should be contacted to assess the impact this may have on the design recommendations and proposed site development. Based on the magnitude of site alterations, the design recommendations may need to be amended.

5.3 EXCAVATIONS AND DEWATERING

Excavations at this site should be made in accordance with current Alberta Labour Occupational Health and Safety (OH&S) Guidelines. The Contractor is solely responsible for protecting the excavation by shoring, sloping, benching and/or other means as required to maintain the stability of both the excavation sides and the bottom. The stability of the excavation will be affected by wetting and drying of the exposed excavation walls, the length of time that the excavation remains open and the consistency and structure of the subgrade soils.

Temporary excavations should be cut no steeper than 1H:1V. Slope flattening will be required if unstable conditions are encountered during excavation. Continuous visual monitoring of the sideslopes should be undertaken to assess whether flatter sideslopes are required to maintain stability.

Groundwater seepage and sloughing conditions were encountered during test drilling. The groundwater level was measured at depths of 2 to greater than 4.5 m below existing ground surface on September 10, 2024. Higher water levels should be expected during and/or following spring snowmelt and/or periods of precipitation.

Excavation below the water table will encounter construction difficulties associated with groundwater seepage and sloughing conditions. De-watering of the excavations will be required during construction. De-watering should be conducted over the time period for which the excavations are left open. A sump (or multiple sumps, if required) should be set up at the deepest excavation points and the floor of the excavation sloped to the sump(s) to handle groundwater seepage and precipitation runoff. A self-actuated sump pump(s) should be operated on a continuous basis and should be discharged well away from the excavations.

The stability of the excavation will be affected by wetting and drying of the exposed excavation walls, the length of time that the excavation remains open and the consistency and structure of the subgrade soils.

Excavated soil should be stockpiled away from the crest of the excavation to minimize potential sloughing of the excavation walls due to the soil surcharge loading. Similarly, equipment and construction materials should also be placed away from the crest of the excavation.

Depending on lateral constraints, excavations at this site may be completed with unbraced, sloped side walls. If there is insufficient room for excavation cuts, due to close proximity to other structures, then a temporary shoring system would be required.

5.4 LIMIT STATES RESISTANCE FACTORS AND SERVICEABILITY

The National Building Code of Canada (NBCC, 2020) requires the use of limit states design for the design of buildings and their structural components, including the design of shallow and deep foundations. It is expected that the designer is familiar with the limit states design method and only a brief discussion will be presented. For a detailed discussion, it is recommended to review the NBCC (2020) and/or the Canadian Foundation Engineering Manual (CFEM, 2023).

Limit states are defined as those conditions under which a structure ceases to fulfill the function for which it was designed (i.e., unsatisfactory performance). In limit states design, two conditions are assessed with respect to performance, these are:

- ultimate limit states (ULS), and
- serviceability limit states (SLS)

Ultimate limit states are concerned with the collapse mechanisms of the structure (i.e., safety), whereas serviceability limit states consider mechanisms that restrict or constrain the intended use, function or occupancy of the structure.

As per NBCC (2020), the factored soil resistance utilized for foundation design may be determined using the following resistance factors applied to the ultimate resistance values presented in the following subsections of the report.

Deep foundations:

- Compressive Resistance, Φ = 0.4
- Tensile Resistance, Φ = 0.3

The above resistance factors have been provided to reflect that semi-empirical methods were used to derive the soil bearing resistances presented in this report using the laboratory and in-situ data collected during this investigation. The potential exists to increase the design resistance factors should a load testing program be conducted on a representative number of piles to more accurately assess capacities.

To satisfy serviceability limit states, a settlement analysis of the foundation must also be evaluated to ensure the structures are not negatively impacted by excessive settlement at the design load. Estimated foundation settlements have been provided in Section 5.5.3.

Piles exposed to lateral loads are typically designed to restrict lateral deflection of the pile head to tolerable limits. Lateral pile head deflection can be determined using the concepts presented in Section 5.5.4.

5.5 DEEP FOUNDATIONS

5.5.1 FROST JACKING OF DEEP FOUNDATIONS

Frost jacking is a process that can cause progressive upward movement of piles due to adfreeze bond stresses (adfreeze) between the soil and the pile shaft within the depth of frost penetration. Frost jacking requires exposure to freezing conditions and frost-susceptible soils. Silty, weak or wet soils and shallow groundwater conditions typically amplify the potential for and severity of frost jacking.

The subgrade soils are frost susceptible and the potential depth of frost penetration could range from about 1.2 m (lower bound) to 2 m (upper bound), depending on surface cover, severity of winter and heat loss effects beneath/adjacent to buildings.

Piles in unheated/intermittently heated areas (particularly those supporting negligible to light loads) are particularly suspectable to frost jacking and must be designed to resist frost jacking forces resulting from the upper bound frost penetration depth.

Interior piles which are never exposed to frost action (i.e., installed during non-freezing conditions and installed below continually heated areas) will be unaffected by frost jacking.

Perimeter piles installed below continually heated areas will experience reduced frost jacking forces (as compared to unheated areas), provided that the building envelope is designed to allow heat loss to the foundation (i.e., where the floor slab is insulated, an uninsulated strip at least 1 m wide should be provided adjacent to the perimeter foundation). In this case, the perimeter piles should be designed to resist frost jacking forces resulting from the lower bound frost penetration depth (i.e., 1.2 m). If heat loss to the foundation is not allowed (i.e., fully insulated building envelope), the perimeter piles should be designed to resist frost jacking forces due to the upper bound frost penetration depth (i.e., 2 m).

Adfreeze values are difficult to quantify accurately and can vary depending on many factors. For the purposes of this report, an adfreeze value of 100 kPa is recommended for concrete piles.

Piles subject to frost action can resist frost jacking in two ways:

1. Structural resistance due to pile self-weight plus sustained (unfactored) structural loading applied to the pile head; and,
2. Geotechnical resistance due to soil/pile interaction below the depth of frost penetration.

To determine the maximum frost jacking force, the structural designer should consider the maximum adfreeze value and the recommended design frost penetration depth, as discussed above. The frost jacking force that the pile should be designed to resist would be equal to the maximum frost jacking force minus the structural resistance (i.e., point 1 above).

To determine the geotechnical resistance of the pile to resist frost jacking (point 2 above), the structural designer should consider the unfactored ULS resistance values presented in the following sections of this report (i.e., resistance factor of 1.0) applied to the soils below the recommended design frost penetration depth.

The potential for frost jacking can be reduced through prudent design and good construction practices. Such measures may include:

- Provide adequate site drainage (overland and/or subsurface) to minimize water accumulation adjacent to foundations;
- Maintain uniform pile shaft cross sections; avoid enlarged/tapered pile tops which can increase the surface area for frost to act on;
- Reduce the potential depth of frost penetration by heating and/or insulating the area; and,
- Utilize bond breakers between the pile and the soil within the depth of frost penetration (e.g., Sonotube forms, polyethylene sleeves, plastic wrapping, low friction coatings etc.). It is noted that some bond breakers will not be suitable for piles subject to lateral loading due to a gap between the soil and the pile.

5.5.2 DRILLED, CAST-IN-PLACE CONCRETE PILES

Casing may be required to complete the installation of some drilled piles (to seal off saturated sand layers), and coring may be required if cobbles/boulders are causing installation difficulties.

Drilled, cast-in-place, straight shaft concrete piles should be designed on the basis of shaft resistance only. Belled piles may be designed on the basis of shaft resistance and end bearing resistance. The ULS and SLS resistance values for design of drilled piles have been presented below.

TABLE II SHAFT RESISTANCE (DRILLED PILES)

Zone / Depth (m) [1]	Shaft Resistance (kPa)	
	Unfactored ULS	SLS
Neglect Zone [2]	0	0
Neglect Zone to 7.5	60	24
7.5 to 12	75	30
12 to 15	90	36
Below 15	105	42

Notes:

1. For the purposes of this report, design depths have been referenced to existing grade. The structural engineer must consider finished grade elevation relative to existing grade. If existing grade is altered significantly, PMEL should be consulted to confirm the design parameters.
2. The shaft resistance in the zone from finished ground surface to a depth of 2 m below finished ground surface (i.e., neglect zone) should be ignored in terms of axial capacity.
3. Minimum pile lengths should take into account the depth required to resist frost action. Piles exposed to frost action may need to be longer and should be designed to resist frost jacking forces (refer to Section 5.5.1).
4. Piles should be reinforced to withstand all axial and lateral forces within the pile.
5. A minimum pile diameter of 400 mm is recommended for the primary structural loads. Larger pile diameters may be required to allow for the removal of cobbles and boulders in some pile holes.
6. The pile holes should be filled with concrete as soon as practical after drilling.
7. Casing will be required where groundwater seepage and sloughing conditions are encountered to maintain the pile holes open for placing of the reinforcing steel and concrete. The annular space between the casing and drilled hole must be filled with concrete. As casing is extracted, concrete in casing must have adequate head to displace all water in the annular space.
8. A minimum centre-to-centre pile spacing of not less than three pile diameters is recommended.

9. A representative of the Geotechnical Consultant should inspect and document the installation of the drilled, cast-in-place concrete piles.

TABLE III END BEARING RESISTANCE (BELLED PILES)

Depth (m) / Bearing Strata [1]	End Bearing Resistance (kPa)	
	Unfactored ULS	SLS
6 to 7.5 / Stiff to Very Stiff Till	600	200
7.5 to 12 / Stiff to Very Stiff Till	800	270
Below 12 / Very Stiff to Hard Till	1,200	400

Belling depth may vary depending on the position of seepage, sloughing, cobbles and boulders.

The following additional recommendations should be considered in the design of belled piles:

Notes:

1. Bells must be formed a minimum of one (1) bell diameter into the bearing strata to develop the capacities presented in Table III.

2. When determining the compressive shaft resistance of the pile, the portion of pile shaft within 1 bell diameter above the base of the bell should be discounted to account for interaction effects between the shaft and the bell.

3. Belled piles designed to resist uplift loading should have a minimum embedment ratio (d/b) of 3, where d = embedment depth and b = bell diameter (m). For bells installed to a shallower depth, the uplift capacity should be reviewed by the Geotechnical Consultant.

4. When determining the uplift resistance of the bell component of the pile, the area used in design is equal to the area of the bell minus the cross-sectional area of the shaft. Due to the interaction between the bell and shaft, the uplift resistance along the shaft should be neglected for the portion of the shaft within two (2) bell diameters from the base of the bell.

5. Concrete should be placed as soon as practical after cleaning the bell. Water should not be allowed to collect at the base of the bell prior to placing concrete.

6. The maximum diameter of the bell shall not exceed three times the shaft diameter.

7. The height of the bell should be designed to provide adequate concrete to distribute the unit stresses into the concrete without over-stressing the outer, non-reinforced concrete within the bell.

8. If belled pile groups are used, the space between adjacent bells should be at least half of the largest bell diameter. Settlement analysis will ultimately dictate acceptance of spacing. Lesser spacings may be acceptable but should be reviewed by the Geotechnical Consultant.

9. Full time inspection by a representative of the Geotechnical Consultant, employed directly by the Owner, is required to confirm pile bearing capacities and to verify suitable pile base conditions, prior to placing steel and concrete, and to document the installation of each belled pile.

5.5.3 PILE SETTLEMENT

With regards to serviceability of pile foundations, assuming good construction practices are followed and the appropriate resistance factors are applied, the settlement of individual piles at the design load will be small and should be within tolerable limits. The estimated pile settlement at working loads should be less than 10 mm for straight shaft piles and in the order of 15 to 25 mm for belled piles.

The above is applicable to individual piles and small pile groups. Although not anticipated, foundation settlement should be evaluated where large pile groups are employed to carry the foundation load (i.e., breadth of foundation or pile cap is a similar dimension as depth of piles) or large bell diameters are constructed (i.e., 2.5 m or larger).

Pile foundations designed utilizing the provided SLS bearing capacities would perform similarly to pile foundations designed using the provided ULS capacities.

5.5.4 LATERAL THRUST FORCES

Pile deflection typically governs the design of laterally loaded piles. Subgrade reaction theory may be utilized to estimate lateral pile deflection. The estimated coefficients of horizontal subgrade reaction of the subgrade soils have been presented in Table IV.

TABLE IV ESTIMATED COEFFICIENTS OF HORIZONTAL SUBGRADE REACTION

Zone / Depth (m)	Coefficient of Horizontal Subgrade Reaction, Ks, (kN/m^3)
0 to 1.5D	0
1.5D to 4.5	7,000/D
4.5 to 7.5	10,000/D
7.5 to 12	15,000/D
Below 12	25,000/D

Where D = pile diameter (m). For large diameter piles (i.e., exceeding 1 m) the zone of zero horizontal subgrade reaction should not exceed 1.5 m.

For the purposes of this report, design depths have been referenced to existing grade. The structural engineer must consider finished grade elevation relative to existing grade. If existing grade is altered significantly, PMEL should be consulted to confirm the design parameters.

The response of a pile to lateral loads is highly nonlinear. Methods that assume linear behaviour, such as horizontal subgrade reaction theory, are only applicable where pile deflections are small, loading is static and pile materials are linear; these conditions do not exist in most cases and soil-pile interaction modeling (i.e., p-y method) is required to accurately model the pile behaviour. If a more detailed lateral analysis is deemed warranted, PMEL can model the interaction between the soil and the pile, in accordance with the p-y method. Specific pile details (i.e., loading, type, diameter, length, etc.) will be required in order to perform the analysis.

5.5.5 GRADE BEAMS AND PILE CAPS

Grade beams and pile caps should be reinforced at both top and bottom throughout their entire length/cross section. Grade beams (and pile caps exposed to frost action) should be constructed to allow for a minimum of 100 mm of net void space between the underside of the grade beam and the subgrade soil (compressible void form). The finished grade/floor finish adjacent to all pile caps and grade beams should be such that water runoff is not allowed to infiltrate and collect in the void space.

5.6 GRADE-SUPPORTED CONCRETE SLABS

5.6.1 GRADE-SUPPORTED CONCRETE SLABS IN HEATED AREAS

The near surface soils generally consisted of silt overlying glacial till. The silt was typically damp and medium plastic; as such, there is a potential for soil moisture/volume change (i.e., swelling) of the silt soils. Removal and replacement of a portion of the damp silt soils is recommended to improve slab performance.

Grade-supported concrete slabs should perform satisfactorily provided the potential for some differential slab movements/cracking to develop is considered tolerable. Design recommendations have been presented below for conventional slab-on-grade construction.

The following minimum provisions should be incorporated into the design of conventional, heated, grade-supported, cast-in-place, at-grade reinforced concrete slabs subject to light loading.

1. Prepare the site in accordance with Section 5.2. Level and compact the upper 150 mm of subgrade soil to 98 percent of standard Proctor density at optimum moisture content.

2. Soft subgrade areas should be excavated and replaced with suitable soil compacted to 98 percent of standard proctor density at optimum moisture content. High-strength geogrid/geotextile may be required to provide soil stabilization and separation where soft/wet soil conditions are encountered. The need for special measures (i.e., over-excavation, geotextile, geogrid, and/or additional gravel fill) in soft/wet areas must be subject to review by the Geotechnical Consultant during field construction.

3. Do not allow the subgrade soil to dry out. Cover the prepared subgrade soil with non-expansive fill as soon as practical after preparation.

4. Over-excavate a minimum of 300 mm of the existing silt soils and replace with approved fill. All fill placed above the prepared subgrade surface should consist of approved, imported granular material or local glacial till (could be sourced from the proposed stormwater pond). The fill should be placed in thin lifts (150 mm loose, maximum) and uniformly compacted. The fill should be compacted to 98 percent of standard Proctor density, respectively, at optimum moisture content.

5. The uppermost portion of the fill immediately below the slab should consist of crushed granular base course material (150 mm minimum in lightly loaded slab areas, 225 mm in moderately loaded slab areas and 300 mm in heavily loaded slab areas).

6. Isolate the slab from foundation walls, columns, etc., by means of separation joints.

7. Reinforce the concrete slab and articulate the slab at regular intervals to provide for controlled cracking.

8. Provide positive site drainage away from the proposed structure. Extend downspouts at least 3 m away from the foundation.

9. Floor slabs should not be constructed on desiccated, wet, or frozen subgrade soil or base.

10. Frost should not be allowed to penetrate beneath the floor slab just prior to, during or after construction.

11. A soil gas membrane (i.e., radon gas and moisture resistant) should be installed between the underside of the floor slab and the granular fill.

5.6.2 Grade-Supported Concrete Slabs Exposed to Freezing Conditions

Grade-supported concrete slabs exposed to freezing conditions (i.e., exterior slabs/sidewalks, etc.) will be subject to differential movements associated with frost action. The potential for differential movements associated with frost action can be minimized by placing sub-horizontal extruded polystyrene insulation below the slabs/sidewalks.

Where applicable, the insulation should butt-up to the grade beam to direct heat to the underside of the slab. The insulation should have a minimum thickness of 75 mm and should extend sub-horizontally to a minimum distance of 1.8 m beyond the outer edges of the slab. If differential movements cannot be tolerated, the slab should be structurally supported on piles.

5.6.3 Soil Gas (Radon) Mitigation

Within human-occupied areas, measures to mitigate radon gas should be incorporated into the overall design of the proposed building. This could include a sub-slab depressurization system (i.e., radon rock, drainage pipes, suction pit etc.), radon gas membrane and/or adequate ventilation system. The design of the radon mitigation system should be undertaken by qualified designers and should be in accordance with all applicable regulations and building codes. If a sub-slab depressurization system is installed, the design should be reviewed by the Geotechnical Consultant.

If radon rock is incorporated into the design, it should be placed below the granular base course layer of the floor slab structure. The radon rock should be fully encapsulated in non-woven geotextile, capable of transmitting a flow of not less than 50 litres per second per square metre (ASTM D-4491).

5.7 SOIL RETAINING WALLS

5.7.1 DESIGN CONSIDERATIONS

In general, soil retaining walls can be classed as restrained (i.e., prevented from moving sufficiently for active earth pressures to develop behind the wall) or unrestrained (i.e., free to move sufficiently to allow active earth pressures to develop behind the wall); a structural engineer must confirm which case to design for.

Examples of structures having restrained walls would be basements, tunnels, lift stations etc. where a floor slab is typically tied into the top of the wall that restricts movement. Examples of unrestrained walls would be gravity walls, sheet pile walls, soldier pile walls etc. (without bracing) or any wall that holds back soil by virtue of self- weight and stiffness and is designed to undergo some rotation.

Soil retaining walls should be designed to resist lateral earth pressure exerted by the soil as well as the horizontal pressure induced by any surcharge loading. The lateral pressures generated from surcharge loading may be calculated based on the surcharge pressure multiplied by an earth pressure coefficient (k) for the backfill soils as follows:

- Granular Fill - k = 0.5
- Cohesive Fill - k = 1.0

Backfill placed against the wall should be uniformly placed and compacted to minimize settlements as much as practical while limiting development of compaction induced pressures on the wall to an acceptable level.

To prevent hydrostatic pressures from developing behind the wall, a drainage system should be incorporated into the design of the wall. A perforated drainage pipe should be installed with the invert elevation at or below the base of the foundation. The perimeter drainage system should be drained to a sump pit(s) or in the case of a gravity wall, drained by gravity through weep holes (if feasible/permissible). The sump pit(s) should be equipped with an automatic sump pump. The perforated drainage pipe should be at least 100 mm in diameter and installed on non-woven geotextile capable of transmitting a flow of not less than 50 litres per second per square metre (ASTM D-4491). The geotextile should be placed on naturally deposited, undisturbed soil or free-draining sand as may be required for leveling. The geotextile should be used to encapsulate at least 300 mm of clean, granular drainage aggregate above the invert of the drainage pipe. The clean drainage aggregate should meet the aggregate gradation requirements shown in Table V.

TABLE V CLEAN, DRAINAGE AGGREGATE

Grain Size (mm)	Percent Passing
25.9	100
9.5	50 – 95
5.0	35 – 70
2.0	20 – 45
0.425	0 – 20
0.150	0 – 8
0.071	0 – 3

All water collected in the drainage system must be discharged in accordance with local regulations.

If a drainage system is not installed at the base of the wall, the wall must also be designed to withstand hydrostatic pressures.

The uppermost 500 mm of the backfill should consist of clay or other low permeability material.

5.7.2 RESTRAINED FOUNDATION WALLS

This section is applicable to subsurface foundation walls that are restrained, less than 6 m in height, have horizontal ground behind the wall and are constructed within an open-cut excavation (i.e., backfill is placed against the wall after construction of the wall).

Where the existing soils are used to backfill the foundation walls, the lateral earth pressure may be calculated on the basis of an equivalent fluid pressure distribution of 16 kN/m^3 (add hydrostatic pressure if a functional drainage system is not installed).

Where clean granular fill (i.e., less than 5 percent material finer than 0.071 mm) is used to backfill the foundation walls, the lateral earth pressure may be calculated on the basis of an equivalent fluid pressure distribution of 10 kN/m^3 (add hydrostatic pressure if a functional drainage system is not installed). In this case, the slope of the clean, granular backfill material must be no steeper than 45 degrees as measured from the base of the wall.

5.7.3 UNRESTRAINED RETAINING WALLS

This section is applicable to walls that are unrestrained and have horizontal ground behind the wall. The lateral earth pressure may be calculated on the basis of the soil properties presented in Table VI.

TABLE VI LATERAL SOIL PARAMETERS

Soil Type	Effective Angle of Internal Friction	Earth Pressure Coefficients		Unit Weight (kN/m^3)	Submerged Unit Weight (kN/m^3)	Undrained Shear Strength (kPa)
		Active (K_a)	Passive (K_p)			
Cohesive Backfill [1]	25°	0.4	2.5	20.0	10.0	75
Granular Backfill [2]	35°	0.3	3.7	22.0	12.0	0
In-Situ Soil	25°	0.4	2.5	20.0	10.0	75

[1] Approved low plastic cohesive backfill.
[2] Clean, granular backfill with less than 5% passing the 0.071 mm sieve.

If the design is based on the backfill parameters, the slope of the backfill material must be no steeper than 45 degrees as measured from the base of the wall. If the backfilled zone does not meet this criteria, the in-situ soil parameters should be used. If the earth pressure exerted by the in-situ soils exceeds that exerted by the backfill, the 'worst case' soil parameters should be used (i.e., limiting condition).

5.8 FOUNDATION DRAINAGE

The finished grade must be landscaped to provide for positive site drainage away from all structures, and site grades should be maintained as high as feasible. A perimeter weeping tile drainage system (installed at the base of the perimeter foundation) would reduce the potential for external water infiltration below the foundation and is thus recommended.

A sub-floor drainage system should be installed below all below-grade structures to allow for controlled collection and discharge of water that may accumulate below the structure, particularly where site drainage is poor, in low-lying areas of the site or if thick deposits of granular fill are utilized.

Many drainage system configurations are possible, but generally consist of clean, drainage aggregate (less than 3% fines) in conjunction with grading the subgrade surface to collection points (i.e., sump pits) and/or utilizing perforated drainage pipes to transmit water to collection points. The drainage system should be positively sloped to sump pits equipped with automatic sump pumps (or drained by gravity) to discharge water a suitable location well away from the proposed structure. Non-woven geotextiles should be utilized to separate the drainage aggregate from the subgrade soils. The drainage pipes and clean drainage aggregate should be fully encapsulated in non-woven geotextile capable of transmitting a flow of not less than 50 litres per second per square metre (ASTM D-4491). If utilized, the sub-surface drainage system should incorporate provisions for mitigation of radon gas (i.e., traps in lines entering the sump, sealed sumps, etc.).

5.9 FOUNDATION CONCRETE

The results of water-soluble sulphate testing on soil samples recovered from the subject site are in progress; an addendum will be prepared to present recommendations for foundation concrete once the test results become available.

5.10 SITE CLASSIFICATION FOR SEISMIC SITE RESPONSE

Based on the consistency of the subgrade soils encountered at this site and Table 4.1.8.4A of the 2020 National Building Code, the site classification for seismic site response falls within Class D. Based on CPTu correlations, the estimated V_s-30 for the subgrade soils is estimated to be in the order of 225 m/s.

5.11 TRAFFIC STRUCTURES

5.11.1 ASPHALT CONCRETE STRUCTURE THICKNESS

The near-surface subgrade soils consisted of silt. Based on the results of the laboratory analysis, the CBR (California Bearing Ratio) rating of the compacted silt is estimated to be in the order of 3 to 4.

Design traffic volumes were not provided to PMEL for the subject site. As such, the assumed traffic volumes presented in Table VIII were utilized to develop the pavement structures presented in the following section.

TABLE VII ASSUMED TRAFFIC VOLUME

Truck Traffic Volume	Equivalent Single Axle Load (ESAL)	Approximate Equivalent Annual Average Daily Truck Traffic (AADTT)[1] – Single Unit Trucks
Low	40,000	Minimal to None
Moderate	120,000	5
High	700,000	35

[1] AADTT based on single unit trucks with a load equivalency factor of 1.2 (as per AASHTO 1993) and pavement design life of 15 years. The AADTT provided is for conceptual purposes only and will vary depending on actual truck traffic types (i.e., single unit trucks, tractor semi-trailer combinations, super B trucks, etc.).

The following pavement structures are recommended for pavement structures subjected to low, moderate, or high truck traffic volumes, consistent with the assumed traffic volumes presented in Table VIII.

TABLE VIII THICKNESS DESIGN FOR PAVEMENT STRUCTURES

Pavement Structure Layer	Thickness (mm)		
	Truck Traffic Volume		
	High	Moderate	Low
Asphalt Concrete	120	85	65
Granular Base	200	175	150
Granular Sub-Base	250	175	150
Geotextile/Geogrid [1]	As Required	As Required	As Required
Prepared Subgrade	(150)	(150)	(150)
Total Thickness (mm)	**570**	**435**	**365**

[1] Geogrid/geotextile may be required where soft/wet/loose subgrade soil conditions are encountered.

Notes:

1. If the traffic areas (or portions of the traffic areas) will be subject to traffic volumes and/or truck types varying, or in excess of, those presented in Table VIII, PMEL should be notified to review our recommendations. A detailed traffic volume analysis may be required. Depending on the actual traffic volume, the recommended pavement structure may be adjusted.

2. It should be noted that the low truck traffic pavement structure is the minimum pavement structure recommended for the parking/driving areas.

3. Traffic should be appropriate for the pavement structure (i.e., do not allow heavy traffic on light traffic structures) or premature distress/failure may occur.

5.11.2 PAVEMENT STRUCTURE CONSTRUCTION

The following minimum recommendations should be incorporated into the construction of the pavement structures.

1. Prepare the site in accordance with Section 5.2. Level and compact the upper 150 mm of subgrade soil to 96 percent of standard Proctor density at optimum moisture content.

2. It is recommended that PMEL conduct a visual site assessment and proof roll on the prepared subgrade prior to construction of the traffic structures presented in Table IX. Remediation (i.e., over-excavation and replacement or geotextile/geogrid) will be required for areas of the roadway where deflection/rutting of the subgrade is observed at the time of the proof roll. The amount of over-excavation required will be dependent upon the severity of the deficiency observed. Recommendations for remediation, if required, would be provided based on the field conditions observed at the time of the visual assessment.

3. If minor site grading (i.e., cut/fill) is required to create a level subgrade surface to allow for the placement of a uniform thickness granular fill structure, locally available soils or approved imported soils may be utilized as fill. The fill should be placed in thin lifts (150 mm loose, maximum) and uniformly compacted to 98 percent of standard Proctor density at optimum moisture content. If significant site grading is required, PMEL should be contacted to reassess the design recommendations.

4. All granular fill placed above the subgrade should be placed in thin lifts (150 mm loose) and compacted to 98 percent of standard Proctor density at optimum moisture content. The granular fill should meet the aggregate gradation requirements provided in Table X.

TABLE IX AGGREGATE GRADATION REQUIREMENTS

Grain Size (mm)	Percent Passing		
	Base-Course (ATT 2-25)	Sub-Base Course (ATT 6-80)	Surfacing Aggregate (ATT 4-40)
80.0	--	100	--
50.0	--	55 - 100	--
40.0	--	--	100
25.0	100	38 - 100	--
20.0	82 - 97		55 - 90
16.0	70 - 94	32 - 85	--
10.0	52 - 79	--	25 - 72
5.0	35 - 64	20 - 65	8 - 55
1.25	18 - 43	--	0 - 30
0.630	12 - 34	--	--
0.315	8 - 26	6 - 30	--
0.160	5 - 18	--	--
0.071	2 - 10	2 - 10	0 - 12
Plasticity Index (%)	6 max	8 max	
% Fracture (Min)	60	--	

5. Positive surface drainage is recommended to reduce the potential for moisture infiltration through the pavement structure.

6. Surface water should be prevented from seeping back under the outer edges of the traffic structure.

7. Where possible, grades should be designed such that the granular materials can freely discharge into ditches or into a sub-surface drainage system; this will provide a capillary break to maintain an unsaturated condition in the overlying traffic structure (this is especially important in low-lying/wetland areas).

8. Periodic maintenance such as crack sealing will be required for asphalt concrete pavement.

9. If concrete catch basins are installed, a series of small holes (25 mm diameter minimum) should be drilled through the catch basin to allow for drainage of free water which may collect adjacent to the catch basin. A layer of non-woven geotextile should be used to encapsulate the catch basin and the surrounding (free-draining) backfill material to prevent clogging of the drainage holes.

10. Damage to the pavement related to frost heave around structures constructed within the pavement (i.e., manholes, curbs, backs of curbs, etc.) may occur. Consideration could be given to constructing 3H:1V frost tapers (constructed with granular fill) at these structures which should reduce the potential for pavement cracking around the structure. Frost tapers are also recommended at transitions between high, moderate, and low truck traffic pavement structures.

11. Damage to the pavement related to a change in stiffness where asphalt concrete pavements transition into concrete (i.e., at the location of the loading dock/pump island/garbage bin slab/etc.) is common. To reduce the potential for damage, a stiffness transition zone could be constructed at the transition between pavement types. The suggested configuration of the stiffness transition zone has been shown in Figure I.

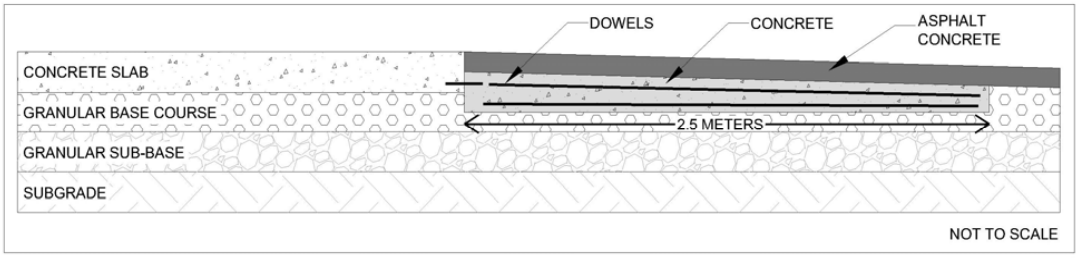


FIGURE I STIFFNESS TRANSITION

5.11.3 GRAVELLED TRAFFIC STRUCTURE CONSIDERATIONS

If gravel surfacing is utilized instead of asphalt concrete, the structure thicknesses presented in Table IX should suffice if site drainage is adequate and regular maintenance/grading is completed to maintain the traffic structure at the desired condition. If drainage is insufficient and maintenance is inadequate, premature traffic structure failure may occur. If a lesser structure is utilized, more frequent maintenance will be required, and premature failure may occur.

If additional longevity/lesser maintenance is desired, the structure thickness should be increased and geosynthetics should be utilized at the base of the structure to provide material separation.

The uppermost 25 to 50 mm of the gravelled structure should consist of suitable traffic gravel. PMEL can review the proposed gravelled traffic structures upon request to confirm suitability for the intended usage.

In staging/laydown areas subject to very infrequent traffic, a thin wearing course of traffic gravel may suffice provided that site drainage is sufficient, adequate maintenance is performed and heavy traffic does not travel on the gravel during soft subgrade conditions (i.e., during/following periods of precipitation and while soils are softened during spring thaw).

5.12 STORMWATER POND

5.12.1 GENERAL

It is understood that a stormwater pond will be constructed at the site. The retention capacity of the pond will depend on the position of the groundwater table, which was situated as shallow as 2 m below ground level to more than 4.5 m below ground surface on September 10, 2024. Groundwater levels can typically fluctuate seasonally by as much as 1 m, with the highest groundwater level in the spring and/or during/following spring thaw and/or periods of precipitation.

The soils at the subject site are low permeability and will provide a natural level of water retention. If a lower permeability is required for the pond, the locally available till or clay soils could be utilized to construct a compacted soil liner (and dykes, if required). The locally available silt soils are not preferred due to the generally damp condition of this material; additional material conditioning would be required.

The design considerations presented below are general in nature and may or may not be required, depending on the requirements of the project.

5.12.2 DYKE CONSTRUCTION

The on-site till or clay soils are considered suitable for dyke construction (silt is not recommended). All existing topsoil, organics and/or deleterious material should be stripped from the surface of the proposed storm pond site. The topsoil should be stockpiled and replaced on the exterior surface of the perimeter dykes following construction of the pond. The excavated surfaces should then be inspected by a representative of the Geotechnical Consultant to ensure that all soil, considered not suitable, has been removed prior to further construction. The subgrade below the exterior dykes should be excavated to form a keyway extending to a minimum depth of 500 mm below the surface of the subgrade soils.

Following construction of the keyways, the remainder of the new dyke should be constructed in accordance with the following recommendations:

1. The dykes should be constructed in thin lifts not exceeding 150 mm in thickness (loose) and compacted to 96% of standard Proctor density (ASTM D-698) within two percent of optimum moisture content.

2. The dykes should be constructed with embankment slopes no steeper than 3 (H) to 1 (V) on the interior surfaces and 4 (H) to 1 (V) on the exterior slopes.

3. The dykes should be designed and constructed to control surface water runoff to the proposed storm pond. A minimum dyke height of 0.5 m above exterior grades is recommended, but it should be adjusted accordingly based on local design flood levels.

4. Topsoil dressing should be applied to the outer and inner dyke faces where it is not possible to achieve submergence for extended periods of time. Vegetation growth along the dyke faces is required to minimize surface erosion. As such, the topsoil should be hydro-seeded.

5.12.3 LINER CONSTRUCTION

The following recommendations should be considered in the design of the compacted soil liner:

1. On-site liner materials should consist of till or clay (silt is not recommended). The material should be placed in thin lifts (maximum 150 mm loose) and uniformly compacted to 98 percent of standard Proctor density within two percent of optimum moisture content. Each compacted lift shall be protected from drying out to prevent cracking due to shrinkage. Unsuitable soils (i.e., sand or other permeable material etc.) should be excavated and replaced with suitable till or clay materials.

2. The base of the liner should be located a suitable distance above the near surface groundwater table in accordance with local regulations for the intended usage.

3. The liner should have a compacted thickness suitable for the intended containment usage, considering local regulations/requirements for the intended usage. The liner should extend up to the full supply plus free board.

4. The compacted liner system should be protected from freezing and/or drying prior to and during in-service operation.

5. The liner should be flooded upon completion of construction.

6. The liner should not be allowed to dry out for extended periods of time (i.e., not longer than two weeks).

7. The owner/client should retain qualified geotechnical personnel to monitor construction activities and to perform quality control testing during pond construction. A post-construction report should be submitted as a part of the quality assurance/quality control (QA/QC) program.

5.12.4 SLOPE PROTECTION

The interior surface of the dykes (i.e. liner) should be protected against surface erosion both above and below the design full supply level. Slope protection could consist of riprap or manufactured erosion protection such as geotextiles or erosion control blankets. The exterior surface of the dykes should be covered with organic topsoil and seeded to provide slope protection from surface runoff erosion.

5.12.5 CONTROL STRUCTURES

It is anticipated that control structures may be required on the newly constructed dykes due to anticipated long-term settlement of the dyke soil and underlying subgrade. The design of control structures should accommodate long-term differential movement of approximately 150 mm. Riprap should be placed around the openings of control structures to minimize the potential for surface erosion.

5.12.6 LEVEL CONTROL MONITORS

Level control monitors should be installed to prevent overtopping of the dykes. The elevation of the level control monitors should reflect the minimum design freeboard of 1 m.

5.12.7 TRAFFIC ACCOMMODATION

If traffic is required to travel on the dykes, the top of the dykes should be of sufficient width (minimum 4 m) to accommodate service vehicle access and practical construction equipment. The top surface of the dykes should have a crown with a minimum cross-slope of 3 percent. It is recommended that the crest of each dyke be capped with 100 mm of base coarse material to permit all season vehicular traffic.

5.12.8 SITE DRAINAGE

A collector ditch should be excavated adjacent to the toe of the perimeter dykes for collection and controlled discharge of surface runoff. The collector ditch should be connected to the local natural surface drainage system.

5.12.9 SHRINKAGE FACTOR

A shrinkage factor of 25 percent is recommended for common borrow. The above shrinkage factor assumes that the organic topsoil will be removed and will not be included in volume calculations to which the shrinkage factor will be applied.

5.12.10 QUALITY CONTROL TESTING

Quality control testing should be performed on a continuous basis during construction to monitor compliance with the placement and compaction requirements outlined in previous sections of this report.

6 LIMITATIONS

The presentation of the summary of the borehole logs and design recommendations has been completed as authorized. Twenty-five, 150 mm diameter boreholes were dry drilled using our continuous flight solid stem auger drilling equipment. Borehole logs were compiled during test drilling which, we believe, were representative of the subsurface conditions at the borehole locations at the time of test drilling. Three CPTu's were conducted during the field investigation. The inferred subsoil stratigraphy has been shown on the attached CPTu plots.

Variations in the subsurface conditions from that shown on the borehole logs and CPTu plots at locations other than the exact test location should be anticipated. If conditions should differ from those reported here, then we should be notified immediately in order that we may examine the conditions in the field and reassess our recommendations in the light of any new findings.

The Terms of Reference for this investigation did not include any environmental assessment of the site. No detectable evidence of environmentally sensitive materials was detected during the actual time of the field test drilling program. If, on the basis of any knowledge, other than that formally communicated to us, there is reason to suspect that environmentally sensitive materials may exist, then additional boreholes should be drilled and samples recovered for chemical analysis.

The subsurface investigation necessitated the drilling of deep boreholes. The boreholes were backfilled at the completion of test drilling. Please be advised that some settlement of the backfill materials will occur which may leave a depression or an open hole. It is the responsibility of the client to inspect the site and backfill, as required, to ensure that the ground surface at each borehole location is maintained level with the existing grade.

It is recommended that the monitoring wells should be decommissioned once they are no longer needed. PMEL will not accept any future liability associated with inadequate decommissioning of monitoring wells. Costs for decommissioning monitoring wells can be provided by PMEL upon request.

This report has been prepared for the exclusive use of Rocky Mountain Equipment LP and their agents for specific application to the proposed Rocky Mountain Equipment (RME) development to be constructed within W½ 10-09-21 W4M in Lethbridge, Alberta. It has been prepared in accordance with generally accepted geotechnical engineering practices and reflects PMEL's understanding of the project based on information available at the time of preparation of this report. No other warranty, expressed or implied, is made.

The report should be referenced in its entirety, in order to properly understand the suggestions, design considerations and recommendations provided in this report. Any use which a Third Party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such Third Party. Governing Agencies such as municipal, provincial, or federal agencies having jurisdictions with respect to this development and/or construction of the facilities described herein have full jurisdiction with respect to the described development. Any other unspecified subsequent development would be considered Third Party and would, therefore, require prior review by PMEL. PMEL accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

Prior to completion of the final design drawings/specifications, PMEL should be retained to review the geotechnical aspects of the project plans and documents to confirm that they are consistent with the intent of this report.

The acceptance of responsibility for the design/construction recommendations presented in this report are contingent on PMEL providing field documentation and review services at the time of construction. Field reviews are necessary for PMEL to provide letters of assurance in accordance with requirements of local regulatory authorities. PMEL will not accept any responsibility on this project for any unsatisfactory performance if adequate and/or full-time inspection is not performed by a representative of PMEL.

If this report has been transmitted electronically, it has been digitally signed and secured with personal passwords to lock the document. Due to the possibility of digital modification, only those reports sent directly by PMEL can be relied upon without fault.

We trust that this report fulfills your requirements for this project. Should you require additional information, please contact us.

P. MACHIBRODA ENGINEERING LTD.

PROFESSIONAL ENGINEER ALBERTA
CORY ZUBROWSKI
ID 71571

Cory Zubrowski, P.Eng.

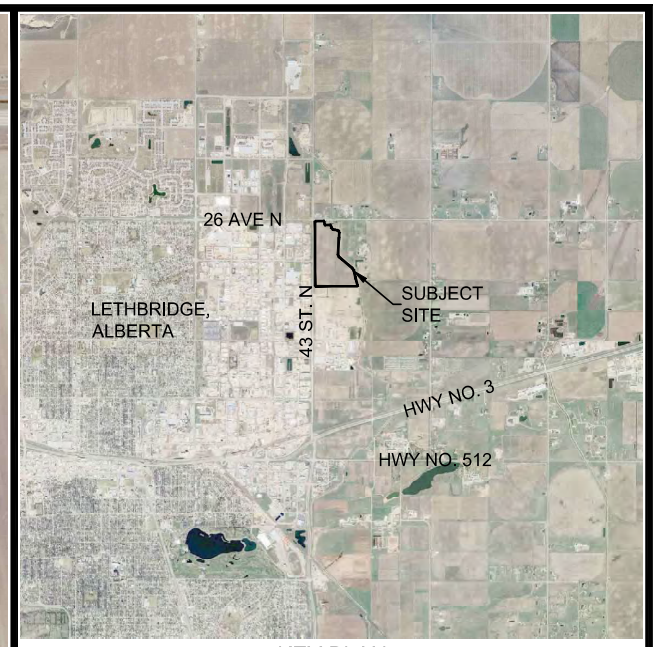
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RM SIGNATURE:
RM APEGA ID #: 71571
DATE: 2024-09-23
PERMIT NUMBER: P005862
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Kelly Pardoski, P.Eng.
CZ/KP

DRAWINGS

P.MACHIBRODA ENGINEERING LTD.





KEY PLAN
NOT TO SCALE

NOTE:
1. THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.
2. THIS DRAWING WAS COMPILED FROM GOOGLE EARTH PRO ©2024, IMAGE ©2024 DIGITALGLOBE, (IMAGERY DATE: 04/10/24).
3. THIS DRAWING WAS COMPILED USING HANDHELD GPS EQUIPMENT (TRIMBLE, MODEL No. Geo7X).

LEGEND

–PMEL BOREHOLE

–PMEL PIEZOCONE PENETRATION TEST

–PMEL BOREHOLE (MONITORING WELL INSTALLED)

P. MACHIBRODA ENGINEERING LTD.

CONSULTING
GEOENVIRONMENTAL
GEOTECHNICAL
ENGINEERS

806 – 48th STREET EAST
SASKATOON, SK
S7K 3Y4

DRAWING TITLE:
SITE PLAN
BOREHOLE AND PIEZOCONE LOCATIONS

PROJECT:
PROPOSED RME DEVELOPMENT
W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

APPROVED BY:	DRAWN BY:
CZ	TP
DATE: SEPTEMBER, 2024	DRAWING NUMBER: 21903-1
SCALE: AS SHOWN	

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-1

DRAWING NUMBER: 21903-2

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509767 **EASTING (m):** 371845 **ELEVATION (m):** 912.2 (+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.	N		8.9						0
		trace organics to 0.05 m.	N		14.9					3.0	
1		GLACIAL TILL, clay, silty, some sand, trace gravel, very stiff, medium plastic, moist, brown, oxide stained, coal chips.	N		18.3					2.0	1
2											2
3		SILT, clayey, some sand, firm, medium plastic, moist to wet, brown, oxide stained.	☒	3	32.9						3
4		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, coal chips.	N		18.6					1.0	4
5											5
6			☒	15	16.0			20.9		1.5	6
		sand seam, wet, seepage, sloughing 6.4 to 6.6 m.									
7		very stiff below 6.6 m.	N		17.0					1.5	7
8											8
9			☒	15	15.4					1.5	9
10			N		16.4					1.5	10
11											11
12											12

CONTINUED ON NEXT PAGE

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-1

DRAWING NUMBER: 21903-2A

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509767 **EASTING (m):** 371845 **ELEVATION (m):** **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
12		GLACIAL TILL, clay, silty, some sand, trace gravel, very stiff, medium plastic, moist, brown, oxide stained, coal chips.	☒	16	15.0			20.9		1.75	12
13			N		17.2					2.5 ▽	13
14											14
15		coal seam 14.9 to 15.1 m. hard below 15.0 m.	☒	26	15.9					3.0	15
16											16
17											17
18											18
19											19
20											20
21											21
22											22
23											23
24											24

NOTE:
1. Borehole sloughed to 14.7 m Immediately After Drilling.

SHEET 2 OF 2

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH1(A)-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-2

DRAWING NUMBER: 21903-3

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509757 **EASTING (m):** 371936 **ELEVATION (m):** 910.7(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.7						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, dark brown.			15.8	37	17			3.5	
1											1
		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.	☒	6	15.9					1.0	
2											2
					18.4					1.75	
3											3
4											4
			☒	16	16.5					2.0	
5											5
					17.1					2.0	
6											6
		very stiff below 7.1 m.									
7			☒	21	14.4			20.8		2.0	7
8											8
					17.5					2.25	
9											9
10											10
			☒	19	15.5					2.5	
11											11
					18.6					2.5	
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH2-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-3

DRAWING NUMBER: 21903-4

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509718 **EASTING (m):** 371891 **ELEVATION (m):** 912.7(+/- 1.0 m) **DATE DRILLED:** AUG 29/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)
0		TOPSOIL, organic, moist, dark brown, rootlets.			11.1					
1		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			9.6					
2		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals.			18.9					1.75
3					14.9					1.5
4										
5										
6										
7										
8										
9										
10										
11										
12										

MONITORING WELL: BH24-3
ELEV.: 913.7 (+/- 1.0 m)

- BENTONITE SEAL
- 50 mm diam. SCH 40, PVC RISER PIPE
- SANDPACKED ANNULUS
- 50 mm diam. MACHINE SLOTTED SCH 40 PVC WELL SCREEN

NOTE:
1. Borehole open and dry Immediately After Drilling.
2. Monitoring well dry on September 10, 2024.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH3-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-4

DRAWING NUMBER: 21903-5

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, AB.

NORTHING (m): 5509677 **EASTING (m):** 371842 **ELEVATION (m):** 911.8(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			22.7						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			10.9						
1											1
		CLAY, silty, trace sand, stiff, medium plastic, moist, brown, gypsum crystals.	☒	6	26.5			19.0		1.25	
2											2
3					27.9					1.0	3
4		firm, moist to wet below 4.3 m.									4
5		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, trace coal chips.	☒	5	23.3					1.25	5
6					21.1					1.5	6
7											7
8			☒	11	19.2			20.0		1.5	8
9					19.7					1.5	9
10											10
11		very stiff below 11.3 m.	☒	11	17.8					1.5	11
12					16.6					2.5	12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH4-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-5

DRAWING NUMBER: 21903-6

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509673 **EASTING (m):** 371953 **ELEVATION (m):** 910.2(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: CUTTINGS SPLIT SPOON SHELBY TUBE

WATER LEVELS
After Drilling
During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.1					
1		SILT, clayey, some sand, very stiff, medium plastic, damp, dark brown.			8.3					
		brown below 0.3 m.								
1		CLAY, silty, stiff, medium plastic, moist, brown.			23.7					
2		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.								
3				6	15.8					1.0
4					21.2					1.25
5										
6				10	16.2			20.8		1.5
7					17.4					1.5
8										
9		sand seam, wet, seepage, sloughing 8.8 to 9.0 m.			21.0					
				10	16.8			20.3		1.75
10		very stiff below 10.2 m.			16.9					2.0
11										
12										

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-5

DRAWING NUMBER: 21903-6A

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509673 **EASTING (m):** 371953 **ELEVATION (m):** **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
12		GLACIAL TILL, clay, silty, some sand, trace gravel, very stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.	☒	23	16.9					2.25	12
13											13
14											14
15											15
16											16
17											17
18											18
19											19
20											20
21											21
22											22
23											23
24											24

NOTE:
1. Borehole sloughed to 9.1 m Immediately After Drilling.

SHEET 2 OF 2

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-6

DRAWING NUMBER: 21903-7

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509661 **EASTING (m):** 372070 **ELEVATION (m):** 910.6(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: CUTTINGS SPLIT SPOON SHELBY TUBE

WATER LEVELS
After Drilling
During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			20.4					1.5	0
1		SILT, clayey, sandy, stiff, medium plastic, moist, dark brown. brown below 0.6 m. firm, moist below 0.7 m.			21.2	36	17			0.5	1
2		GLACIAL TILL, clay, silty, some sand, trace gravel, firm, medium plastic, moist to wet, brown, oxide stained, gypsum crystals, trace coal chips. stiff, moist below 2.3 m.		4	20.7					0.25	2
3					17.8					1.5	3
4					20.7					1.75	4
5											5
6		sand seam, wet, seepage, sloughing 6.3 to 6.6 m.			17.2					1.75	6
7											7
8				12	16.0			20.8		2.0	8
9		sand layer, wet, seepage, sloughing 8.7 to 9.7 m.			18.3					4.5	9
10		very stiff below 10.3 m.			18.2					2.0	10
11											11
12					16.8						12

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-6

DRAWING NUMBER: 21903-7A

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509661 **EASTING (m):** 372070 **ELEVATION (m):** **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
12		GLACIAL TILL, clay, silty, some sand, trace gravel, very stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.									12
13					14.8					2.5	13
14											14
15					17.1					2.5	15
16											16
17											17
18											18
19											19
20											20
21											21
22											22
23											23
24											24

NOTE:
1. Borehole sloughed to 6.1 m Immediately After Drilling.

SHEET 2 OF 2

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-7

DRAWING NUMBER: 21903-8

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509634 **EASTING (m):** 371898 **ELEVATION (m):** 912.4(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			10.1						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			20.2						
1		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals.			15.5	38	19				1
2					16.9						2
3											3
4											4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-8

DRAWING NUMBER: 21903-9

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509631 **EASTING (m):** 372022 **ELEVATION (m):** 910.4(+/- 1.0 m) **DATE DRILLED:** AUG 29/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			8.9						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			16.1					2.0	
1		CLAY, silty, trace sand, stiff, medium plastic, moist, brown.			16.8					1.5	1
2		GLACIAL TILL, clay, silty, sandy, trace gravel, stiff, medium plastic, moist, brown.			20.9					1.5	2
3											3
4											4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-9

DRAWING NUMBER: 21903-10

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509587 **EASTING (m):** 371842 **ELEVATION (m):** 912.5(+/- 1.0 m) **DATE DRILLED:** AUG 29/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.	N		9.2						0
			N		8.0						
1		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, trace coal chips.	N		18.4					1.5	1
2											2
3			☒	9	15.2					1.5	3
4		very stiff below 4.5 m.	N		17.3					1.75	4
5											5
6			☒	13	16.0					1.75	6
7			N		17.5					1.5	7
8											8
9			☒	18	15.8					2.5	9
10			N		22.3					2.0	10
11											11
12											12

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-9

DRAWING NUMBER: 21903-10A

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509587 **EASTING (m):** 371842 **ELEVATION (m):** **DATE DRILLED:** AUG 29/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
12		GLACIAL TILL, clay, silty, some sand, trace gravel, very stiff to hard, medium plastic, moist, brown, oxide stained, trace coal chips.	☒	26	14.8			21.0		2.5	12
13											13
14											14
15											15
16											16
17											17
18											18
19											19
20											20
21											21
22											22
23											23
24											24

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 2 OF 2

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-10

DRAWING NUMBER: 21903-11

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509589 **EASTING (m):** 371971 **ELEVATION (m):** 914.3(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.2						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			9.5	33	14				
1		stiff, moist below 1.0 m.									1
		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, trace coal chips.	☒	11	13.1					1.75	
2											2
					18.3					1.75	
3											3
4											4
			☒	9	19.0			20.3		1.75	
5		very stiff below 5.5 m.									5
					18.5					2.25	
6											6
7											7
			☒	19						2.25	
8											8
					18.2					2.25	
9											9
10											10
			☒	17	17.0			21.2		2.0	
11											11
					16.8					2.0	
12											12

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-10

DRAWING NUMBER: 21903-11A

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509589 **EASTING (m):** 371971 **ELEVATION (m):** **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
12		GLACIAL TILL, clay, silty, some sand, trace gravel, very stiff, medium plastic, moist, brown, oxide stained, trace coal chips.									12
13			☒	23	15.7					2.5	13
14											14
15					16.0					2.75	15
16											16
17											17
18											18
19											19
20											20
21											21
22											22
23											23
24											24

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 2 OF 2

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-11

DRAWING NUMBER: 21903-12

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509583 **EASTING (m):** 372095 **ELEVATION (m):** 913.6(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			10.8					1.0	0
		CLAY, silty, some sand, stiff, medium plastic, moist, brown.			20.4	34	16			1.0	
1											1
		firm 1.6 to 2.3 m.			21.3					1.5	
2											2
3			☒	6	29.4					1.0	3
		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, trace coal chips.									
4					18.1					1.5	4
5											5
6			☒	12	16.1			20.8		1.5	6
7		sand seam, wet, seepage, sloughing 7.2 to 8.0 m.			21.5						7
8											8
9		very stiff below 9.0 m.	☒	15	14.7					2.0	9
10					19.7					2.5	10
11											11
12											12

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-11

DRAWING NUMBER: 21903-12A

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509583 **EASTING (m):** 372095 **ELEVATION (m):** **DATE DRILLED:** AUG 29/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
12		GLACIAL TILL, clay, silty, some sand, trace gravel, very stiff to hard, medium plastic, moist, brown, oxide stained, trace coal chips.	☒	26	17.1			20.5		3.0	12
13											13
14											14
15											15
16											16
17											17
18											18
19											19
20											20
21											21
22											22
23											23
24											24

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 2 OF 2

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-12

DRAWING NUMBER: 21903-13

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509500 **EASTING (m):** 371849 **ELEVATION (m):** 911.7(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.	N		10.3						0
1			N		9.9						1
		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, trace coal chips.	N		16.9						
2											2
3			☒	11	14.8						3
4			N		16.8						4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-13

DRAWING NUMBER: 21903-14

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509500 **EASTING (m):** 371970 **ELEVATION (m):** 912.0(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		SILT, clayey, some sand, very stiff, low to medium plastic, damp, brown.	N		11.8						0
1			N		10.1						1
1		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.	☒	11	21.0					2.0	2
3			N		14.9					1.5	3
4			☒	10	18.6					1.5	4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-14

DRAWING NUMBER: 21903-15

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

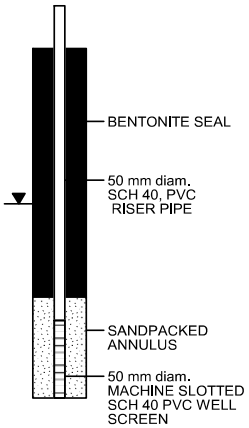
NORTHING (m): 5509495 **EASTING (m):** 372092 **ELEVATION (m):** 910.7(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)
0		TOPSOIL, organic, moist, dark brown, rootlets.			10.3					
1		SILT, clayey, some sand, stiff, medium plastic, moist, brown.			19.9					
2		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.			19.0					
3			☒	10	15.2					
4					16.4					
5										
6										
7										
8										
9										
10										
11										
12										

MONITORING WELL: BH24-14
ELEV.: 911.7 (+/-1.0 m)



DEPTH (m) 0 1 2 3 4 5 6 7 8 9 10 11 12

NOTE:
1. Borehole open and dry Immediately After Drilling.
2. Monitoring well water level at 2.0 m below existing grade on September 10, 2024.

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P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-15

DRAWING NUMBER: 21903-16

PROJECT: PROPOSED RME DEVELOPMENT

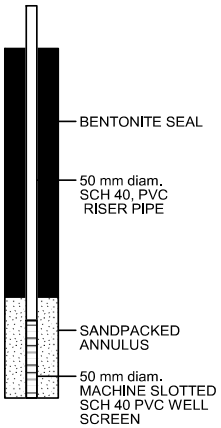
LOCATION: W1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509333 **EASTING (m):** 371841 **ELEVATION (m):** 911.9(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.7	39	20			
1		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			8.1					
2		CLAY, silty, some sand, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals.			27.9					1.5
3		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.		9	18.5					1.5
4					18.2					1.75
5										
6										
7										
8										
9										
10										
11										
12										



DEPTH (m) 0 1 2 3 4 5 6 7 8 9 10 11 12

NOTE:
1. Borehole open and dry Immediately After Drilling.
2. Monitoring well dry on September 10, 2024.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH15-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-16

DRAWING NUMBER: 21903-17

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509322 **EASTING (m):** 371986 **ELEVATION (m):** 911.5(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			8.9						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			7.0						
1		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.									1
		cobbles and boulders at 1.2 m.									
2				9	12.1					1.5	2
3					15.0					1.5	3
4		cobbles and boulders at 3.9 m.									4
5				8	17.8					1.5	5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH16-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-17

DRAWING NUMBER: 21903-18

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509322 **EASTING (m):** 372098 **ELEVATION (m):** 910.8(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			13.7						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			20.7				83.4		
1		CLAY, silty, some sand, stiff, medium plastic, moist, brown.			19.1	33	16				1
2		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.									2
3			☒	8	17.4					2.0	3
4					19.8						4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH17-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-18

DRAWING NUMBER: 21903-19

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509145 **EASTING (m):** 371841 **ELEVATION (m):** 913.0(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			10.2						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			10.7						
1		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.									1
2			☒	9	16.1	36	15			1.5	2
3					17.7					1.5	3
4											4
5			☒	9	17.5					1.5	5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH18-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-19

DRAWING NUMBER: 21903-20

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509139 **EASTING (m):** 371968 **ELEVATION (m):** 912.5(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.2						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			8.7						
1		CLAY, silty, some sand, stiff, medium plastic, moist, brown, gypsum crystals.			25.4					1.5	1
2		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.									2
3			☒	7	18.6					1.5	3
4					22.3					1.5	4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH19-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-20

DRAWING NUMBER: 21903-21

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509141 **EASTING (m):** 372110 **ELEVATION (m):** 911.5(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			8.0						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			8.8						
1											1
2		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.		8	11.2						2
3					14.8						3
4		silt seam, moist to wet 3.6 to 3.9 m.		7	19.6						4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH20-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-21

DRAWING NUMBER: 21903-22

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5509136 **EASTING (m):** 372265 **ELEVATION (m):** 909.8(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.9					
0.5		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			10.5					
1		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.			13.1					1.5
2		silt seam, moist to wet, trace seepage/sloughing 2.1 to 2.4 m.			22.1					
3			☒	6	16.8					1.25
4					17.6					1.5

MONITORING WELL: BH24-21
ELEV.: 910.8 (+/- 1.0 m)

- BENTONITE SEAL
- 50 mm diam. SCH 40, PVC RISER PIPE
- SANDPACKED ANNULUS
- 50 mm diam. MACHINE SLOTTED SCH 40 PVC WELL SCREEN
- SLOUGH

DEPTH (m) 0 1 2 3 4 5 6 7 8 9 10 11 12

NOTE:
1. Borehole sloughed to 3.8 m and dry Immediately After Drilling.
2. Monitoring well water level at 3.0 m below existing grade on September 10, 2024.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH21-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-22

DRAWING NUMBER: 21903-23

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5508966 **EASTING (m):** 371840 **ELEVATION (m):** 913.7(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☒ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.3						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			8.7						
1		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, coal chips.			15.7					2.0	1
2											2
3				8	17.2					1.5	3
4					17.8					1.5	4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH22-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-23

DRAWING NUMBER: 21903-24

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

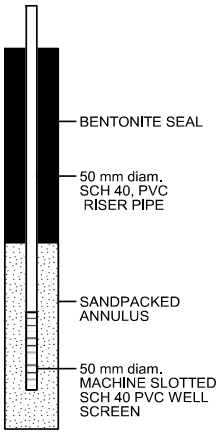
NORTHING (m): 5508971 **EASTING (m):** 371980 **ELEVATION (m):** 913.0(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.0					
1		SILT, clayey, some sand, very stiff, medium plastic, damp, brown.			8.4				81.8	
2		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips. cobbels and boulders at 2.0 m.		9	12.6					
3					18.3					
4				8	17.5					
5										
6										
7										
8										
9										
10										
11										
12										

MONITORING WELL: BH24-23
ELEV.: 914.0 (+/- 1.0 m)



NOTE:
1. Borehole open and dry Immediately After Drilling.
2. Monitoring well dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH23-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-24

DRAWING NUMBER: 21903-25

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5508965 **EASTING (m):** 372122 **ELEVATION (m):** 914.2(+/- 1.0 m) **DATE DRILLED:** AUG 27/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			12.5						0
		SILT, some clay, trace sand, very stiff, medium plastic, damp, brown.			12.9	37	16				
1		CLAY, silty, some sand, stiff, medium plastic, moist, brown.									1
		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff to very stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.			13.2					2.0	
2											2
3			☒	15	12.1					2.0	3
4		stiff below 4.0 m.			15.8					1.75	4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH24-21903.bor

P.MACHIBRODA ENGINEERING LTD.

BOREHOLE 24-25

DRAWING NUMBER: 21903-26

PROJECT: PROPOSED RME DEVELOPMENT

LOCATION: W 1/2 10-09-21 W4M, LETHBRIDGE, ALBERTA

NORTHING (m): 5508954 **EASTING (m):** 372273 **ELEVATION (m):** 911.2(+/- 1.0 m) **DATE DRILLED:** AUG 28/24

SAMPLE TYPE: ☐ CUTTINGS ☒ SPLIT SPOON ■ SHELBY TUBE

WATER LEVELS
▼ After Drilling
▽ During Drilling

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE TYPE	SPT (N) BLOWS/ 300 mm	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	UNIT WEIGHT (kN/m³)	P200 (%)	POCKET PEN. (kg/cm²)	DEPTH (m)
0		TOPSOIL, organic, moist, dark brown, rootlets.			9.5						0
		SILT, clayey, some sand, very stiff, medium plastic, damp, dark brown.			11.5						
1		CLAY, silty, some sand, stiff, medium plastic, moist, brown.									1
2		GLACIAL TILL, clay, silty, some sand, trace gravel, stiff, medium plastic, moist, brown, oxide stained, gypsum crystals, trace coal chips.	☒	10	11.0					1.5	2
3					17.6					1.5	3
4											4
5			☒	11	15.9					1.5	5
6											6
7											7
8											8
9											9
10											10
11											11
12											12

NOTE:
1. Borehole open and dry Immediately After Drilling.

SHEET 1 OF 1

09-23-2024 Y:\2024 Projects\21903 - RME Development, Lethbridge, AB\Drafting\DWG\BH25-21903.bor

APPENDIX A

Explanation of Terms on
Borehole Logs

CLASSIFICATION OF SOILS

Coarse-Grained Soils: Soils containing particles that are visible to the naked eye. They include gravels and sands and are generally referred to as cohesionless or non-cohesive soils. Coarse-grained soils are soils having more than 50 percent of the dry weight larger than particle size 0.080 mm.

Fine-Grained Soils: Soils containing particles that are not visible to the naked eye. They include silts and clays. Fine-grained soils are soils having more than 50 percent of the dry weight smaller than particle size 0.080 mm.

Organic Soils: Soils containing a high natural organic content.

Soil Classification By Particle Size

Soil Type	Particles of Size
Clay	< 0.002 mm
Silt	0.002 – 0.060 mm
Sand	0.06 – 2.0 mm
Gravel	2.0 – 60 mm
Cobbles	60 – 200 mm
Boulders	>200 mm

TERMS DESCRIBING CONSISTENCY OR CONDITION

Coarse-grained soils: Described in terms of compactness condition and are often interpreted from the results of a Standard Penetration Test (SPT). The standard penetration test is described as the number of blows, N, required to drive a 51 mm outside diameter (O.D.) split barrel sampler into the soil a distance of 0.3 m (from 0.15 m to 0.45 m) with a 63.5 kg weight having a free fall of 0.76 m.

Compactness Condition	SPT N-Index (blows per 0.3 m)
Very loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	Over 50

Fine-Grained Soils: Classified in relation to undrained shear strength.

Consistency	Undrained Shear Strength (kPa)	N Value (Approximate)	Field Identification
Very Soft	<12	0-2	Easily penetrated several centimetres by the fist.
Soft	12-25	2-4	Easily penetrated several centimetres by the thumb.
Firm	25-50	4-8	Can be penetrated several centimetres by the thumb with moderate effort.
Stiff	50-100	8-15	Readily indented by the thumb, but penetrated only with great effort.
Very Stiff	100-200	15-30	Readily indented by the thumb nail.
Hard	>200	>30	Indented with difficulty by the thumbnail.

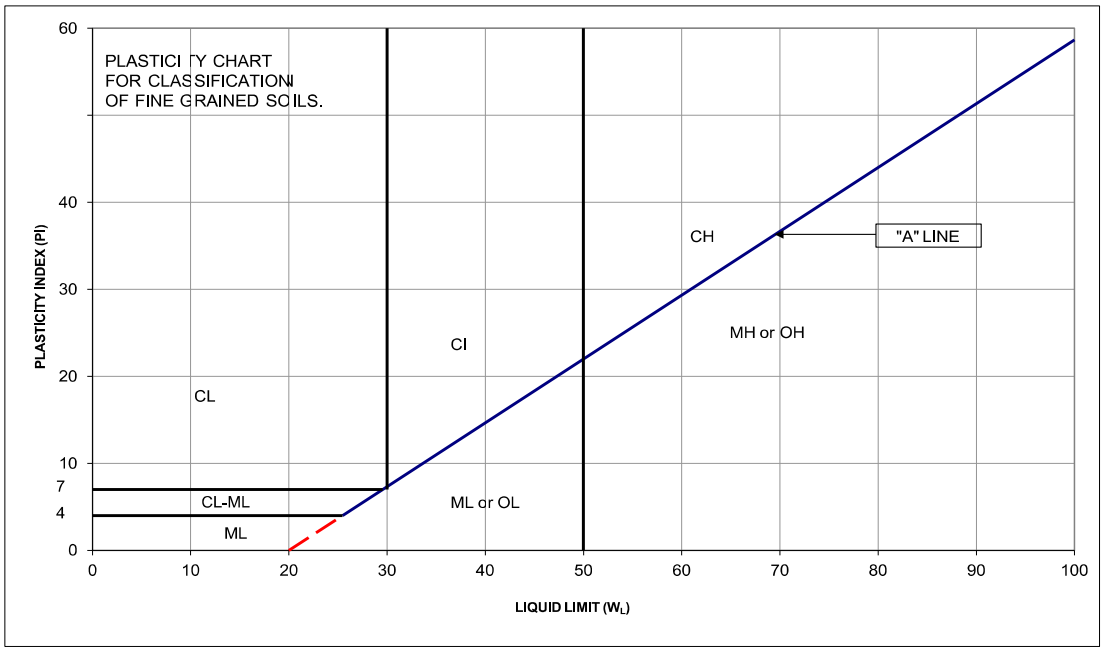
Organic Soils: Readily identified by colour, odour, spongy feel and frequently by fibrous texture.

DESCRIPTIVE TERMS COMMONLY USED TO CHARACTERIZE SOILS

Poorly Graded	- predominance of particles of one grain size.
Well Graded	- having no excess of particles in any size range with no intermediate sizes lacking.
Mottled	- marked with different coloured spots.
Nuggety	- structure consisting of small prismatic cubes.
Laminated	- structure consisting of thin layers of varying colour and texture.
Slickensided	- having inclined planes of weakness that are slick and glossy in appearance.
Fissured	- containing shrinkage cracks.
Fractured	- broken by randomly oriented interconnecting cracks in all 3 dimensions

SOIL CLASSIFICATION SYSTEM (MODIFIED U.S.C.)

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR AND OFTEN FIBROUS TEXTURE
COARSE-GRAINED SOILS(MORE THAN HALF BY WEIGHT LARGER THAN NO. 200 SIEVE SIZE)	GRAVELS More than half coarse fraction larger than No. 4 sieve size	CLEAN GRAVELS	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES <5% FINES	$C_u = \frac{D_{60}}{D_{10}} > 4 \quad C_c = \frac{(D_{30})^2}{D_{60} \times D_{10}} = 1 \text{ to } 3$
			GP	POORLY-GRADED GRAVELS AND GRAVEL-SAND MIXTURES <5% FINES	NOT MEETING ALL ABOVE REQUIREMENTS FOR GW
		DIRTY GRAVELS	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES >12% FINES	ATTERBERG LIMITS BELOW "A" LINE OR PI < 4
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES >12% FINES	ATTERBERG LIMITS ABOVE "A" LINE WITH PI > 7
	SANDS More than half coarse fraction smaller than No. 4 sieve size	CLEAN SANDS	SW	WELL-GRADED SANDS, GRAVELLY SANDS MIXTURES <5% FINES	$C_u = \frac{D_{60}}{D_{10}} > 6 \quad C_c = \frac{(D_{30})^2}{D_{60} \times D_{10}} = 1 \text{ to } 3$
			SP	POORLY-GRADED SANDS OR GRAVELLY SANDS <5% FINES	NOT MEETING ALL GRADATION REQUIREMENTS FOR SW
		DIRTY SANDS	SM	SILTY SANDS, SAND-SILT MIXTURES >12% FINES	ATTERBERG LIMITS BELOW "A" LINE OR PI < 4
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES >12% FINES	ATTERBERG LIMITS ABOVE "A" LINE WITH PI >7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSING NO. 200 SIEVE SIZE)	SILTS Below "A" line on plasticity chart; negligible organic content		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	$W_L < 50$
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	$W_L > 50$
	CLAYS Above 'A" line on plasticity chart; negligible organic content		CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS	$W_L < 30$
			CI	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	$W_L > 30 < 50$
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	$W_L > 50$
	ORGANIC SILTS & ORGANIC CLAYS Below "A" line on plasticity chart		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	$W_L < 50$
			OH	ORGANIC CLAYS OF HIGH PLASTICITY	$W_L > 50$



recpt/PMEL/repref/SoilClassChart

P.MACHIBRODA ENGINEERING LTD.

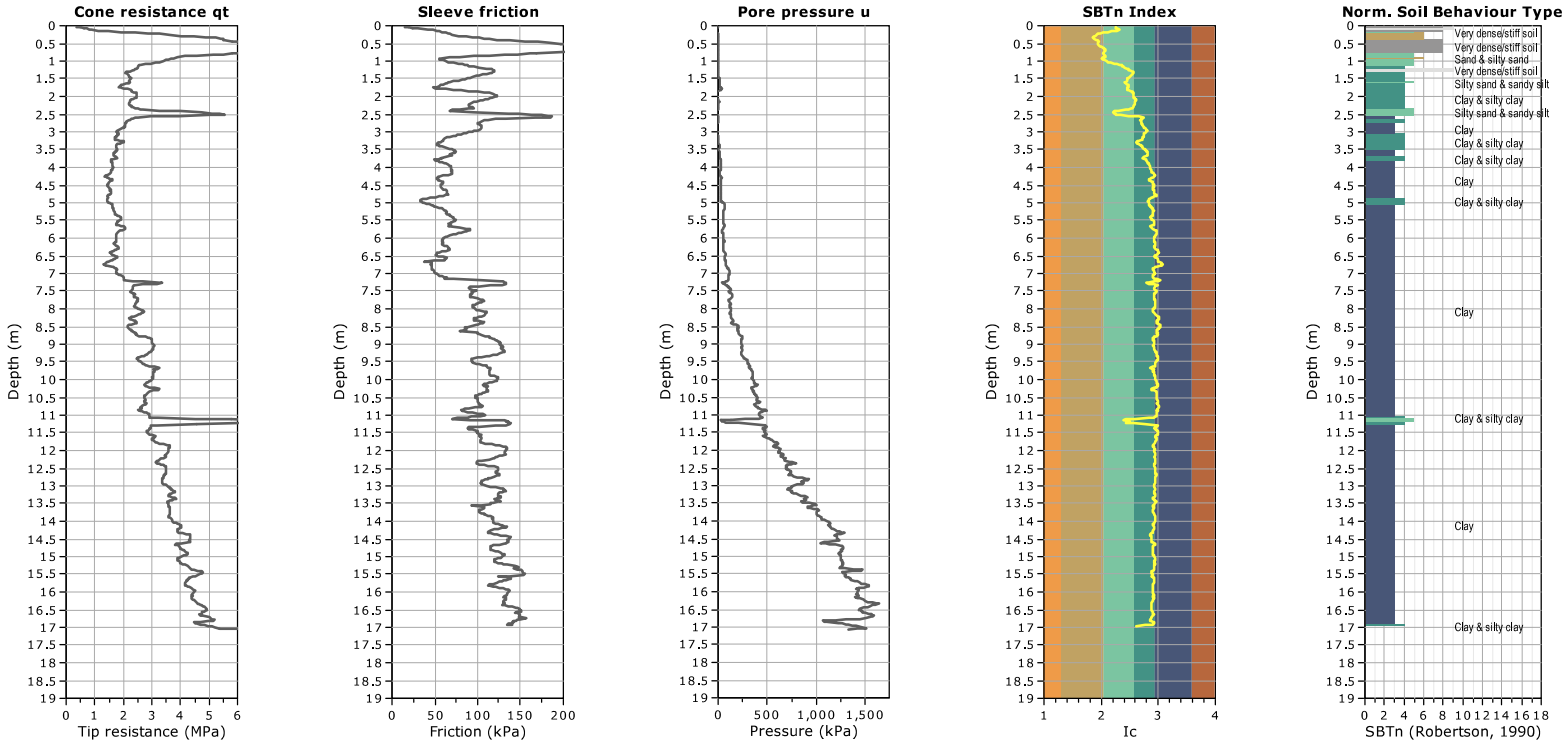
APPENDIX B

CPTu Plots

P. Machibroda Engineering Ltd.
806 - 48th Street East
Saskatoon, Saskatchewan
http://www.machibroda.com

CPT: 24-3
Total depth: 17.06 m, Date: 2024-08-29
Surface Elevation: 0.00 m
Cone Type: 15 cm^2
Cone Operator: PMEL

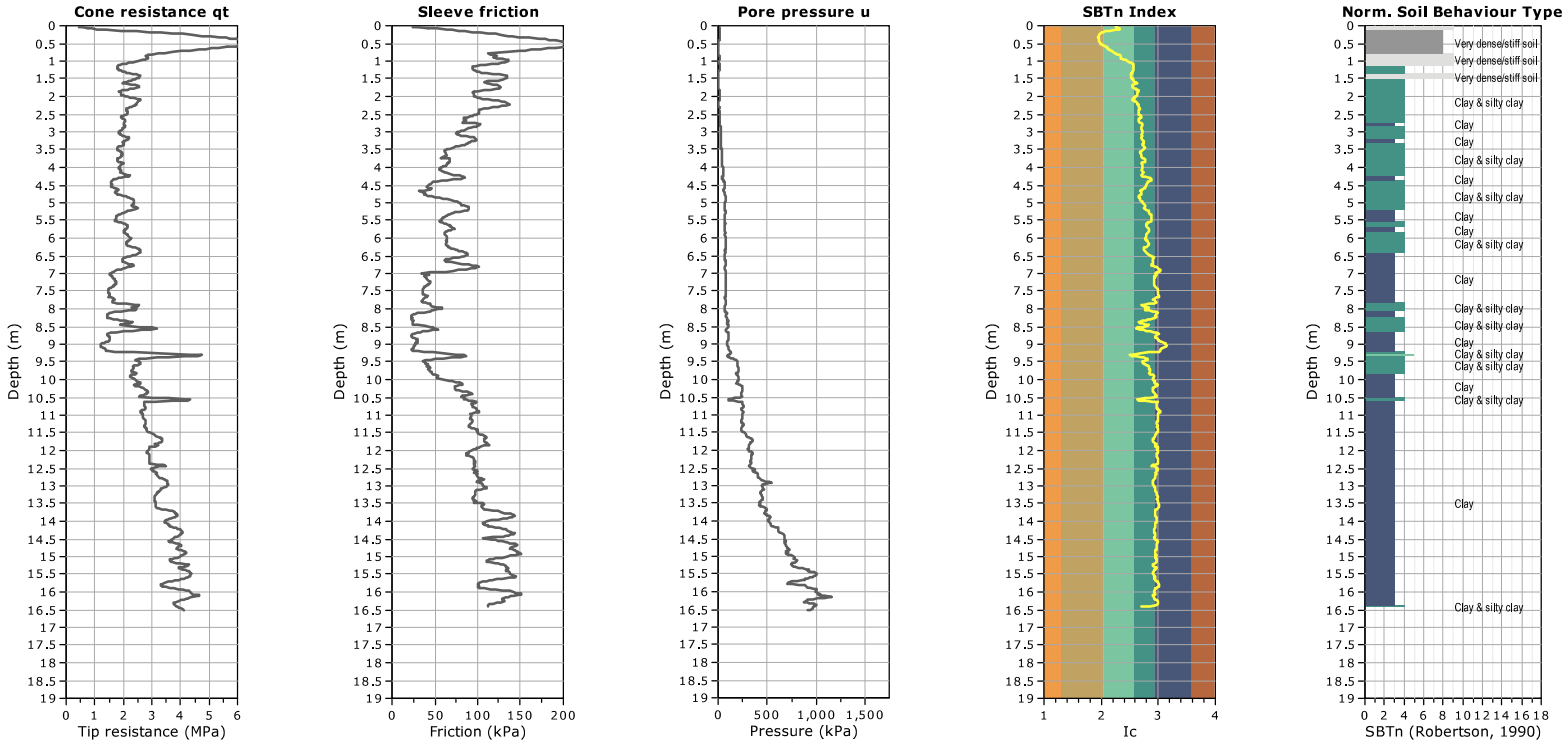
Project: **21903 - Proposed RME Development**
Location: **Lethbridge, AB**



P. Machibroda Engineering Ltd.
806 - 48th Street East
Saskatoon, Saskatchewan
http://www.machibroda.com

CPT: 24-7
Total depth: 16.52 m, Date: 2024-08-29
Surface Elevation: 0.00 m
Cone Type: 15 cm^2
Cone Operator: PMEL

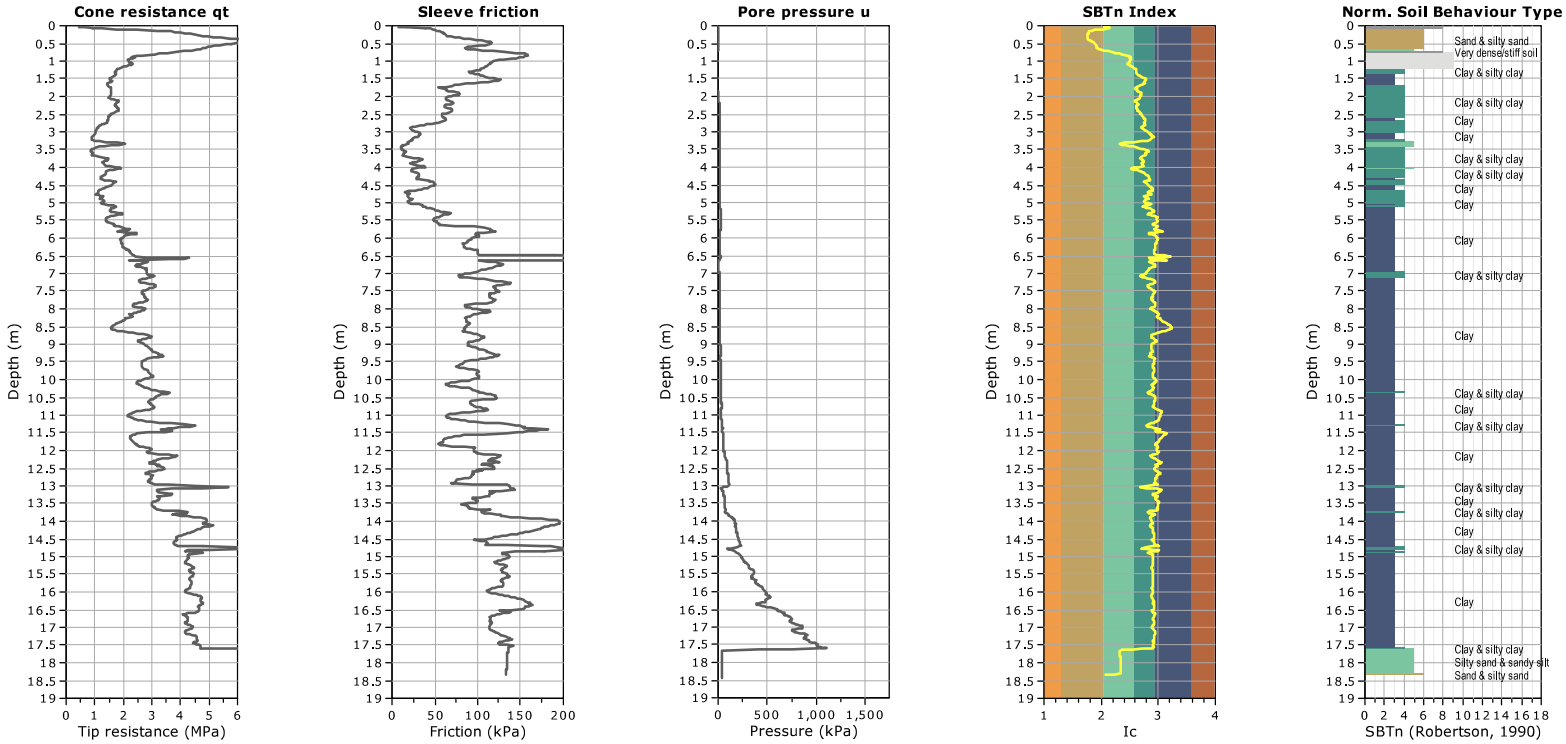
Project: **21903 - Proposed RME Development**
Location: **Lethbridge, AB**



P. Machibroda Engineering Ltd.
806 - 48th Street East
Saskatoon, Saskatchewan
http://www.machibroda.com

CPT: 24-8
Total depth: 18.44 m, Date: 2024-08-29
Surface Elevation: 0.00 m
Cone Type: 15 cm^2
Cone Operator: PMEL

Project: **21903 - Proposed RME Development**
Location: **Lethbridge, AB**



APPENDIX C

Grain Size Distribution Analysis
Test Results

P.MACHIBRODA ENGINEERING LTD.

P.MACHIBRODA ENGINEERING LTD.

AASHTO T 88: PARTICLE SIZE ANALYSIS OF SOILS

Project: Proposed RME Development

Location: Lethbridge, AB

Project No.: 21903

Date Tested: September, 2024

Borehole No.: 24-6

Sample No.: 35

Depth (m): 0.8

Sieve Analysis:

Sieve	Diameter mm	% Finer
1.5"	38.100	100
1"	25.400	100
3/4"	19.100	100
1/2"	12.700	100
3/8"	9.500	100
# 4	4.750	100
# 10	2.000	100
# 20	0.850	100
# 40	0.425	97.8
#60	0.250	95.6
# 100	0.150	91.2
# 200	0.075	72.8

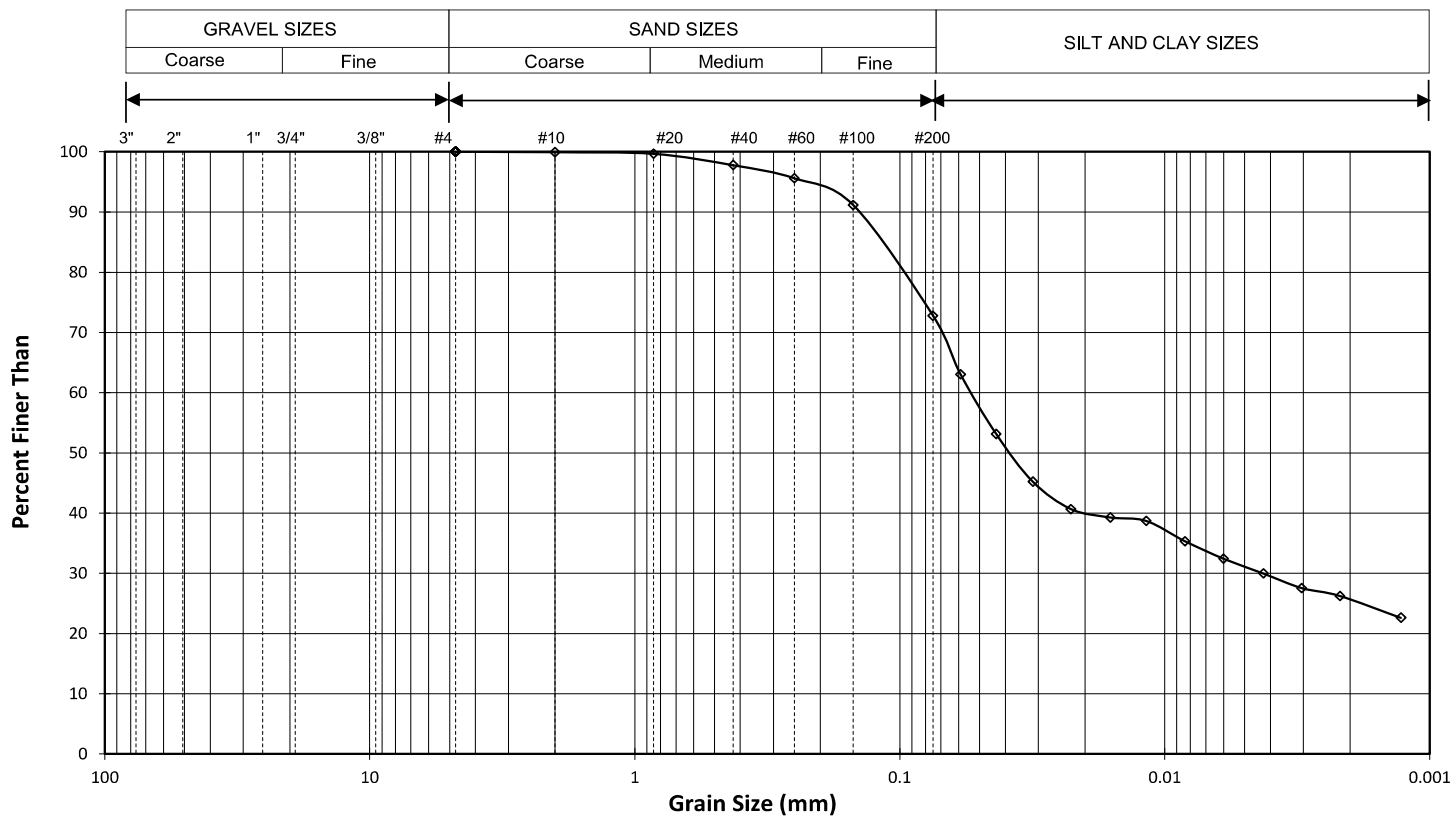
Hydrometer Analysis:

	Diameter mm	% Finer
Dispersing Agent:	0.0590	63.0
Sodium Hexametaphosphate	0.0433	53.1
	0.0315	45.2
	0.0226	40.7
	0.0161	39.3
	0.0118	38.7
	0.0084	35.3
	0.0060	32.4
	0.0043	30.0
	0.0030	27.5
	0.0022	26.2
	0.0013	22.6

Material Description:

% Gravel Sizes	% Sand Sizes	% Silt Sizes	% Clay Sizes
0	27	47	26

Remarks:



CERTIFIED BY CCIL Canadian Council of Independent Laboratories For specific tests as listed on www.ccil.com

Drawing No.

Appendix C-1

WE CERTIFY TESTING PROCEDURES ARE IN ACCORDANCE WITH AASHTO T 88 STANDARD
P. MACHIBRODA ENGINEERING LTD.

PER

APPROVED BY: RAY MACHIBRODA; REVISION NO.1

JANUARY 21, 2016

P.MACHIBRODA ENGINEERING LTD.

AASHTO T 88: PARTICLE SIZE ANALYSIS OF SOILS

Project: Proposed RME Development

Location: Lethbridge, AB

Project No.: 21903

Date Tested: September, 2024

Borehole No.: 24-7

Sample No.: 165

Depth (m): 1.5

Sieve Analysis:

Sieve	Diameter mm	% Finer
1.5"	38.100	100
1"	25.400	100
3/4"	19.100	100
1/2"	12.700	99
3/8"	9.500	98
# 4	4.750	97
# 10	2.000	97
# 20	0.850	94
# 40	0.425	90.6
#60	0.250	85.6
# 100	0.150	78.9
# 200	0.075	69.5

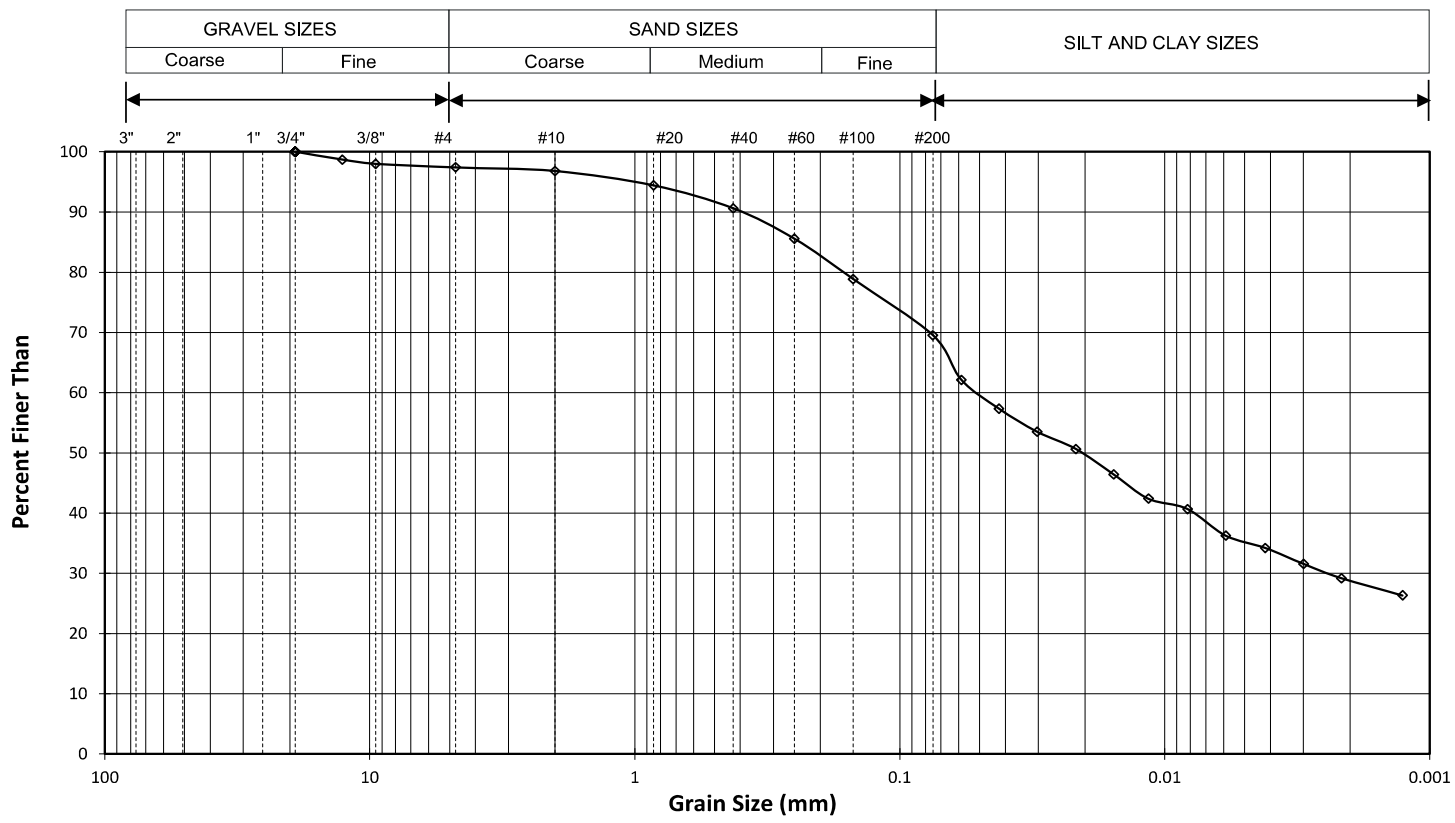
Hydrometer Analysis:

	Diameter mm	% Finer
Dispersing Agent:	0.0586	62.1
Sodium Hexametaphosphate	0.0422	57.3
	0.0303	53.5
	0.0217	50.6
	0.0156	46.4
	0.0115	42.4
	0.0082	40.7
	0.0059	36.3
	0.0042	34.2
	0.0030	31.5
	0.0022	29.2
	0.0013	26.3

Material Description:

% Gravel Sizes	% Sand Sizes	% Silt Sizes	% Clay Sizes
3	27	41	29

Remarks:



CERTIFIED BY CCIL Canadian Council of Independent Laboratories For specific tests as listed on www.ccil.com

Drawing No.

Appendix C-2

WE CERTIFY TESTING PROCEDURES ARE IN ACCORDANCE WITH AASHTO T 88 STANDARD
P. MACHIBRODA ENGINEERING LTD.

PER

APPROVED BY: RAY MACHIBRODA; REVISION NO.1

JANUARY 21, 2016

P.MACHIBRODA ENGINEERING LTD.

AASHTO T 88: PARTICLE SIZE ANALYSIS OF SOILS

Project: Proposed RME Development

Location: Lethbridge, AB

Project No.: 21903

Date Tested: September, 2024

Borehole No.: 24-10

Sample No.: 57

Depth (m): 0.8

Sieve Analysis:

Sieve	Diameter mm	% Finer
1.5"	38.100	100
1"	25.400	100
3/4"	19.100	100
1/2"	12.700	100
3/8"	9.500	100
# 4	4.750	100
# 10	2.000	100
# 20	0.850	100
# 40	0.425	99.6
#60	0.250	99.1
# 100	0.150	95.8
# 200	0.075	82.0

Hydrometer Analysis:

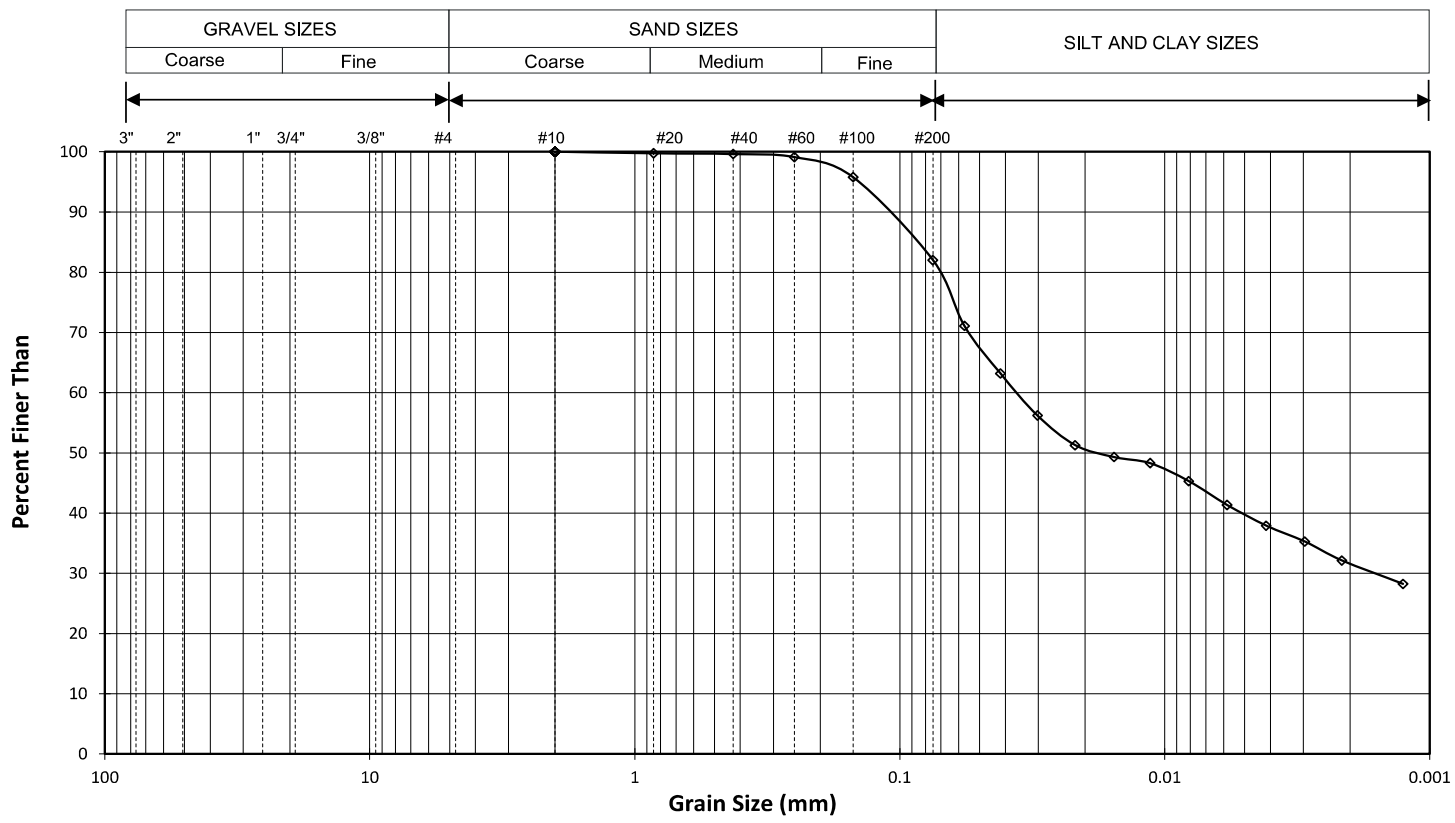
Dispersing Agent: *Sodium Hexametaphosphate*

Diameter mm	% Finer
0.0570	71.1
0.0416	63.1
0.0302	56.2
0.0218	51.3
0.0155	49.3
0.0114	48.3
0.0081	45.3
0.0058	41.4
0.0041	37.9
0.0030	35.3
0.0021	32.1
0.0013	28.3

Material Description:

% Gravel Sizes	% Sand Sizes	% Silt Sizes	% Clay Sizes
0	18	51	31

Remarks:



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Drawing No.

Appendix C-3

WE CERTIFY TESTING PROCEDURES ARE IN ACCORDANCE WITH AASHTO T 88 STANDARD
P. MACHIBRODA ENGINEERING LTD.

PER

APPROVED BY: RAY MACHIBRODA; REVISION NO.1

JANUARY 21, 2016

APPENDIX F

PHASE I ENVIRONMENTAL SITE ASSESSMENT OF

LOT 5, BLOCK 1, PLAN NO. 1113171, LETHBRIDGE COUNTY, ALBERTA



Prepared for:
RME Ventures GP Inc.
Attention: Jason Carter
3345 - 8th Street SE
CALGARY, Alberta
T2G 3A4

By:
Ryan Riess, M.Sc., P.Eng.
Senior Environmental Engineer
&
John Polson BAg, M.Sc.
Phase I Environmental Site Assessor

MAY, 2024

Project No.RSQ-024-137

Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.
Your best fit for remediation and assessment solutions

RME Ventures GP Inc.
Attention: Jason Carter
3345- 8th Street South East
Calgary, AB, T2G3A4

The enclosed Phase I Environmental Site Assessment Report was prepared for **RME Ventures GP Inc. and their lenders,** by *R Squared Environmental Inc.* for a block of cultivated farmland located in Lethbridge County, Alberta.

The Subject Property has the following legal description: *Lot 5, Block 1, Plan 1113171 in Lethbridge County and the Province of Alberta.*

It is acknowledged that the information contained within this report will be used to evaluate the potential environmental liability for lending purposes.

The assessment was completed by Mr. Ryan Riess, J. Polson and Eileen Barlow and follows guidelines contained in CSA Standard Z768 - 01 (Latest revision 2022). The opinions represented in this report are based on data collected for a Phase I Site investigation and are subject to limitations inherent in this level of investigation.

This May 23, 2024

Sincerely yours,

Ryan Riess, Senior Environmental Engineer

John Polson, MSc. AESAC - Phase I Site Assessor

Eileen Barlow, B.A. AESAC- Phase I Sit Assessor (In Training)

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APPENDIX G - SITE PHOTOS
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Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
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PHASE I ENVIRONMENTAL SITE ASSESSMENT of

Lot 5, Block 1, Plan No. 1113171,
LETHBRIDGE COUNTY, ALBERTA

For:
RME Ventures GP Inc.
Attention: Jason Carter
3345 - 8th Street SE
CALGARY, Alberta, T2G 3A4

By:
Ryan Riess,
Senior Environmental Engineer
R Squared Environmental Inc.

MAY 23, 2024 Project No.RSQ-024-137

1.1 EXECUTIVE SUMMARY

This report describes a Phase I Environmental Site Assessment conducted for a parcel (Site, Subject Property, Property) of cultivated farmland consisting of 33.95 hectares or 83.9 acres in Lethbridge County, Alberta. The Property is just to the east of the eastern boundary of the City of Lethbridge.

R Squared Environmental Inc. was commissioned **by Jason Carter** to conduct the Phase I Environmental Site Assessment for **RME Ventures GP Inc.**

The Subject Property is located on the SE corner of Township Road 92 and 43rd Street North (Range Road 213).

The legal description of the Site is *Lot 5, Block 1, Plan 1113171 in Lethbridge County and the Province of Alberta.*

The Property is zoned "Rural Agriculture District". A small building used to distribute water is located at the north end of the Subject Property. The remainder of the Site consists of a cultivated field.

Our historical investigations did not identify any environmental concerns.

CONCLUSIONS

A Phase I Site Assessment was conducted for a cultivated field located in Lethbridge County, Alberta.

No significant environmental concerns were identified during the study which included a review of relevant historical research, interviews, and a Site Inspection.

RECOMMENDATIONS

There are no recommendations for further environmental work on this Site at this time.

2.0 INTRODUCTION

Jason Carter has commissioned *R Squared Environmental Inc.* on behalf of RME Ventures GP Inc. to conduct a Phase I Environmental Site Assessment for a block of cultivated farmland measuring 83.9 acres in Lethbridge County, Alberta.

The Site is adjacent to the east boundary of the City of Lethbridge on the SE corner of 43rd Street North and Township Road 92. The Site has the following legal description: *Lot 5, Block 1, Plan 1113171 in Lethbridge County and the Province of Alberta.*

The purpose of the Phase I Environmental Site Assessment (ESA), as described in CSA Standard Z768-01 (most recent revision 2022) is to identify actual and potential site contamination and to reduce uncertainty about potential environmental liabilities. Findings and conclusions regarding contamination of the Subject Property are:

1) based solely on the extent of observations and information gathered during the Phase I and
2) do not involve the selection or implementation of any measuring, sampling, analysis or remedial actions.

The Phase I ESA was carried out by Site Assessor John Polson for *R Squared Environmental Inc.* Mr Polson has followed the requirements as set out in the CSA Standard Z768-01, revised in 2022. Mr. Polson has examined the Property, conducted interviews,

examined relevant historical documents and conducted relevant file searches. This research is described in Sections 3 to 7.

3.0 SITE DESCRIPTION

The Subject Property is located in Lethbridge County on the SE corner of Township Road 92 (26 Avenue North) and Range Road 213 (43rd Street North). 43rd Street North is the boundary line between the City of Lethbridge (to the west) and Lethbridge County (to the east) (Figure 1, Appendix A).

The Site is currently cultivated farmland. Sherring Industrial Park is located on the west side of 43rd Street North and land to the east of the Site is farmland, portions of it are irrigated.

Commercial properties on the west side of 43rd Street North included: Southland Trailer Corp., Peterbilt Lethbridge, Haul-All Equipment Ltd., Community Animals Services Lethbridge and DeGraaf Excavating. There are two large ASTs located on the latter property an estimated 336m to the western edge of the Subject Property.

The Old Man River runs north/south 5.9km to the west (Figure 4, Appendix A). The Regional Ground Water Drainage would be expected to travel to the west towards the river.

The local water table levels are derived from Water Driller Reports (*Government of Alberta*) in the vicinity of the Subject Property. There were no water wells listed in the vicinity of the Subject Property.

4.0 SITE HISTORY AND RECORDS REVIEW

4.1 INTERVIEWS

Personnel at the Lethbridge County Office were interviewed. They did not know of any Building permits, spill or concerns for the Site.

A representative of the Coaldale Fire Department was also interviewed by phone. He did not know of any history of fires on the Property.

4.2 LETHBRIDGE COUNTY

Personnel at the County of Lethbridge office were contacted by phone. A copy of their response is included in Appendix C. In summary, they did not have any records of building permits for the Site. They indicated that it is currently zoned "Rural Agriculture".

4.3 ZONING

The Subject Property is zoned "Rural Agriculture". The purpose of "RA" zoning is *"to allow agriculture to continue as an important land use in the county and ensure that it can continue to operate unencumbered by conflicting land uses while giving the County flexibility to allow isolated non-agriculture uses in certain locations as a support to the agricultural base. The terms of the* ***Agricultural Operations Protection Act*** *apply on Lethbridge County and must be respected by both agricultural operators and non-agricultural land users".*

A copy of the bylaw is included in Appendix D.

4.4 FIRE SUPPRESSION

The Development Planner for Lethbridge County indicated that fire suppression of the Site would fall under the jurisdiction of the Coaldale Fire Department. There are no structures on the Site and no historical fires were reported.

4.5 FIRE INSURANCE MAPS

Fire Insurance Maps were not available for the Site and adjacent properties.

4.6 ENVIRONMENTAL RECORDS SEARCH

A search of the available Environmental records was initiated for the study. These included the "Environmental Site Assessment Repository", the "Alberta Energy Regulator Compliance Dashboard" and the "Alberta Energy Regulator Abandoned Wells" database. The searches looked for environmental hazards within a 300-metre radius of the Subject Property.

Environmental Site Assessment Repository



This search uses the PBL (Plan/Block/Lot) information as well as a map viewer to identify locations of Environmental work across Alberta.

No environmental records were identified for the Subject Property or surrounding area.

Alberta Energy Regulator Abandoned Wells Database



This search is map-based. Blue dots indicate the location of an abandoned well site and the red star indicates the location of the Subject Property.

No abandoned well sites were identified within 300 metres of the Subject Property.

Alberta Energy Regulator Compliance Dashboard

This search is list-based and searchable online. Keywords entered for the search included the community of Lethbridge.

No energy-related incidents were identified within 300m of the Subject Property.

Copies of environmental searches and available records are included in Appendix E.

4.7 LAND TITLES

A Land Titles record search was conducted for the Subject Property. The most recent ownership listed is **1000824 ALBERTA Ltd.** (21 February 2024). A summary of the Land Titles is provided in Table 1 and a list of caveats, liens and easements registered against the Subject Property is included in Table 2. Neither the Land Titles nor easements or single caveat suggested any significant environmental concerns.

Copies of the Land Title records are included in Appendix F.

Table 1: Land Titles History - Lot 5, Block 1, Plan No.1113171, Lethbridge County, Alberta.

OWNER	DATE	TTILE NUMBER	LOT
1000824 ALBERTA Ltd.	21 February 2024	241-053-431+12	Subdivision No. 2410456

Table 2: Caveats, Easements & Liens - Subdivision No. 2410456, Lethbridge County, Alberta.

ACTION	DATE	HOLDER
Caveat	02 February 2024	Lethbridge County
Easement	01 January 1988	Alberta Government Telephones
Easement	05 February 1968	Canadian Western Natural Gas Company Limited

4.8 HENDERSON DIRECTORIES

The history of specific addresses can be traced through the Henderson Directories which, in Alberta, where available, generally span the years from the early 1900s to 2000 at which time they were discontinued.

There are no structures on the Site and Henderson's Directory records were not developed for the Site.

4.9 REVIEW OF HISTORIC AERIAL PHOTOGRAPHS & SATELLITE IMAGERY

Historic aerial photographs and high-resolution satellite imagery were available for the Site and vicinity properties for the years 1949 to 2024 (Figures 6 - 14, Appendix A). The photographs and images were reviewed and our findings are summarized in Table 5 below.

Table 3: Interpretation of Historic Aerial Photographs & Satellite Imagery for Subdivision No. 2410456 and Vicinity, Lethbridge County, Alberta.

YEAR & SCALE PHOTO QUALITY	SITE	TO THE NORTH & SOUTH	TO THE EAST & WEST	OTHER FEATURES	ENVIRONMENTAL CONCERNS
Fig. 6 1949 1:60,000 (Good Quality)	The Site is part of a larger cultivated field.	There is a small yard to the north surrounded by a hedge.	The irrigation canal runs along the east side of the Subject Property.	There's a farmstead to the east.	No concerns noted.
Fig. 7 1961 1:31,700 (Good Quality)	No significant change,	No significant change,	No significant change,	The farmstead to the east has been expanded.	No concerns noted.
Fig. 8 1970 1:31,680 (Good Quality)	No significant change,	No significant change,	No significant change,	No significant change,	No concerns noted.
Fig. 9 1973 1:24,000 (Good Quality)	No significant change,	No significant change,	No significant change,	No significant change,	No concerns noted.
Fig. 10 1975 1:24,000 (Good Quality)	No significant change,	No significant change,	No significant change,	The city of Leth-bridge is now approximately 1.5km to the west.	No concerns noted.
Fig. 11 1983 1:12,000 (Good Quality)	No significant change,	No significant change,	No significant change,	A single development is located to the west across 43rd Street North. The City boundary extends to the west side of 43rd St. North.	No concerns noted.

YEAR & SCALE PHOTO QUALITY	SITE	TO THE NORTH & SOUTH	TO THE EAST & WEST	OTHER FEATURES	ENVIRONMENTAL CONCERNS
Fig. 12 2004 SPOT Satellite Image 1:5,000 (Good Quality)	There is a small building at the north end of the property just off the Township road.	The property to the north across the Township road appears to be used to store some tanks.	Commercial development now completed to the west across 43rd Street North.	Businesses along the west side of 43rd Street North look similar to the present.	No concerns noted.
Fig. 13 2023 SPOT Satellite Image 1:5,000 (Good)	There appears to be separation between the Subject Property and the field to the south.	No significant change,	No significant change,	Two large ASTs were noted 336m to the west of the Subject Property	Not a concern.
Fig. 14 2024 SPOT Satellite Image 1:5,000 (Good Quality)	No significant change,	The field immediately to the south has had the top layer of soil removed.	No significant change,	No significant change,	No significant change,

The review of aerial photographs and satellite imagery did not identify any potential environmental concerns.

4.10 SUMMARY OF FINDINGS

The Subject Property consists of a cultivated field. A review of Historical aerial photographs and high-resolution satellite imagery extending back to 1949 did not identify any refuse dumps on the Site nor structures other than the small building at the north end of the Property used to access water from a community well.

The Site is located on the eastern edge of the boundary between Lethbridge County and the City of Lethbridge. Properties to the west and south are commercial. One property to the west has two ASTs present on the Site. These are an estimated 336m to the western edge of the Subject Property. Any pollutants from these tanks would be

expected to travel towards the west in the groundwater towards the Old Man River. None of the historical investigations identified any significant environmental concerns.

5.0 SITE INSPECTION

A self-guided tour of the Property was conducted on April 29, 2024. Vicinity properties were also viewed from public access points. The grounds were snow-free at the time of the visit.

Pertinent Observations:

Subject Property

- The Site is a cultivated field.
- An irrigation canal runs along the eastern edge of the Property.
- The only structure of the Site is a small building and well used to supply water to locals.

Vicinity Properties

- Vicinity properties include a variety of commercial properties on the west side of 43rd Street North and south of the Subject Property.
- A yard with a number of empty storage tanks is located on the north side of Township Road No. 92.
- There is a farmstead to the east of the Subject Property.
- The cultivated field immediately to the south of the Subject Property had heavy soil-moving equipment operating on the field at the time of the Site inspection.
- Two ASTs were noted on the west side of 43rd Street North, an estimated 336m from the western edge of the Subject Property.

Photographs were taken during the Site Visit and a selection of Site pictures is included in Appendix G.

6.0 FINDINGS

6.1 GENERAL OBSERVATIONS

A Phase I Site Assessment study was conducted for a parcel of cultivated farmland located in the County of Lethbridge in Alberta. One small structure was noted on the Site at the north end. This was a community water distribution well.

The Site is zoned "Rural Agriculture".

Neither the Site Inspection, interviews nor our review of relevant historical documents identified any significant environmental concerns.

6.1.1 EXTERNAL HAZARDS

6.1.1.1 Hydrocarbons

There are no gas stations in the vicinity of the "Subject Property. No references were found regarding environmental records or abandoned oil or gas wells on the Property during the search of Alberta's Environmental Databases..

6.1.1.1 Dry Cleaners

There were no dry cleaning businesses in the vicinity of the Subject Property.

6.1.1.3 Outside Staining and Stressed Vegetation

The field was free of weeds or crops at the time of the Site inspection. There was no evidence of oil staining on the Property.

6.1.1.4 Above-ground & underground fuel storage tanks.

There was no historical evidence found during the interpretation of aerial photography and satellite imagery of the presence of above-ground fuel storage tanks (ASTs) having been on the Site.

No evidence of above-ground or underground fuel storage tanks was noted during the Site Inspection. Two (2) ASTs found during the inspection of vicinity properties were an estimated 336m to the west.

6.1.1.5 Operation of Mechanical Equipment

Farm machinery would be used on the Site for seeding, crop maintenance and harvesting.

6.1.1.6 Exterior Drainage

Interpretation of historic aerial photography and satellite imagery did not identify any significant drainage concerns.

6.1.1.7 Electromagnetic Fields (EMFs)

No high-tension transmission lines with the potential to generate significant Electromagnetic Fields (EMFs) were identified on the Subject Property.

6.1.1.8 Fill

Fill is unlikely to have been added to the Site.

6.1.2.9 Sewage and Potable Water

A community water well is located at the north end of the Property.

6.1.1.10 Solid Wastes

No evidence of refuse dumping was noted on the Property during our interpretation of historical aerial photographs and high-resolution satellite images extending back to 1949. No dumping was noted on the Site during the Site inspection.

6.1.1.11 Wells, Pits and Lagoons

There is a community water well located on the north end of the Property.

6.1.1.12 Water Courses, Ditches or Standing Water

The Old Man River runs in a north/south direction 5.9 km to the west. An irrigation canal runs along the eastern edge of the Property.

6.1.1.13 Roads, Parking Facilities, Rights-of-Way

43srd Street North runs along the west side of the Site and Township Road 92 along the north end.

6.1.1.14 Vicinity Properties

Properties along the west side of 43rd Street North included: Southland Trailer Corp., Peterbilt Lethbridge; Haul-All Equipment Ltd.; Community Animals Services Lethbridge and DeGraaf Excavating. There is a farmstead to the east. North of Township Road No. 92 is a yard currently used to store empty ASTs. An acreage is located to the NE of the Subject Property.

6.1.1.15 Cemeteries

There are no known cemeteries in the vicinity of the Site. Royal View Memorial Cemetery is the closest cemetery located 4.6 km to the NW.

6.1.2 INTERNAL HAZARDS

The small building associated with the community water well located at the north end of the Property was not visited. There were no other structures on the Site. No evidence of the dumping of building materials or appliances was noted on the Property.

6.1.2.1 Indoor Staining

Not Applicable

6.1.2.2 Electrical Ballasts

The Federal Chlorobiphenyls Regulation SQR/91-152, prohibited the use of Polychlorinated Biphenyls (PCBs) in electrical equipment installed after July 1, 1980. Older fluorescent light ballasts may contain PCB's (Polychlorinated biphenyls).
Not Applicable.

6.1.2.3 Asbestos-containing Materials

Buildings constructed prior to 1985 may have asbestos/or asbestos-containing materials (ACMs) that can crumble, powder or pulverize by hand pressure (i.e. friable).
Not Applicable.

6.1.2.4 Lead-containing Paints

Canadian regulations (Hazardous Products Act) limited the amount of lead and mercury in paint in 2005. Older painted surfaces may contain lead. Lead-containing painted surfaces are unlikely to be exposed in this building.
Not Applicable.

6.1.2.5 Mercury-containing Materials

Mercury can be found in some thermostats and compact fluorescent light bulbs. No materials containing mercury should be deposited in local landfills as mercury could find its way into local or regional water bodies.

No appliances were dumped on the Site.

6.1.2.6 Urea Formaldehyde

The majority of Urea Formaldehyde Foam Insulation (UFFI) was installed in new and existing construction in Canada between 1975 and 1978 as part of the Canadian Home Insulation Program. UFFI was banned in Canada in 1980 due to health concerns.

Not Applicable.

6.1.2.7 Heating and Cooling Systems

No appliances were dumped on the Site.

6.1.2.8 Ozone-depleting Substances

The Federal Government implemented the Ozone-Depleting Substances (ODSs) Regulations in 1994 to amend controls, on the manufacture and use of chlorofluorocarbons (CFCs), halons, carbon tetrachloride and methyl chloroform.

No appliances were dumped on the Site.

6.1.2.9 Radon Gas

Testing for radon gas was not done under the guidelines for Phase I ESA's.

6.1.2.10 Bioaerosols

Bioaerosols include moulds and mildew. Not applicable.

7.0 DISCUSSION

7.1 GENERAL

The Subject Property is a parcel of cultivated farmland consisting of 83.9 acres located in Lethbridge County, Alberta. Properties to the west and south are commercial/ industrial. There is a farmstead to the east, a storage yard to the north and an acreage to the NE. The storage yard had empty ASTs on the Site at the time of the Site inspection. Site Assessor, John Polson conducted the Site Inspection on behalf of *R Squared Environmental Inc.* for **RME Ventures GP Inc. of Calgary, Alberta.** Additional research was carried out by Assessor Eileen Barlow of *Polson Environmental*. The study included: interviews; an on-site Inspection and a review of relevant historical information for the Site and surrounding properties. None of our investigations identified any significant environmental concerns. The Site is not listed in any of the Alberta Environmental Databases. There was no evidence of ASTs or USTs having been on the Subject Property.

7.2 CONCLUSIONS

A Phase I Site Assessment was conducted for the parcel of cultivated farmland in Lethbridge County, Alberta.
No significant environmental concerns were identified during the study which included a review of relevant historical research, interviews, and a Site Inspection.

7.3 RECOMMENDATIONS

There are no recommendations for further environmental work on this Site at this time.

8.0 QUALIFICATIONS OF ASSESSORS & REPORT LIMITATIONS

8.1 QUALIFICATIONS OF THE ASSESSOR

The report was reviewed by Ryan Riess of R Squared Environmental Inc. Ryan is a Senior Environmental Engineer with over 20 years of experience in environmental site assessment and remediation.

The Site Assessor was John Polson (MSc.). Mr. Polson has been involved in environmental impact assessment for over 40 years. He is a member of the Associated Environmental Assessors of Canada (AESAC) and has conducted Phase I Site Assessments since 1995. Proof of Insurance is provided in Appendix H.

Historical research and interpretation was also conducted by Eileen Barlow of *Polson Environmental*. Ms. Barlow completed her AESAC Phase I Site Assessor training course in the spring of 2022 and began work with *Polson Environmental* in July 2022. Since joining *Polson Environmental* she has assisted in the Phase I study of over 70 commercial properties.

Additional information on *R Squared Environmental Inc.* and *Polson Environmental*, including Proof of Insurance, is provided in Appendix H.

8.2 LIMITATIONS OF THE REPORT

Consistent with the accepted methodology for a Phase I Assessment, no on-site testing, sampling or analysis of soils, water, wastes, air or other materials was conducted. Our observations should be evaluated in light of this limited scope.

No warranty expressed or implied, is given concerning contamination at the Subject Property. This report has been prepared for the exclusive use of **RME Ventures GP Inc. of Calgary, Alberta and their lenders.** Any use that a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

9.0 REFERENCES AND SUPPORTING DOCUMENTATION

Alberta Site Assessment Repository. Alberta Environment and Parks. 2017. Accessed through: https://www.esar.alberta.ca/ESARmain.aspx

Abandoned Well Map Viewer, Alberta Energy Regulator. Accessed through: https://extmapviewer.aer.ca/AERAbandonedWells/Index.html

Alberta Water Wells Web Application. 2023. Accessed through: https://www.alberta.ca/alberta-water-wells-web-application.aspx#jumplinks-1

Canadian Standards Associated. Phase I Environmental Site Assessment Document No. Z768-01 -Most recent revision 2022.

Canadian Standards Associated. Phase I Environmental Site Assessment Document No. Z768-01 - Revised 2016.

Canadian Standards Associated. Phase I Environmental Site Assessment Document No. Z768-01 - Reaffirmed in 2012.

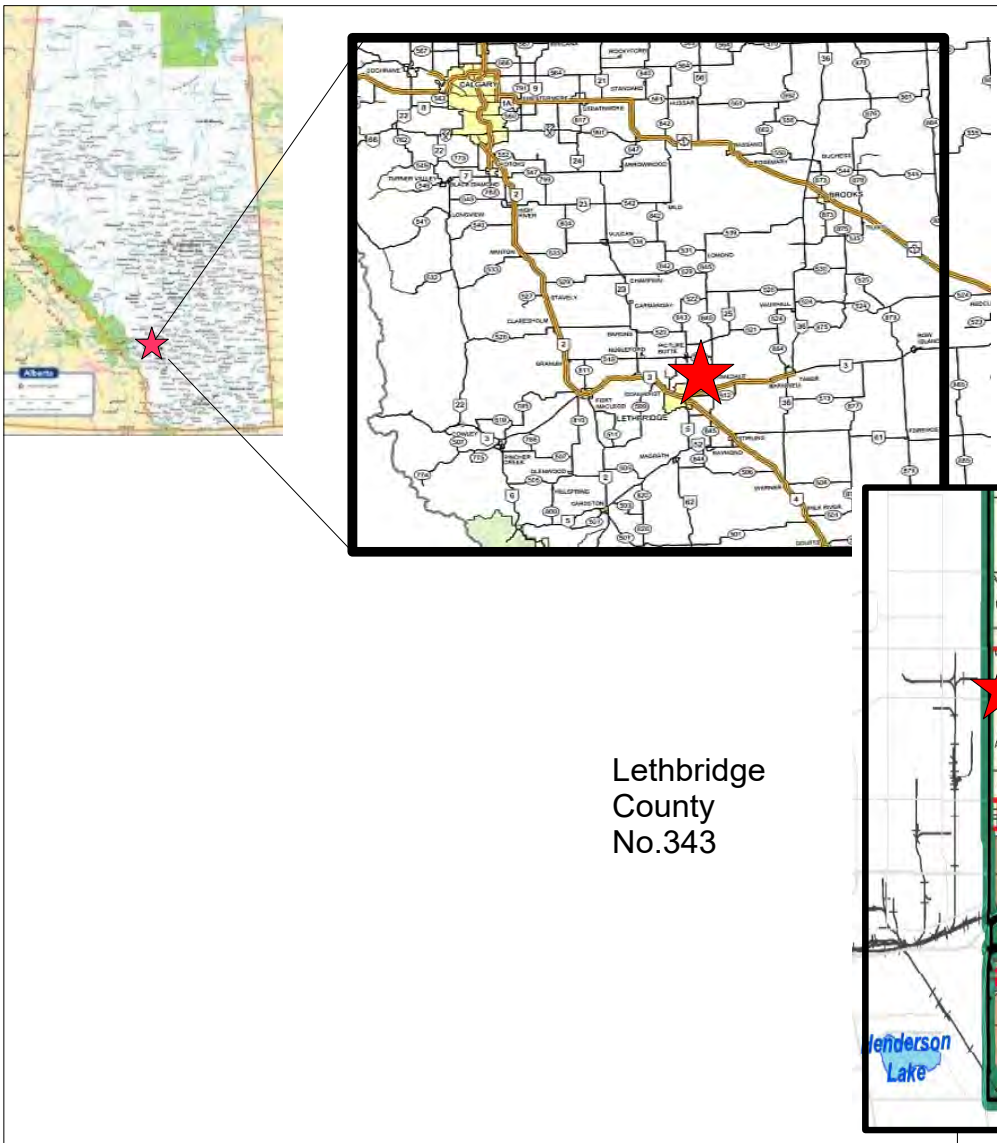
Compliance Dashboard, Alberta Energy Regulator. 2021. Accessed through: https://www1.aer.ca/compliancedashboard/index.html

Dry Cleaners and Environmental Site Assessments. 2018. Paper by John Katze, National Director of Operations, Traditional Services.

APPENDIX A

MAPS, FIGURES, AERIAL PHOTOGRAPHS

Figure 1: Location of the Subject Property
Figure 2: Site & General Vicinity
Figure 3: Site & Near Vicinity
Figure 4: Local Waterbodies
Figure 5: Vicinity Water Wells
Figure 6: 1949 Aerial Photograph
Figure 7: 1961 Aerial Photograph
Figure 8: 1970 Aerial Photograph
Figure 9: 1973 Aerial Photograph
Figure 10: 1975 Aerial Photograph
Figure 11: 1983 Aerial Photograph
Figure 12: 2004 SPOT Satellite Image
Figure 13: 2023 SPOT Satellite Image
Figure 14: 2024 SPOT Satellite Image



GOOGLE MAPS

LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 1: LOCATION OF THE SUBJECT PROPERTY

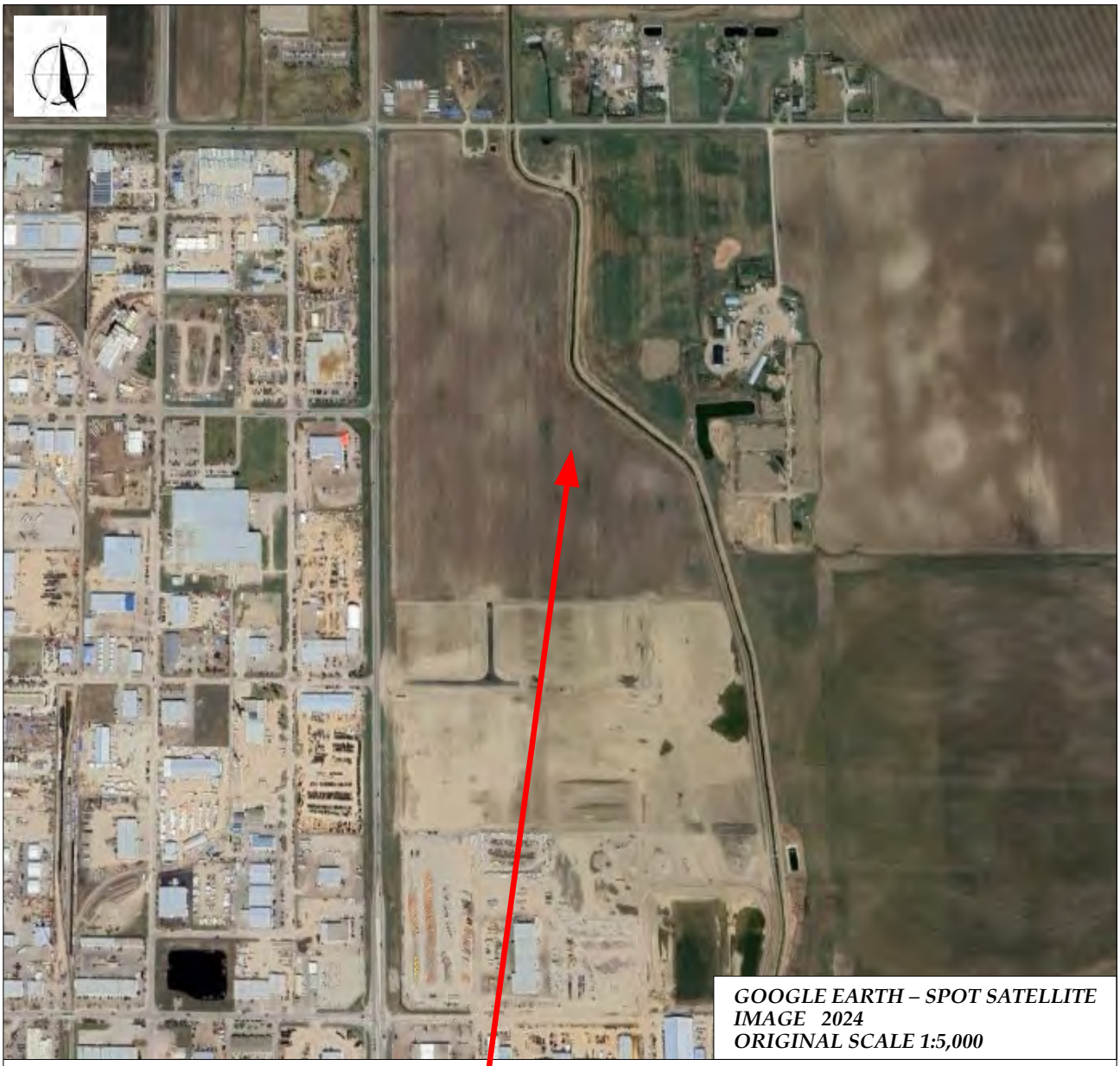
PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP

DATE: MAY 9, 2024

SCALE: NOT TO SCALE

PROJECT NO: RSQ-024-137



GOOGLE EARTH – SPOT SATELLITE IMAGE 2024
ORIGINAL SCALE 1:5,000

LEGEND:

LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL

Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 2: SITE & GENERAL AREA

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP		**PROJECT NO:** RSQ-024-137
DATE: MAY 9, 2024	**SCALE:** NOT TO SCALE	



GOOGLE EARTH – SPOT SATELLITE IMAGE 2024

LEGEND:

LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 3: SITE & NEAR VICINITY

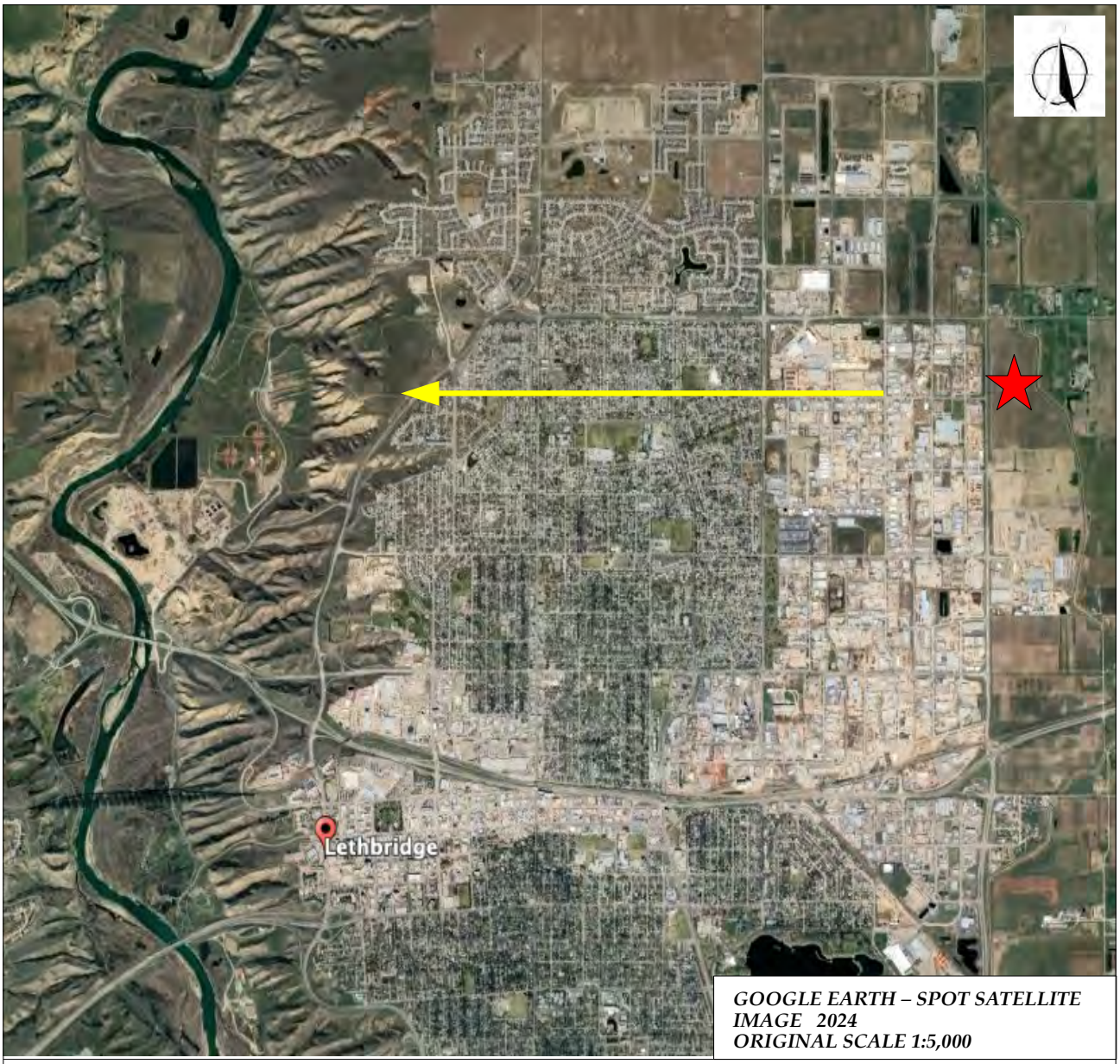
PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP

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GOOGLE EARTH – SPOT SATELLITE IMAGE 2024
ORIGINAL SCALE 1:5,000

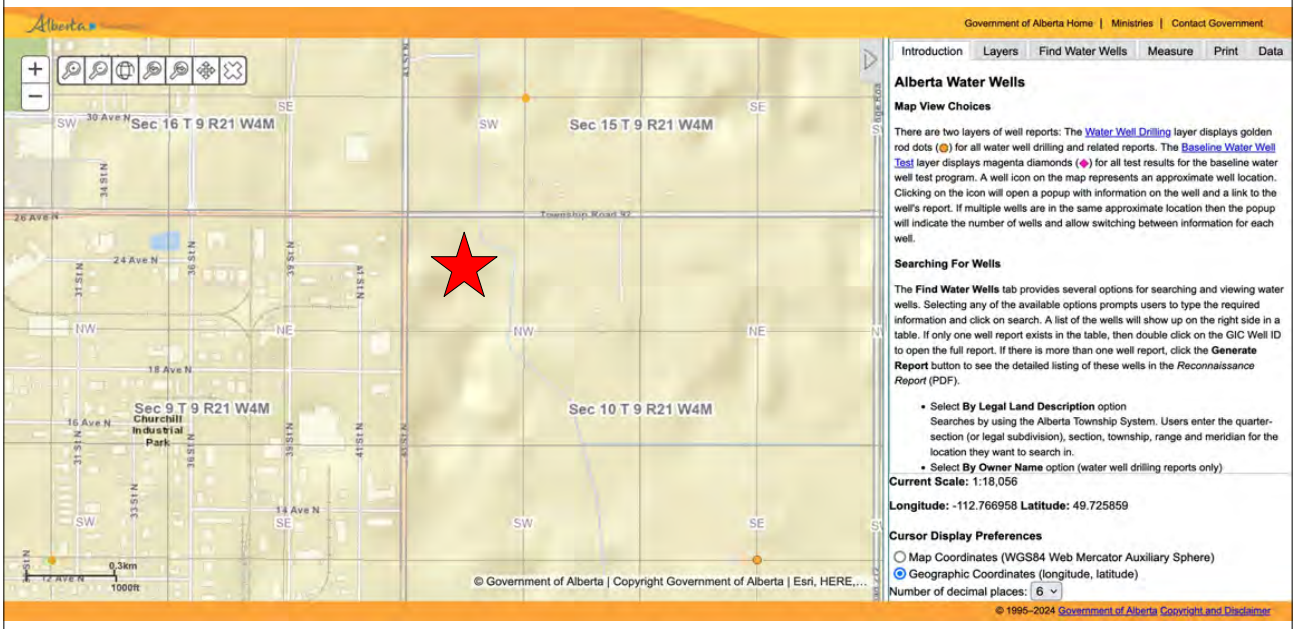
LEGEND: ★ LOCATION OF THE SUBJECT PROPERTY ← EXPECTED DIRECTION OF REGIONAL WATER FLOW

R² ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 4: WATERBODIES IN RELATION TO THE SITE

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY:		PROJECT NO:
JP		
DATE:	SCALE:	RSQ-024-137
MAY 9, 2024	NOT TO SCALE	



GOVERNMENT OF ALBERTA

LEGEND: ★ LOCATION OF THE SUBJECT PROPERTY

Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 5: LOCATION OF VICINITY WATER WELLS

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP

DATE: MAY 9, 2024

SCALE: NOT TO SCALE

PROJECT NO: RSQ-024-137



ORIGINAL SCALE: 1:160,000
PROVINCE OF ALBERTA
AERIAL PHOTO LIBRARY

LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 6: 1949 AERIAL PHOTOGRAPH

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY:		PROJECT NO:
JP		
DATE: MAY 9, 2024	SCALE: NOT TO SCALE	RSQ-024-137



ORIGINAL SCALE: 1:131,700
PROVINCE OF ALBERTA
AERIAL PHOTO LIBRARY

LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 7: 1961 AERIAL PHOTOGRAPH

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY:		PROJECT NO:
JP		
DATE:	SCALE:	
MAY 9, 2024	NOT TO SCALE	RSQ-024-137



ORIGINAL SCALE: 1:131,680
PROVINCE OF ALBERTA
AERIAL PHOTO LIBRARY

LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
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R Squared Environmental Inc.

DRAWING TITLE: FIGURE 8: 1970 AERIAL PHOTOGRAPH

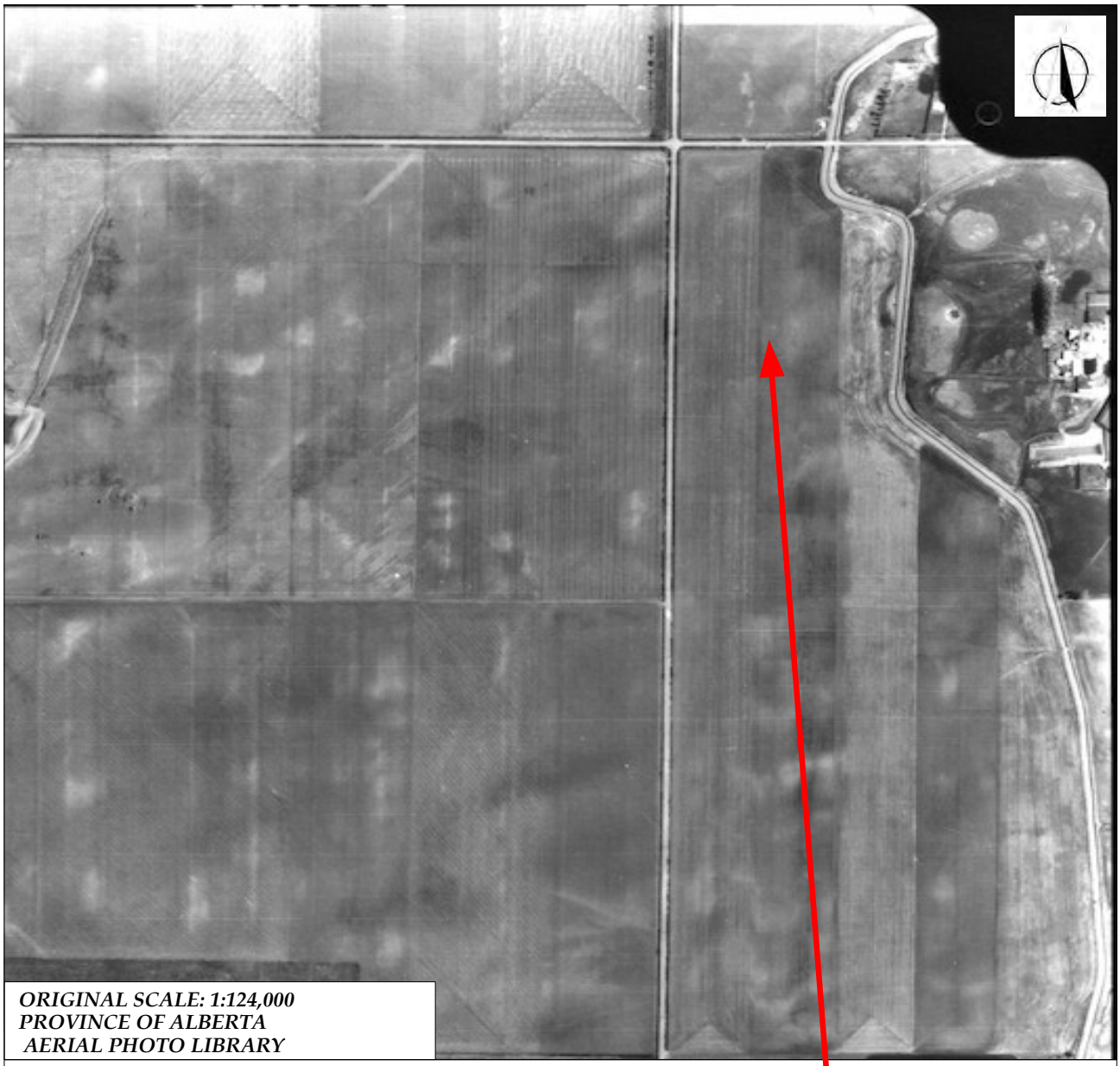
PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP

DATE: MAY 9, 2024

SCALE: NOT TO SCALE

PROJECT NO: RSQ-024-137



ORIGINAL SCALE: 1:124,000
PROVINCE OF ALBERTA
AERIAL PHOTO LIBRARY

LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
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R Squared Environmental Inc.

DRAWING TITLE: FIGURE 9: 1973 AERIAL PHOTOGRAPH

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP		**PROJECT NO:** RSQ-024-139
DATE: MAY 9, 2024	**SCALE:** NOT TO SCALE	



ORIGINAL SCALE: 1:124,000
PROVINCE OF ALBERTA
AERIAL PHOTO LIBRARY

LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
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R Squared Environmental Inc.

DRAWING TITLE: FIGURE 10: 1975 AERIAL PHOTOGRAPH

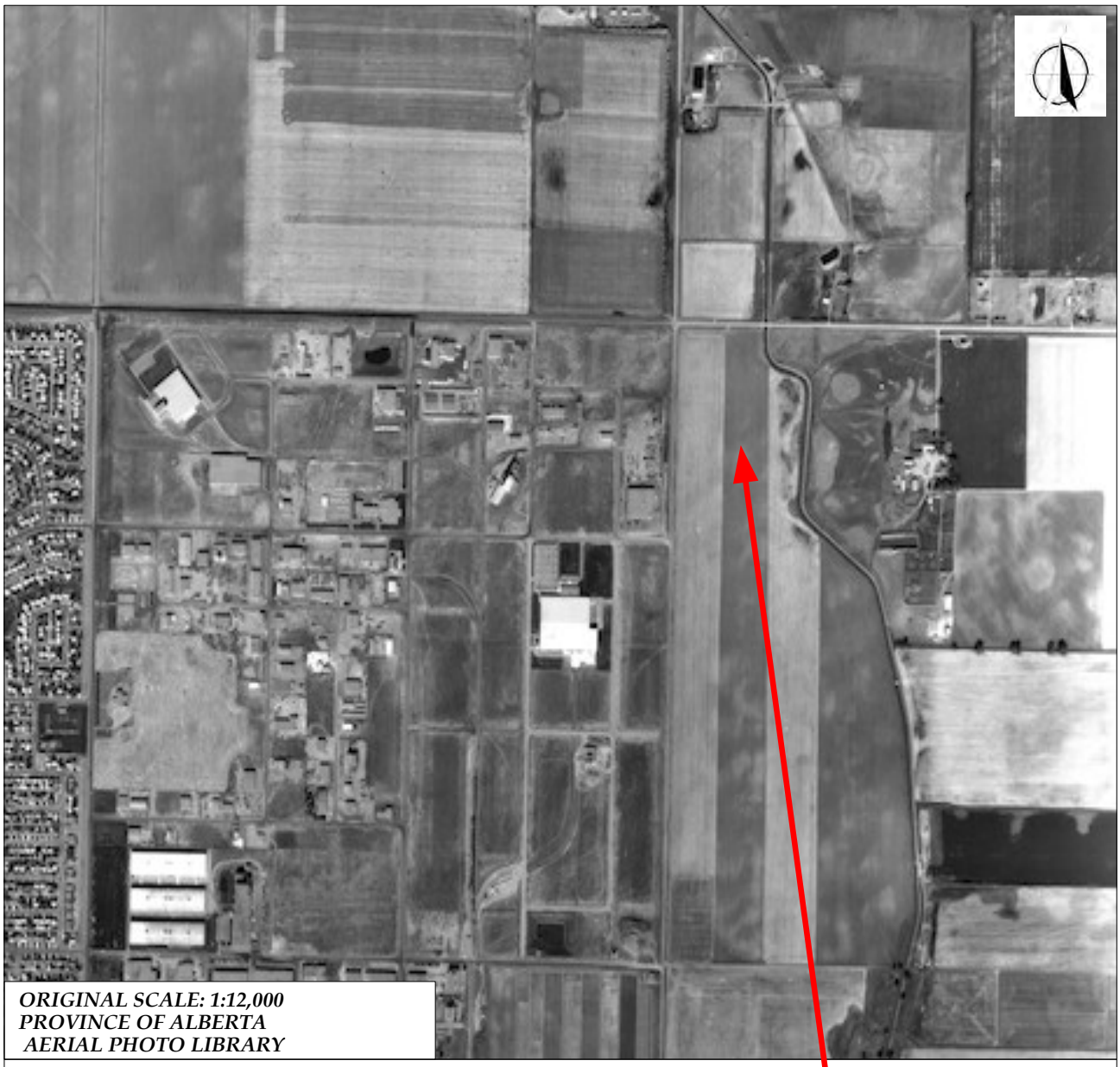
PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP

DATE: MAY 9, 2024

SCALE: NOT TO SCALE

PROJECT NO: RSQ-024-137



ORIGINAL SCALE: 1:12,000
PROVINCE OF ALBERTA
AERIAL PHOTO LIBRARY

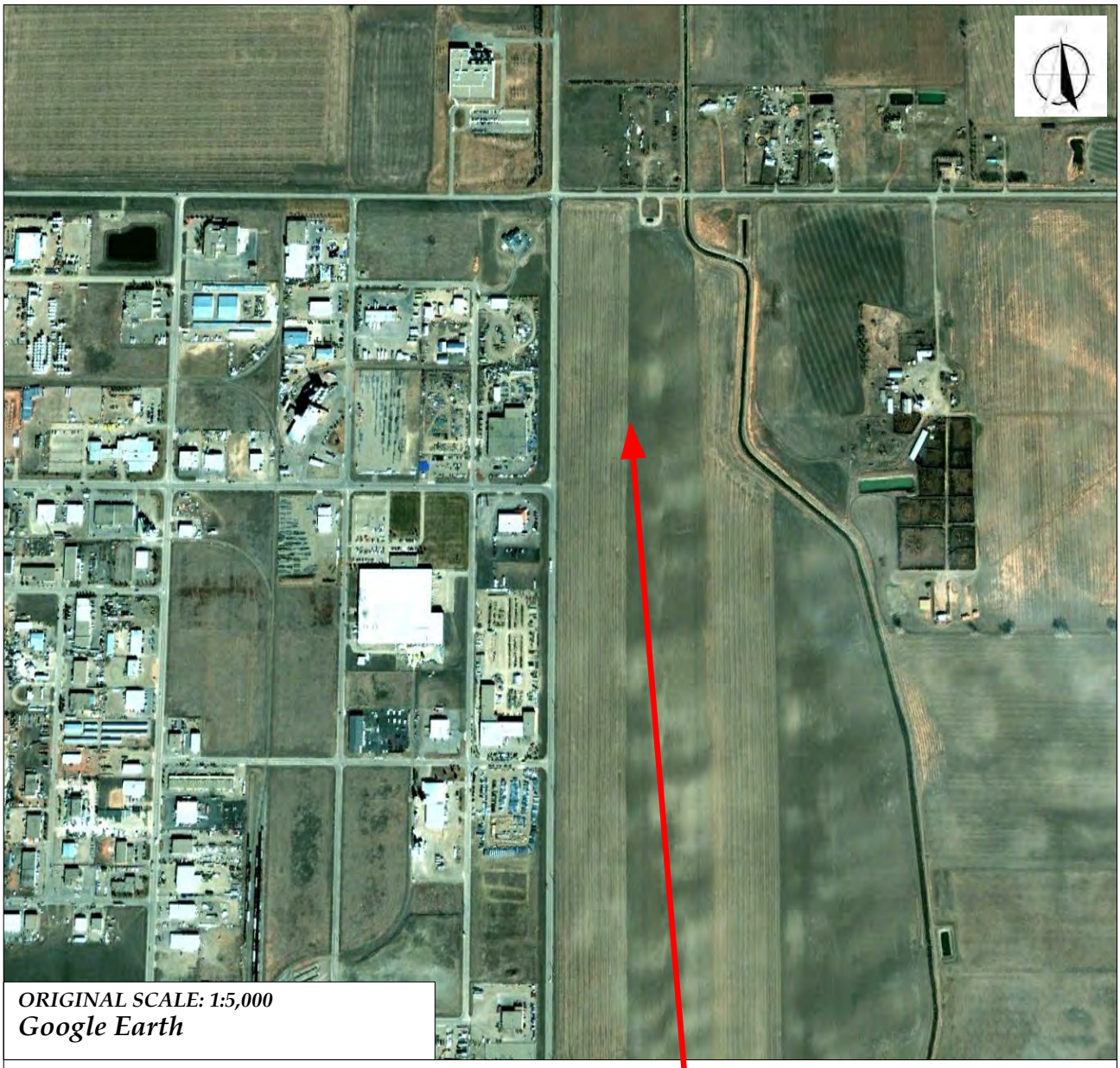
LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 11: 1983 AERIAL PHOTOGRAPH

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY:		PROJECT NO:
JP		
DATE: MAY 9, 2024	**SCALE:** NOT TO SCALE	RSQ-024-137



ORIGINAL SCALE: 1:5,000
Google Earth

LEGEND: LOCATION OF THE SUBJECT PROPERTY

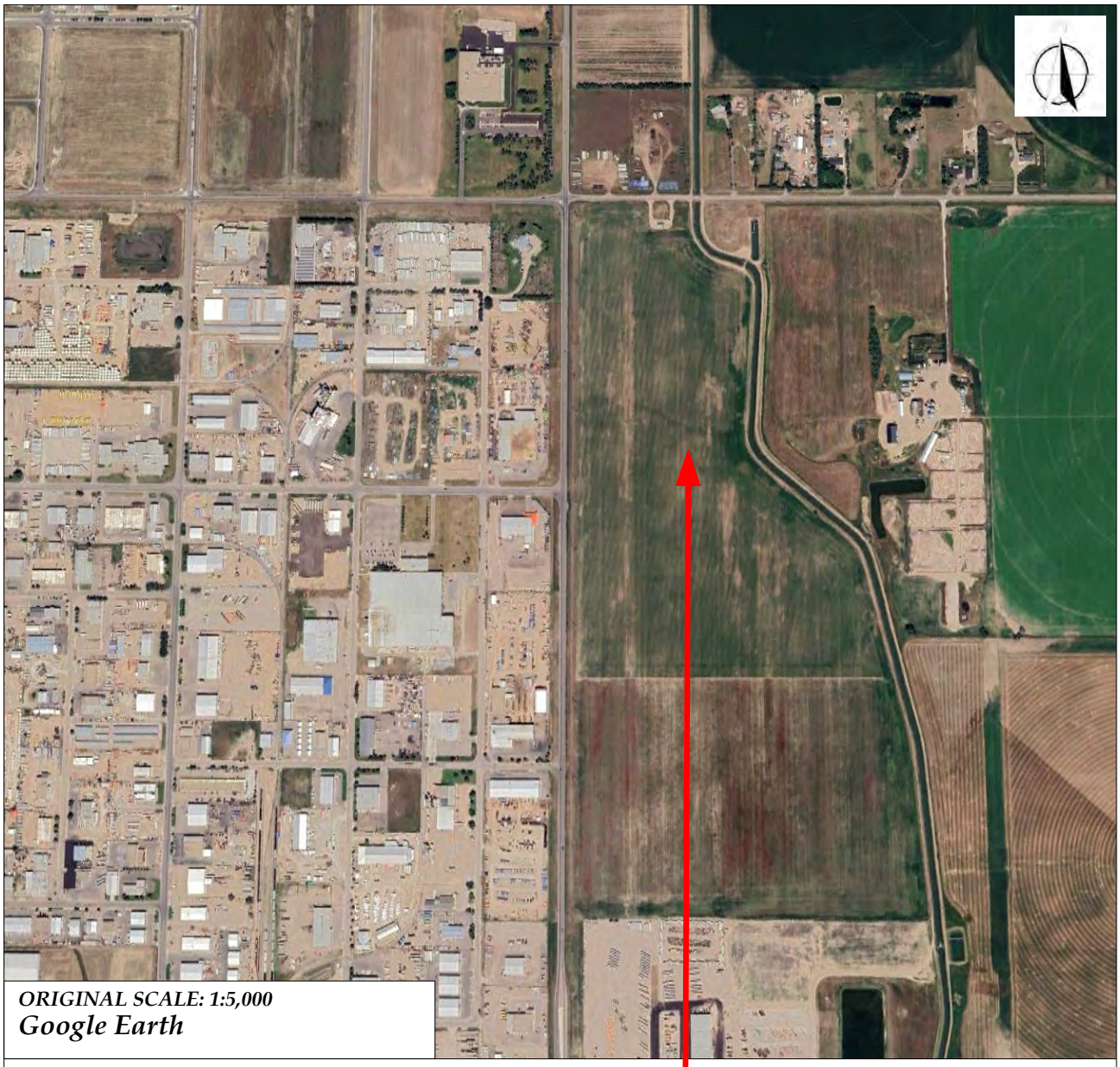
ENVIRONMENTAL

Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 12: 2004 SPOT SATELLITE IMAGE

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP		**PROJECT NO:** RSQ-024-137
DATE: MAY 9, 2024	**SCALE:** NOT TO SCALE	



ORIGINAL SCALE: 1:5,000
Google Earth

LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 13: 2023 SPOT SATELLITE IMAGE

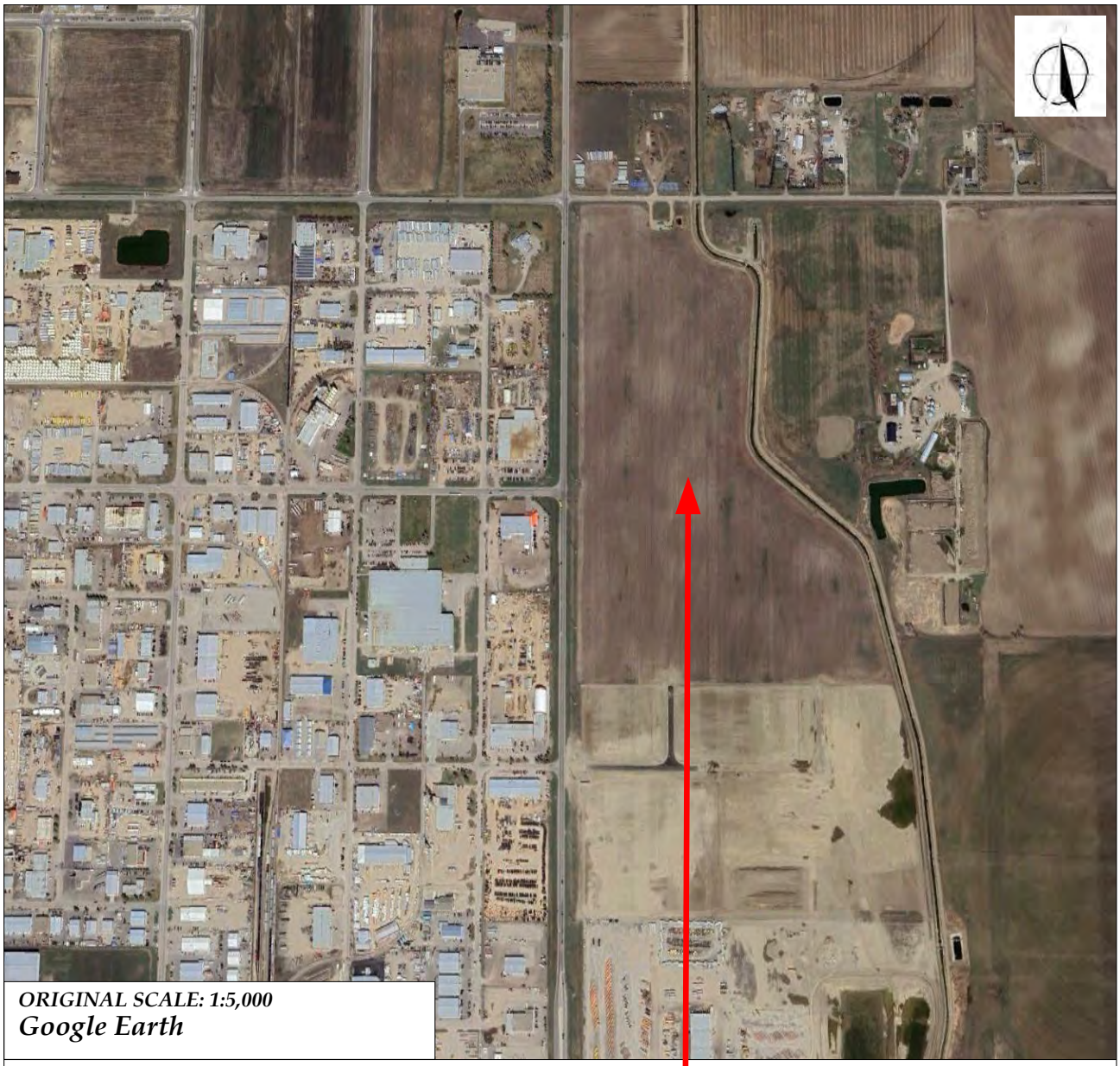
PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP

PROJECT NO: RSQ-024-137

DATE: MAY 9, 2024

SCALE: NOT TO SCALE



ORIGINAL SCALE: 1:5,000
Google Earth

LEGEND: LOCATION OF THE SUBJECT PROPERTY

ENVIRONMENTAL
Ryan Riess, M.Sc., P.Eng.
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Ph : 306 227 2423
www.rsquaredenviro.com
R Squared Environmental Inc.

DRAWING TITLE: FIGURE 14: 2024 SPOT SATELLITE IMAGE

PROJECT: PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR LOT 5, BLOCK 1, PLAN 1113171, LETHBRIDGE COUNTY, ALBERTA

DRAWN BY: JP

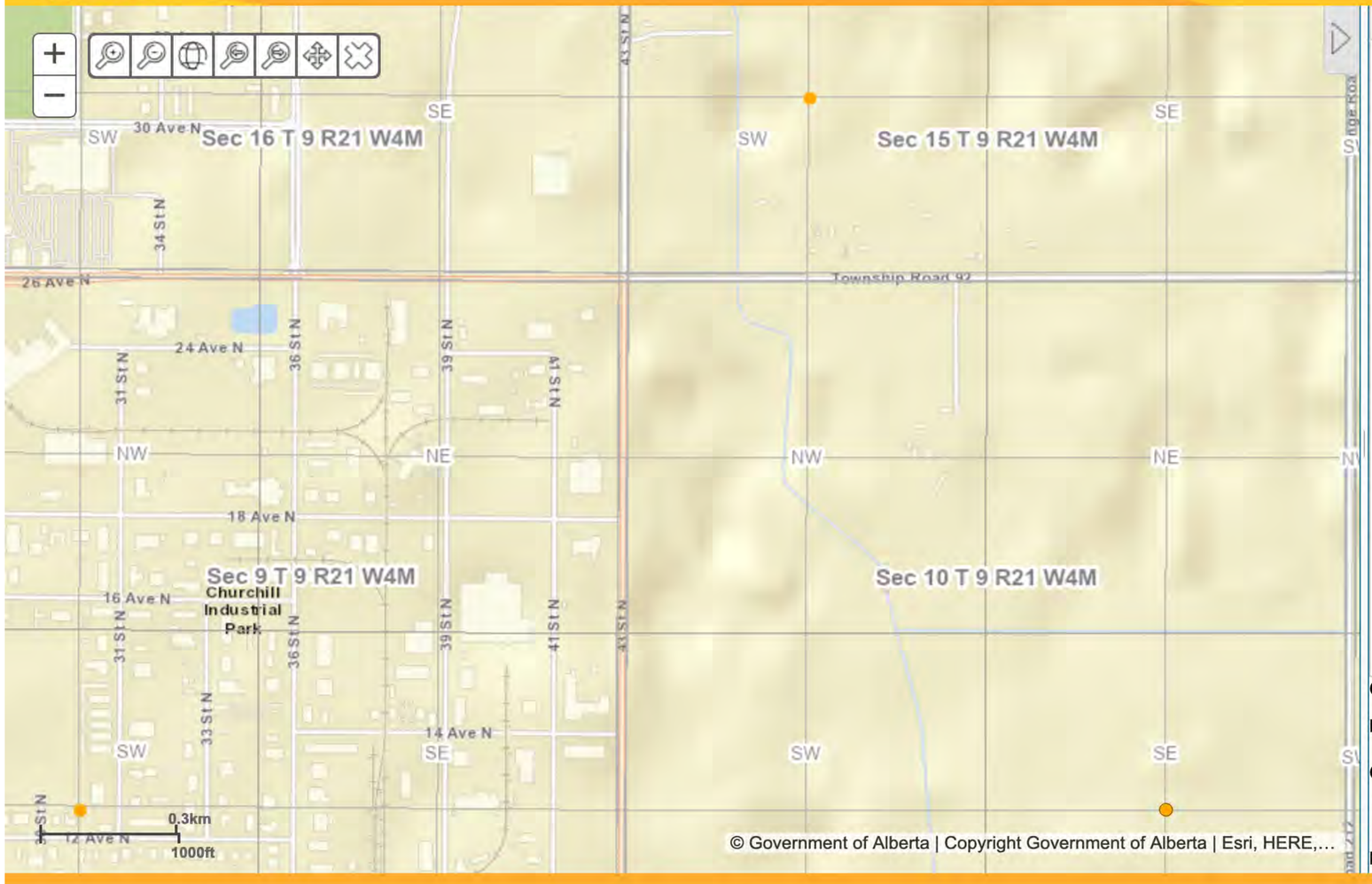
DATE: MAY 9, 2024

SCALE: NOT TO SCALE

PROJECT NO: RSQ-024-137

APPENDIX B

WATER WELL DATA



Introduction | Layers | Find Water Wells | Measure | Print | Data

Alberta Water Wells

Map View Choices

There are two layers of well reports: The Water Well Drilling layer displays golden rod dots (●) for all water well drilling and related reports. The Baseline Water Well Test layer displays magenta diamonds (◆) for all test results for the baseline water well test program. A well icon on the map represents an approximate well location. Clicking on the icon will open a popup with information on the well and a link to the well's report. If multiple wells are in the same approximate location then the popup will indicate the number of wells and allow switching between information for each well.

Searching For Wells

The **Find Water Wells** tab provides several options for searching and viewing water wells. Selecting any of the available options prompts users to type the required information and click on search. A list of the wells will show up on the right side in a table. If only one well report exists in the table, then double click on the GIC Well ID to open the full report. If there is more than one well report, click the **Generate Report** button to see the detailed listing of these wells in the *Reconnaissance Report* (PDF).

- Select **By Legal Land Description** option
  Searches by using the Alberta Township System. Users enter the quarter-section (or legal subdivision), section, township, range and meridian for the location they want to search in.
- Select **By Owner Name** option (water well drilling reports only)

Current Scale: 1:18,056

Longitude: -112.766958 **Latitude:** 49.725859

Cursor Display Preferences

- ○ Map Coordinates (WGS84 Web Mercator Auxiliary Sphere)
- ◉ Geographic Coordinates (longitude, latitude)

Number of decimal places: 6

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Water Well Drilling Report

View in Metric | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GIC Well ID 106314
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

GOWN ID

Well Identification and Location

Measurement in Imperial

Owner Name	Address	Town	Province	Country	Postal Code
#GH-29					

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	15	9	21	4				

Measured from Boundary of
ft from
ft from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.730906 Longitude -112.773057

How Location Obtained
Not Verified

Elevation 2968.00 ft

How Elevation Obtained
Survey-Transit

Drilling Information

Method of Drilling
Rotary

Proposed Well Use
Investigation

Type of Work
Test Hole

Formation Log

Measurement in Imperial

Depth from ground level (ft)	Water Bearing	Lithology Description
5.00		Sandy Topsoil
10.00		Silty Topsoil
215.00		Sandy Clay
220.00		Medium Grained Sand
235.00		Clay
253.00		Gravel
280.00		Shale
298.00		Sandstone

Yield Test Summary

Measurement in Imperial

Recommended Pump Rate igpm

Test Date	Water Removal Rate (igpm)	Static Water Level (ft)

Well Completion

Measurement in Imperial

Total Depth Drilled	Finished Well Depth	Start Date	End Date
298.00 ft			1968/04/08

Borehole

Diameter (in)	From (ft)	To (ft)
0.00	0.00	298.00

Surface Casing (if applicable)

Size OD : 0.00 in
Wall Thickness : 0.000 in
Bottom at : 0.00 ft

Well Casing/Liner

Size OD : 0.00 in
Wall Thickness : 0.000 in
Top at : 0.00 ft
Bottom at : 0.00 ft

Perforations

From (ft)	To (ft)	Diameter or Slot Width(in)	Slot Length (in)	Hole or Slot Interval(in)

Perforated by

Annular Seal

Placed from 0.00 ft to 0.00 ft
Amount

Other Seals

Type	At (ft)

Screen Type

Size OD : 0.00 in

From (ft)	To (ft)	Slot Size (in)

Attachment
Top Fittings
Bottom Fittings

Pack

Type
Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
BYRT, STAN & SONS LTD.

Copy of Well report provided to owner

Date approval holder signed

Water Well Drilling Report

View in Metric | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GIC Well ID 106314
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

GOWN ID

Well Identification and Location

Measurement in Imperial

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#GH-29					

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Measured from Boundary of
ft from
ft from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.730906 Longitude -112.773057

How Location Obtained
Not Verified

Elevation 2968.00 ft

How Elevation Obtained
Survey-Transit

Additional Information

Measurement in Imperial

Distance From Top of Casing to Ground Level in
Is Artesian Flow
Rate igpm
Is Flow Control Installed
Describe

Recommended Pump Rate igpm
Recommended Pump Intake Depth (From TOC) ft
Pump Installed
Type
Depth ft
Make
H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS)
Depth ft
Gas
Depth ft
Well Disinfected Upon Completion
Geophysical Log Taken Electric
Submitted to ESRD Electric

Remedial Action Taken

Sample Collected for Potability
Submitted to ESRD

Additional Comments on Well

Yield Test

Taken From Ground Level | Measurement in Imperial

Test Date	Start Time	Static Water Level
		ft

Method of Water Removal

Type
Removal Rate igpm
Depth Withdrawn From ft

If water removal period was < 2 hours, explain why

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	ig	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
BYRT, STAN & SONS LTD.

Copy of Well report provided to owner

Date approval holder signed

Water Well Drilling Report

View in Metric | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 106304
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1936/06/22

Well Identification and Location

Measurement in Imperial

Owner Name	Address	Town	Province	Country	Postal Code
HENDERSON, F.W.	LETHBRIDGE				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SE	10	9	21	4				

Measured from Boundary of
ft from
ft from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.716286 Longitude -112.761994
How Location Obtained: Not Verified

Elevation 2977.00 ft
How Elevation Obtained: Estimated

Drilling Information

Method of Drilling
Drilled

Proposed Well Use
Domestic & Stock

Type of Work
Federal Well Survey

Formation Log

Measurement in Imperial

Depth from ground level (ft)	Water Bearing	Lithology Description

Yield Test Summary

Measurement in Imperial

Recommended Pump Rate 0.00 igpm

Test Date	Water Removal Rate (igpm)	Static Water Level (ft)
1936/06/22		280.00

Well Completion

Measurement in Imperial

Total Depth Drilled	Finished Well Depth	Start Date	End Date
330.00 ft			1935/01/01

Borehole

Diameter (in)	From (ft)	To (ft)
0.00	0.00	330.00

Surface Casing (if applicable)
Size OD : 0.00 in
Wall Thickness : 0.000 in
Bottom at : 0.00 ft

Well Casing/Liner
Size OD : 0.00 in
Wall Thickness : 0.000 in
Top at : 0.00 ft
Bottom at : 0.00 ft

Perforations

From (ft)	To (ft)	Diameter or Slot Width(in)	Slot Length (in)	Hole or Slot Interval(in)

Perforated by

Annular Seal
Placed from 0.00 ft to 0.00 ft
Amount

Other Seals

Type	At (ft)

Screen Type
Size OD : 0.00 in

From (ft)	To (ft)	Slot Size (in)

Attachment
Top Fittings
Bottom Fittings

Pack
Type
Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
MAHON JOE

Copy of Well report provided to owner

Date approval holder signed

Water Well Drilling Report

View in Metric | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GIC Well ID 106304
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1936/06/22

GOWN ID

Well Identification and Location

Measurement in Imperial

Owner Name	Address	Town	Province	Country	Postal Code
HENDERSON, F.W.	LETHBRIDGE				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SE	10	9	21	4				

Measured from Boundary of
ft from
ft from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.716286 Longitude -112.761994
How Location Obtained: Not Verified

Elevation 2977.00 ft
How Elevation Obtained: Estimated

Additional Information

Measurement in Imperial

Distance From Top of Casing to Ground Level: in
Is Artesian Flow:
Rate: igpm
Is Flow Control Installed:
Describe:

Recommended Pump Rate: 0.00 igpm
Recommended Pump Intake Depth (From TOC): 0.00 ft
Pump Installed:
Depth: ft
Type:
Make:
H.P.:
Model (Output Rating):

Did you Encounter Saline Water (>4000 ppm TDS):
Depth: ft
Gas:
Depth: ft
Well Disinfected Upon Completion:
Geophysical Log Taken:
Remedial Action Taken
Submitted to ESRD
Sample Collected for Potability:
Submitted to ESRD:
Additional Comments on Well

Yield Test

Taken From Ground Level
Measurement in Imperial

Test Date	Start Time	Static Water Level
1936/06/22	12:00 AM	280.00 ft

Depth to water level

Pumping (ft)	Elapsed Time Minutes:Sec	Recovery (ft)

Method of Water Removal
Type:
Removal Rate: igpm
Depth Withdrawn From: 0.00 ft

If water removal period was < 2 hours, explain why

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	ig	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well: UNKNOWN NA DRILLER
Certification No: 1
Company Name: MAHON JOE
Copy of Well report provided to owner
Date approval holder signed

APPENDIX C

LETHBRIDGE COUNTY

RE: Information re subdivision 2410456

From: Nathan Hill

To: JOHN POLSON

Cc: Heath Wright

Good afternoon John,

I have no record of any development permits for the subject site. It is currently designated Rural Agriculture.
I will defer to Heath Wright, our Regional Manager of Safety and Emergency Services, on the fire question as I'm not sure. He has been cced for your convenience.

If you have any further questions or clarifications, feel free to reach me.

Regards,

LETHBRIDGE COUNTY

Nathan Hill
Development Planner
P: 403.317.6053 C: 403.915.6143 E: nhill@lethcounty.ca
www.lethcounty.ca

In the true spirit of reconciliation, we acknowledge all those who call this land home now and for thousands of years in the past. May we respect each other and find understanding together and recognize the benefits that this land provides to all of us.

APPENDIX D

ZONING BYLAW

RURAL AGRICULTURE - RA

1. PURPOSE

To allow agriculture to continue as an important land use in the County and ensure that it can continue to operate unencumbered by conflicting land uses, while giving the County the flexibility to allow isolated non-agriculture uses in certain locations as a support to the agricultural base. The terms of the *Agricultural Operations Protection Act* apply in Lethbridge County and must be respected by both agricultural operators and non-agricultural land users.

2. PERMITTED, DISCRETIONARY AND PROHIBITED USES

(1) **Permitted Uses**

Accessory Buildings, Structures and Uses to an Approved Permitted Use
Additions to Existing Buildings
Agricultural Buildings and Structures (see Part 2 - No permit required)
Alternative or Renewable Energy Facilities, Individual (see Part 7)
Day Homes (see Part 2 - No permit required and Part 5, Section 17)
Dwellings:
- Single-detached Site-built
- Single-detached Manufactured Home 1 (see Part 5, Section 24)
- Single-detached Manufactured Home 2 (see Part 5, Section 24)
- Single-detached Ready-to-move (see Part 5, Section 24)
- Single-detached Moved-in (see Part 5, Section 24)

Extensive Agriculture and Grazing (see Part 2- No permit required)
Home Occupations 1 and 2 (see Part 5, Section 22)
Secondary Suites (contained within a single-detached dwelling) (see Part 5, Section 34)
Secondary Suites (detached garage) (see Part 5, Section 36)
Shipping Containers (see Part 2 - No permit required and Part 5, Section 36)
Signs Type 1 (in accordance with Part 6)
Signs Type 2 (in accordance with Part 6)
Small Wind Energy Conversion Systems (see Part 7, Section 3)
Solar Collectors, Individual (roof, wall mount) (see Part 2 - No Permit Required and Part 7, Section 2)

(2) **Discretionary Uses**

Abattoir (see Part 5, Section 1)
Accessory Buildings, Structures and Uses to an Approved Discretionary Use
Agricultural Services
Airstrips
Alternative or Renewable Energy Commercial/Industrial Facilities (see Part 7)
Anhydrous Ammonia Storage (see Section 15 of this district and Part 5, Section 5)
Auction Markets (see Section 6 of this district)
Bed and Breakfasts (see Part 5, Section 9)

Boarding Stables (see Section 6 of this district)
Breeding Facilities (see Section 6 of this district)
Cannabis Cultivation (see Part 5, Section 11)
Cannabis Nursery (see Part 5, Section 11)
Confined Feeding Operations (see Part 2 - No municipal permit required, but NRCB provincial approval needed)
Cryptocurrency (bitcoin) mining (see Part 5, Section 15)
Day Care (see Part 5, Section 16)
Dwellings:
- Semi-detached
- Multiple-unit
- Second or Additional Residence*

Dog Training Facilities (see Section 6 of this district, and Part 5, Section 23)
Farm Stands
Feed Mills / Grain Elevators
Hay Plants (see Part 5, Section 20)
Heliport Sites
Home Occupations 3 (see Part 5, Section 22)
Horticulture, including commercial intensive agriculture and commercial greenhouses
Intensive Livestock Operations (see Part 5 - municipal permit required for non NRCB jurisdiction animal confinement as outlined in Part 5 standards)
Isolated commercial or industrial uses, pre-existing (see notation below***)
Isolated Country Residential
Kennels (see Section 6 of this district, and Part 5, Section 23)
Market Gardens and Nurseries
Meteorological Towers (see Part 7)
Moved-in Buildings (see Part 5, Section 27)
Personal Workshop and Storage (on vacant parcels) (see Part 5, Section 29)
Public or Private Utilities
Public/Institutional Uses including Cemeteries
Railway and Railway Related Uses
Recreation, Minor
Resource Extraction and Associated Works (see Section 14 of this district, and Part 5, Section 30)
Riding Arena (personal use)
Rodeo Grounds
Seed Processing Facility
Shipping Containers (more than 2) (see Part 5, Section 36)
Signs Type 3 (in accordance with Part 6)
Solar Collectors, Individual (ground mount) (see Part 7, Section 2)
Specialty Manufacturing/Cottage Industry
Stockpiles (inside the distances in Section 5 of this district)
Telecommunications Facilities (see Part 5, Section 40)
Tourist Homes/Short Term Rentals (see Part 5, Section 41)
Veterinary Clinics, Large and Small Animal (see Section 6(3) of this district)
Wind Energy Conversion Systems (see Part 7)

Boarding Stables (see Section 6 of this district)
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plan, the Subdivision and Development Regulation, this Land Use Bylaw, the Municipal Development Plan and any other applicable legislation or regulations.

4. MINIMUM SETBACK REQUIREMENTS

(1) **Side Yard**

No building, structure (excluding fencing) or dugout banks shall be within 6.1 metres (20 ft.) of a property line not fronting on or adjacent to a municipal roadway. For setbacks adjacent to or fronting roadways, the following Section 5 stipulations shall apply.

(2) **Special Setback Requirements**

(a) All buildings, structures and development other than extensive cultivation or grazing on parcels having frontage on a provincial highway may have special requirements for setback, access and service roadways imposed as a condition of approval by the Development Authority in accordance with the requirements of Alberta Transportation and the *Highways Development Protection Regulation.*

(b) As determined by the Development Authority, all buildings, structures and development that are to be located in the vicinity of an escarpment, coulee break, river bank or other geographical feature may have special requirements for setbacks upon due consideration of any geotechnical or slope stability analysis reports requested by the municipality.

5. MINIMUM SETBACKS FROM ROADWAYS

(1) No part of a building, structure or development shall be located within:

(a) 38.1 metres (125 ft.) of the centre line of any of any developed or undeveloped municipal road allowance or public roadway which is not designated as a provincial highway under the Highways Development Protection Regulation;

(b) 70.0 metres (230 ft.) of the centre line or 40.0 metres (131 ft.) from the right-of-way boundary, whichever is greater, of roads designated as provincial highways under the Highways Development Protection Regulation;

(c) for any development adjacent to provincial roadways classified as a four-lane divided highway or freeways/expressways, the required setback distances and accesses will be reviewed on a highway-by-highway/development-by-development basis and shall be as prescribed by Alberta Transportation;

(d) any greater distance that may be required by the Development Authority in order to facilitate future road widening, service road dedication, to reduce potential snow drifting, or vision restrictions.

(2) Where any parcel or part of a parcel has frontage on a provincial highway, special standards for setbacks, access, and service roadways may be required by Alberta Transportation under the *Highways Development Protection Regulation*.

plan, the Subdivision and Development Regulation, this Land Use Bylaw, the Municipal Development Plan and any other applicable legislation or regulations.

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(4) The requirement of a service road or subdivision street to provide access may be imposed as a condition of approval for any new subdivision or development. Construction and survey costs for a service road shall be the responsibility of the applicant.

9. ACCESSORY BUILDINGS AND STRUCTURES

(1) An accessory building or structure shall not be located in the required setback from a public road or on an easement.

(2) An accessory building or structure shall be setback a minimum 3.0 metres (10 ft.) from the principal dwelling and from all other structures on the same lot.

(3) Where a structure is attached to the principal building on a site by a roof, an open or enclosed structure, a floor or foundation, it is to be considered a part of the principal building and is not an accessory building.

(4) As a condition of a permit, if a development approval is required, the Development Authority may stipulate specific requirements for the type of foundation, fastening or tie-down system, finish, colour, roof pitch, and materials to be applied to the accessory building or structure.

10. FENCES AND SHELTERBELTS

In rural areas along local roads, the construction or erection of a fence, hedge or shelterbelt shall comply with the following:

(a) no fence, hedge or shelterbelt shall be erected which would unduly restrict the vision of approaching traffic;

(b) fencing surrounding public utility lots shall be as per the *Lethbridge County Engineering Guidelines and Minimum Servicing Standards* or as stipulated in a Development Agreement;

(c) all fences must be sited to be able to meet the required corner site triangle setbacks as stipulated in Part 4, Section 12.

(d) a chain link, split rail or barb wire type fence may be located adjacent to the property line or within the required setbacks to a public road, but, solid material fences and snow fences must meet the stipulated setbacks to the public road;

(e) no hedge or shelterbelt shall be erected closer than the distances as stipulated in Part 4, Section 12, Fences, Trees and Shelter Belts in Rural Areas, Diagram 4.5, of the right-of-way of a public road.

11. OBJECTS PROHIBITED OR RESTRICTED IN YARDS

(1) No person shall allow a motor vehicle which has all or part of its superstructure removed, or a motor vehicle which is in a dilapidated or unsightly condition to remain within 30.5 metres (100 ft.) of a local road or Provincial highway in the district unless it is suitably housed or screened to the satisfaction of the Development Authority.

(2) Not more than six (6) recreational vehicles shall be stored or parked on a parcel unless otherwise approved by the Development Authority.

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(2) Not more than six (6) recreational vehicles shall be stored or parked on a parcel unless otherwise approved by the Development Authority.

(2) The Development Authority may refuse to approve an application for a private sand, clay and gravel pit or a stone quarry in or adjacent to a river valley, shoreland area or flood prone area if it is of the opinion that the area is unsuitable in accordance with Section 19 of this district.

(3) The Development Authority shall take into consideration the *Cottonwood Report: Environmentally Significant Areas in the Oldman River Region* in making a decision on an application for a resource extraction use and may deem a development application to be unsuitable in accordance with that report, or may request additional information be provided by the applicant to ensure any matters outlined in Section 19 of this district are addressed to the satisfaction of the Development Authority.

15. ANHYDROUS AMMONIA STORAGE FACILITY

For a development permit application for a bulk anhydrous ammonia storage facility or a residential dwelling in proximity to an existing bulk ammonia storage facility the Development Authority:

(a) shall consider the location of neighbouring residential uses and apply the "Guidelines for the Location of Stationary Bulk Ammonia Facilities" prepared by Alberta Environment before making a decision on a development application concerning a bulk ammonia storage facility; and

(b) in all instances, a development application for a residential dwelling shall not be approved if it is located within 500 metres (1,640 ft.) of an established anhydrous ammonia bulk storage facility.

16. AIRPORT AREA RESTRICTIONS

Properties that lie within the area shown in Map 1, Part 5, will have additional subdivision and development restrictions as outlined in Part 5, Section 3, Airport Area Restrictions.

17. RIVER VALLEYS AND SHORELANDS

(1) Before approving any application in or adjacent to a river valley or shoreland area to locate or expand a land use, or which requires a land use bylaw waiver, the Development Authority shall refer such an application to any local, regional, provincial or federal government agency that, in its opinion, has an interest in land use management.

(2) No application to locate or expand a land use in or adjacent to a river valley or shoreland area shall be approved unless, in the opinion of the Development Authority, the proposal will not:

(a) be located in a flood prone area; and

(b) cause soil erosion or damage to a river bank; and

(c) cause deterioration of water quality; and

(d) hinder the flow of water to the river; and

(e) compromise aesthetic quality or natural amenities; and

(f) be detrimental to area of ecologically sensitive habitat or of historic or scenic importance; and

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APPENDIX E

LAND TITLES
Copies of Land Titles

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0039 801 056	1113171;1;5	241 053 431 +12

LEGAL DESCRIPTION

PLAN 1113171
BLOCK 1
LOT 5
CONTAINING 59.56 HECTARES(147.18 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES	(ACRES)	MORE OR LESS
SUBDIVISION	2410456	25.61	63.28	

EXCEPTING THEREOUT ALL MINES AND MINERALS

ATS REFERENCE: 4;21;9;10;W
ESTATE: FEE SIMPLE

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 241 053 245 +1

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
241 053 431	21/02/2024	SUBDIVISION PLAN		

OWNERS

1000824 ALBERTA LTD.
OF 2365 ASPEN DRIVE
COALDALE
ALBERTA T1M 0E6

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
1485KX .		IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE ST. MARY RIVER IRRIGATION DISTRICT

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
1049KD .	05/02/1968	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "PORTION DESCRIBED"
881 219 612	01/12/1988	UTILITY RIGHT OF WAY GRANTEE - ALBERTA GOVERNMENT TELEPHONES. AS TO PORTION OR PLAN:8810684 "TAKES PRIORITY OF CAVEAT 871131928 REGISTERED 27/07/1987"
991 249 227	30/08/1999	IRRIGATION DISTRICT RESOLUTION PART OF AN IRRIGABLE UNIT " AFFECTS PART OF THIS TITLE "
241 053 435	21/02/2024	CAVEAT RE : DEFERRED RESERVE CAVEATOR - LETHBRIDGE COUNTY. C/O OLDMAN RIVER REGIONAL SERVICES COMMISSION 3105 - 16TH AVENUE NORTH LETHBRIDGE ALBERTA T1H5E8

TOTAL INSTRUMENTS: 005

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 27 DAY OF APRIL, 2024 AT 08:11 P.M.

ORDER NUMBER: 50356991

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION, APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).

HISTORICAL LAND TITLE CERTIFICATE

CURRENT TITLE WITH HISTORICAL DATA

S

LINC	SHORT LEGAL	TITLE NUMBER
0039 801 056	1113171;1;5	241 053 431 +12

LEGAL DESCRIPTION

PLAN 1113171
BLOCK 1
LOT 5
CONTAINING 59.56 HECTARES(147.18 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES	(ACRES)	MORE OR LESS
SUBDIVISION	2410456	25.61	63.28	

EXCEPTING THEREOUT ALL MINES AND MINERALS

ATS REFERENCE: 4;21;9;10;W
ESTATE: FEE SIMPLE

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 241 053 245 +1

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
241 053 431	21/02/2024	SUBDIVISION PLAN		

OWNERS

1000824 ALBERTA LTD.
OF 2365 ASPEN DRIVE
COALDALE
ALBERTA T1M 0E6

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
1485KX .		IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE ST. MARY RIVER IRRIGATION DISTRICT

(CONTINUED)

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991 249 227	30/08/1999	IRRIGATION DISTRICT RESOLUTION PART OF AN IRRIGABLE UNIT " AFFECTS PART OF THIS TITLE "
241 053 435	21/02/2024	CAVEAT RE : DEFERRED RESERVE CAVEATOR - LETHBRIDGE COUNTY. C/O OLDMAN RIVER REGIONAL SERVICES COMMISSION 3105 - 16TH AVENUE NORTH LETHBRIDGE ALBERTA T1H5E8

TOTAL INSTRUMENTS: 005

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APPENDIX F

PROVINCE OF ALBERTA

Alberta Environment and Protected Areas

The ESA marker represents an approximate location of a site where the Government of Alberta has received scientific and/or technical information. The marker is an arbitrary, 40 meter diameter circle centered on the property for which this information is attached. For locations or other site information, see the document results table.

Spatial Search provided by the Alberta Land Titles SPIN 2 System

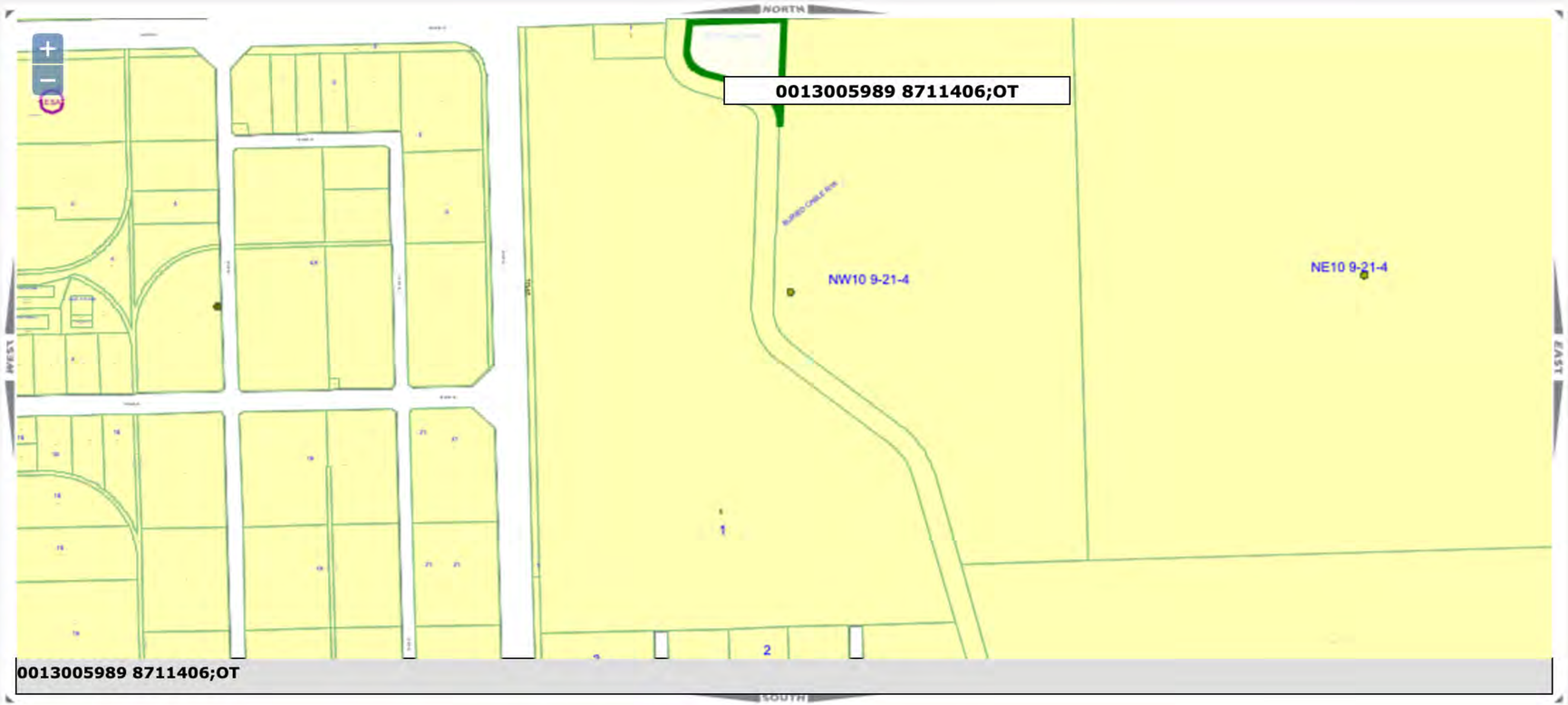
Search Form | Map Search

A designated location identifies a site where Environment and Protected Areas has received scientific or technical information for that site and does not imply anything regarding the current state or condition of the site. Please refer to the studies and reports to determine the condition of the site.

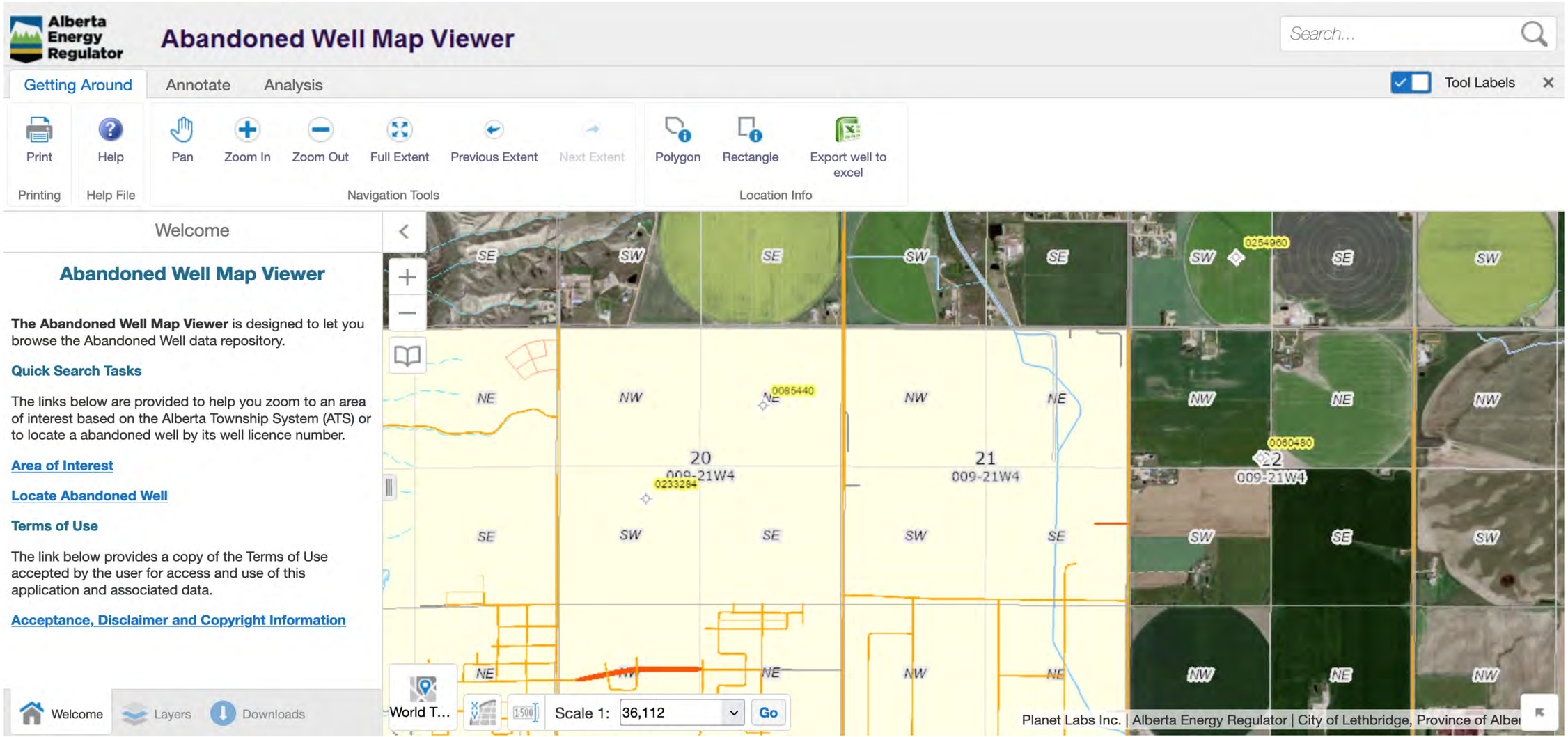
- ATS
- **PBL**

Plan 1113171
Block 1
Lot 5
Search

- Address
- Place Name
- Coordinate
- Help with Map



Map Views | Map Information | Map Navigation | Map Tools


Alberta Energy Regulator
Abandoned Well Map Viewer
Search...
Getting Around
Annotate
Analysis
Tool Labels
Print
Help
Pan
Zoom In
Zoom Out
Full Extent
Previous Extent
Next Extent
Polygon
Rectangle
Export well to excel
Printing
Help File
Navigation Tools
Location Info
Welcome
Abandoned Well Map Viewer
The Abandoned Well Map Viewer is designed to let you browse the Abandoned Well data repository.
Quick Search Tasks
The links below are provided to help you zoom to an area of interest based on the Alberta Township System (ATS) or to locate a abandoned well by its well licence number.
Area of Interest
Locate Abandoned Well
Terms of Use
The link below provides a copy of the Terms of Use accepted by the user for access and use of this application and associated data.
Acceptance, Disclaimer and Copyright Information
Welcome
Layers
Downloads
World T...
Scale 1:
36,112
Go
20
009-21W4
21
009-21W4
22
009-21W4
0085440
0233284
0254960
0060480
Planet Labs Inc. | Alberta Energy Regulator | City of Lethbridge, Province of Alber

APPENDIX G

PHOTO PAGES



Photo 1: View of the Field looking from the west.



Photo 2: Another view of the Subject Property. The adjacent farm is visible in the background of the photograph.



Photo 3: View of the Subject Property taken on a drive along the adjacent irrigation canal.



Photo 4: Another view of the field.



Photo 5: The canal crossed Township Road 92 and travelled south along the east edge of the Subject Property.



Photo 6: The Site is on the right hand side of the photograph.



Photo 7: Earth moving equipment in the photograph is on the adjacent property to the south.



Photo 8: Another view of the earth moving activity to the south.



Photo 9: The photograph is taken from the eastern edge of the Site looking towards the commercial properties to the south.



Photo 10: A view of properties on the west side of 43rd Street North.



Photo 11: Property on the west side of 43rd Street North.



Photo 12: The ASTs identified in the photograph were located 336m to the west of the western edge of the Site.

APPENDIX H

QUALIFICATIONS
PROOF OF INSURANCE

GESTIONNAIRES D'ASSURANCES | SUM | STRATEGIC UNDERWRITING MANAGERS INC
A subsidiary of ONE80 INTERMEDIARIES

1001 De Maisonneuve Blvd. W., Suite 900, Montreal, QC, H3A 3C8
T: 514-845-7861 or 1-855-845-7861 | F: 514-844-7862
www.assurancesum.ca

18 King St. E., Suite 300 Toronto, ON M5C 1C4
T: 416-603-7864 or 1-877-603-7864 | F: 416-603-7861
www.suminsurance.ca

ENVIRONMENTAL CONSULTANTS PROFESSIONAL LIABILITY POLICY
NEW POLICY

POLICY NUMBER: PI-ENV-32131-001 **EXPIRING POLICY NUMBER:**

DECLARATIONS

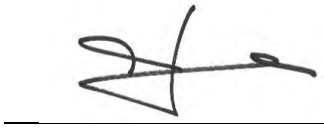
1.	**NAME INSURED**:	R Squared environmental Inc.
2.	**MAILING ADDRESS**:	PO Box 471 Dalmeny, SK, S0K 1E0
3.	**INSURED'S BUSINESS**:	environmental consulting and incidental contracting
4.	**POLICY PERIOD**:	FROM: May 31, 2022 TO: May 31, 2023 12.01 a.m. standard time at the mailing address of the Named Insured as stated herein.
5.	**LIMITS OF INSURANCE**:	a) $2,000,000 each claim b) $2,000,000 aggregate for the policy period
6.	**DEDUCTIBLE:**	$10,000
7.	**PREMIUM:** **ADJUSTMENT RATE:**	$4,427.00 Flat
8.	**RETROACTIVE DATE**:	May 31, 2022
9.	**MINIMUM RETAINED**:	$1,106.75
10.	**CANCELLATION:**	30 days
11.	**BROKER**:	Harvard / Western Insurance
12.	**CLAIMS REPORTING**:	Report all claims to BOTH DWF Adjusting (Canada) Limited newclaims@dwfadjusting.com TEL: 647-256-3579 FAX: 647-256-3501 AND claims@suminsurance.ca

This policy contains a clause which may limit the amount payable

13. **AUTHORIZED REPRESENTATIVE**:

Strategic Underwriting Managers Inc.
18 King St. E., Suite 903
Toronto, ON M5C 1C4
Tel: (416) 603-7864; Toll-free 1-877-603-7864 Fax: (416) 603-7861
toronto@suminsurance.ca

1001 De Maisonneuve O, Suite 900,
Montreal, QC H3A 3C8
Tel: (514)485-7861; Toll-free: 1-855-845-7861; Fax: (514)844-7862
montreal@suminsurance.ca



Signed on behalf of the Companies providing Insurance by Strategic Underwriting Managers Inc., a subsidiary of One80 Intermediaries

Authorized Representative

This policy contains a clause which may limit the amount payable

NAME OF INSURED: R Squared environmental Inc.
POLICY NO.: PI-ENV-32131-001

Schedule of Endorsements

Environmental Consultants Professional Liability Policy - Cost inclusive, and endorsement(s) as follows:
LMA5096 – Several Liability Notice
LMA5028 – Service of Suit Clause (Canada)
LSW1669 – Insure in Canada A Risk
LMA3100 – Sanction Limitation and Exclusion Clause
LMA5531 – Cyber Limited Exclusion and Data Exclusion
LSW1543C - Notice Concerning Personal Information
LSW1542F - Lloyds Policyholders Complaint Protocol
LSW1565C - Lloyd's Underwriters Code of Consumer Rights & Responsibilities
Compliance with the law
LSW1550 – Lloyd's Identification of Insurer
SUM STAT 01-08-2012 - Alberta and British Columbia statutory conditions endorsement
EC04 - Project management services

This policy contains a clause which may limit the amount payable

Environmental Consultants Professional Liability

We, the **Subscribing Insurers** as shown below or substituted or added by endorsement, will severally and not jointly pay those sums as described in the Limits of Liability as provided in the Declarations for the proportion shown below and in accordance with the Coverage Form(s).

It is agreed that our liability individually as insurers shall be limited to the proportion of the limits of Liability shown below for each insurer, and to the same proportion of any loss, claim or expense paid or payable in accordance with the Coverage Form

List of Subscribing Insurers

Subscribing Insurers	Proportion of the Limits of Liability	Premium
Certain Underwriters at Lloyd's under contract B1525PACBA211066	60%	$2,656.20
Everest Insurance Company of Canada	25%	$1,106.75
Sovereign General Insurance Company	15%	$664.05

This policy contains a clause which may limit the amount payable

ENVIRONMENTAL CONSULTANTS PROFESSIONAL LIABILITY POLICY

(This is a *Claims Made Policy* - Please read carefully)

COSTS INCLUSIVE AND DEDUCTIBLE APPLYING

This is a "claims made and reported" policy. Subject to its terms and conditions, this policy only affords cover for claims first made against the Insured and reported to the Insurer in writing during the Policy Period or the Extended Reporting Period, if applicable.

The person or persons or partnership or Firm named in the Declarations (herein referred to as the "Insured"), has/have submitted and warranted to certain Underwriters (herein referred to as the "Insurer") a written application containing the particulars and statements which, together with any other information that may have been supplied, is agreed to be the basis of this contract and is considered as incorporated herein, and in consideration of the premium stated in the Declarations:

INSURING CLAUSES

The Insurer hereby agrees to pay on behalf of the Insured, all sums in excess of the deductible as stated in Item 6 of the Declarations which the Insured becomes legally obligated to pay as Damages in respect of any Claim or series of Claims from the same originating cause made against them as a direct result of any negligent act, error or omission in the performance or the failure to perform Professional Services usual to the Insured's Business as stated in Item 3 of the Declarations, provided such Claim is first made against the Insured and reported to the Insurer within the Policy Period stated in Item 4 of the Declarations, and:

a) the Claim results from or arises out of Professional Services for others which were performed subsequent to the retroactive date (if any) stated in Item 8 of the Declarations, and

b) the Insured had no knowledge of the Claim prior to the effective date of this Policy stated in the Declarations.

TERRITORY

Unless otherwise endorsed herein, and subject to the Insuring Agreement of this Policy, coverage applies only to any negligent act, error or omission committed by the Insured anywhere in the world.

INVESTIGATION, DEFENCE AND SETTLEMENT

a) The Insurer shall have the right and duty to defend any suit or arbitration proceeding against the Insured which alleges any negligent act, error or omission as might result in a Claim against the Insured for which coverage would be afforded under this Policy and seeks damages on account thereof, even if such suit or arbitration proceeding is groundless, false or fraudulent.

b) The Insurer may take any and all steps as it may deem necessary, and make such investigations and negotiations and incur on behalf of itself and the Insured, such costs and expenses in connection with such defence, investigation and negotiation as the Insurer may deem necessary.

c) The Insurer shall not settle any Claim without the consent of the Insured. If, however, the Insured shall refuse to consent to any settlement recommended by the Insurer and acceptable to the claimant, and elects to contest the Claim or continue any legal proceedings in connection with such Claim, then the Insurers liability for the Claim shall not exceed the amount for which the Claim could have been settled, plus the costs and expenses incurred with its consent up to the date of such refusal, subject to the Limit of Liability of this Policy and to the Deductible amount stated in Item 6 of the Declarations.

d) The Insurer may at any time pay to the Insured in connection with any Claim or series of Claims under the Policy the Limit of Liability or any lesser amount for which such Claim or Claims can be settled less any sums already paid. Upon such payment being made, the Insurer shall relinquish the conduct and control of and be under no further liability in connection with such Claims or associated costs and expenses incurred after the date of such relinquishment.

e) In the event that the amount of any judgement and/or settlement exceeds the Limit of Liability as stated in Item 5a of the Declarations, the Insurer shall only be liable for any costs and/or expenses which are to be in the same proportion as the Limit of Liability bears to the total judgement and/or settlement amount.

f) Amounts payable in the investigation and defence of any Claim are included within the Limit of Liability as stated in Items 5a and 5b of the Declarations.

g) The Insured shall not admit or acknowledge liability for or settle or make or promise of any payment in respect of any Claim which may be afforded coverage by this Policy or incur any costs or expenses in connection with such Claim without the written consent of the Insurer.

SUPPLEMENTARY PAYMENTS

With respect to such insurance coverage as afforded by this Policy, having express reference to all terms, conditions, limitations and exclusions in this Policy, the Insurer will:

a) with respect to a defended suit, pay all premiums on bonds to release attachments, all premiums on appeal bonds required in any such defended suit but without any obligation to apply for or furnish any such bonds;

b) pay all costs taxed against the Insured in any such suit defended by the Insurer;

c) pay all interest accruing after entry of judgement until the Insurer has paid or tendered or deposited in court such part of such judgement for which coverage is afforded by this Policy;

d) pay expenses incurred by the Insured for such immediate emergency medical and surgical relief to others as shall be imperative at the time of any bodily injury, sickness, disease or death for which the Insured believed might have been the result of a negligent act, error or omission on the Insured's part.

e) reimburse the Insured for time and expenses reasonably incurred by the Insured for their attendance at examination for discovery and the trial or hearing to determine their liability on the Claim. For the purpose of this sub-clause e), reimbursement for time shall be for actual hours in attendance at discovery and trial and shall be limited to 75% of the customary billing rate, or CAD200.00 per hour, whichever is less. The maximum aggregate amount that the Insurer will pay under this sub-clause e) is CAD25, 000.00.

f) reimburse the Insured for legal expenses reasonably incurred in the defence of a disciplinary proceeding brought against the Insured by their professional association with respect to Professional Services usual to the Insured's Business as stated in Item 3 of the Declarations. The maximum aggregate amount that the Insurer will pay under this sub-clause f) is CAD 50,000.00.

g) reimburse the Insured for legal expenses reasonably incurred in the defence of a proceeding under an Occupational Health and Safety Act with respect to Professional Services, usual to the Insured's Business as stated in Item 3 of the Declarations, which are provided to others. The maximum aggregate amount that the Insurer will pay under this sub-clause g) is CAD 50,000.00. The Insurer however will not pay any and all legal expenses incurred by others and assessed against the Insured in such a proceeding.

Amounts payable under Supplementary Payments are included within the Limit of Liability as stated in Items 5a and 5b of the Declarations.

DEFINITIONS

a) "Insured" shall mean:

i) the Insured as stated in Item 1 of the Declarations;
ii) any person who is or was a partner, officer, director, stockholder or employee of the Insured but only while acting within the scope of his/her professional capacity on behalf of the Insured during the period of such service with the Insured;
iii) personnel on loan to the Insured and contract employees under personal services contracts who perform the normal services of the Insured while under the direct supervision and control of the Insured;
iv) the legal heir, executor, administrator and legal representative of the Insured, as defined in i) and ii) above, in the event of death, incapacity or bankruptcy, but only with respect to the liability arising out of Professional Services rendered by, and prior to such Insured's death, incapacity or bankruptcy.

b) "Claim" shall mean:

i) a written or oral demand for money or services; or
ii) a written or oral allegation of breach in the rendering or failure to render Professional Services; or
iii) a written or oral allegation of an error, omission or negligent act in the performance of Professional Services; or
iv) a circumstance, dispute or controversy which a reasonable person might expect or should foresee could subsequently give rise to a Claim.

All Claims arising from a single error, omission or negligent act shall be considered a single Claim regardless of the number of Insureds, the number of persons or organizations making a Claim or the number of civil suits or arbitration proceedings in which the Claims are made.

All allegations of breaches in the rendering or failure to render Professional Services or errors, omissions or negligent acts contained in a Statement of Claim, Notice of Action, Counterclaim, Crossclaim, Third or Subsequent Party Claim, Application or submission to arbitration shall be considered a single Claim regardless of the number of parties to a civil or arbitration proceeding.

c) "Damages" shall mean:

Compensatory damages, including pre-judgement interest, payable to claimants but does not include fines, penalties (whether contractual or other), punitive or exemplary damages, or fees which have either not been paid to the Insured or which the Insured is asked to return.

d) "Act of Terrorism" shall mean an activity that:

i) involves a violent act or the unlawful use of force or an unlawful act dangerous to human life, tangible or intangible property or infrastructure, or a threat thereof; and

ii) appears to be intended to:

a. intimidate or coerce a civilian population; or
b. disrupt any segment of the economy of a government de jure or de facto, state, or country; or
c. overthrow, influence or affect the conduct or policy of any government de jure or de facto by intimidation or coercion; or
d. affect the conduct of a government de jure or de facto by mass destruction, assassination, kidnapping or hostage taking.

e) "Nuclear Energy Hazard" shall mean:

the radioactive, toxic, explosive or other hazardous properties of Radioactive Material.

f) "Radioactive Material" shall mean:

uranium, thorium, plutonium, neptunium, their respective derivatives and compounds, radioactive isotopes of other elements and any other substances which may designated by or pursuant to any law, act or statute or law amendatory thereof as being prescribed substances capable or releasing atomic energy, or as being requisite for the production, use or application of atomic energy.

g) "Nuclear Facility" shall mean:

i) any apparatus designed or used to sustain nuclear fission in a self-supporting chain reaction or to contain a critical mass of plutonium, thorium and uranium or any one or more of them;
ii) any equipment or device designed or used for:
a. separating the isotopes of plutonium, thorium and uranium or any one or more of them; or
b. processing or utilizing spent fuel; or
c. handling, processing or packaging waste;

iii) any equipment or device used for the processing, fabricating or alloying of plutonium, thorium or uranium enriched in the isotope uranium 233 or in the isotope uranium 235, or any one or more of them if at any time the total amount of such material in the custody of the Insured at the premises where such equipment or device is located consists of or contains more than 25 grams of plutonium or uranium 233 or any combination thereof, or more than 250 grams of uranium 235;
iv) any structure, basin, excavation, premises or place prepared or used for the storage or disposal of waste Radioactive Material;

and includes the site on which any of the foregoing is located, together with all operations conducted thereon and all premises used for such operations.

h) "Fissionable Substance" shall mean:

any prescribed substance that is, or from which can be obtained, as a substance capable of releasing atomic energy by nuclear fission.

i) "Documents" shall mean:

deeds, wills, agreements, maps, plans, records, written or printed Documents and/or forms of any nature whatsoever (excluding, however, any bearer bonds or coupons, bank or currency notes or other negotiable paper) used in connection with the Insured's Business as stated in Item 3 of the Declarations.

j) "Professional Services" shall mean:

only those services that the Insured is legally qualified to perform and which are usual to the conduct of the Insured's Business as stated in Item 3 of the Declarations.

EXCLUSIONS

This Insurance does not cover any liability, Damages, Supplementary Payments, Investigation or defence costs or any other expense, whatsoever arising out of:

a) any Claim based upon or arising out of any goods, products or projects for which the installation, construction, alterations, repairs, fabrication, supply or distribution is provided by the Insured or any enterprise that any Insured controls, manages, operates or holds ownership in, or by any enterprise that controls, manages, operates or holds ownership in the Insured, unless such Claim is a direct result of the negligent design and/or negligent specification by the Insured in the exercise and conduct of the Insured's Business as stated in Item 3 of the Declarations.

b) bodily injury, sickness, disease or death sustained by any person arising out of and in the course of his employment by the Insured or under a contract of service or apprenticeship with the Insured.

c) any Claim made against the Insured as the result of any dishonest, malicious or illegal acts of any present or previous employee, director, principal or partner of the Insured, however, this exclusion shall not apply with respect to any Insured who is neither the author of said act nor an accomplice unless they had knowledge of such acts.

d) the ownership, use, occupation or leasing of property mobile and/or immobile by, to or on the behalf of the Insured.

e) any Claim made against the Insured by or on behalf of any business enterprise that is wholly or partly owned by an Insured or by a business enterprise that owns or partly owns an Insured or by any employee, director, officer or partner of any such business enterprise unless emanating from independent third parties. However, this exclusion e) shall not apply if the interest held by any party is 25% or less.

f) any Claim, circumstance or occurrence:

i) which has been notified to the Insurer(s) on any other Policy of insurance effected prior to the inception of this Policy;
ii) known to the Insured prior to the inception of this Policy.

g) any Claim arising out of seepage, pollution or contamination of any kind except to the extent that the Insured can demonstrate that such seepage, pollution or contamination was:

i) the direct result of a negligent act, error or omission in the performance or failure to perform Professional Services usual to the Insured's Business as stated in Item 3 of the Declarations; and
ii) not the result of the Insured failing to take reasonable precautions to prevent such seepage, pollution or contamination.

Provided always that no indemnity is granted against liability arising out of seepage, pollution or contamination of any kind where the Claim or suit is brought outside of Canada.

h) the giving by the Insured of any express warranty or guarantee which increases the Insured's liability, but this exclusion shall not apply to:

i) liability which would have attached to the Insured in the absence of such express warranty or guarantee.
ii) the issuance of records of site conditions or other similar documents attesting to the environmental condition of a property or to services performed as a Registered Code Agent under Ontario Bill 124 or similar legislation in other provinces dealing with the condition of sewage/septic systems.

i) any financial estimates of probable construction costs, estimates of profit, return on capital, economic return or other estimates giving rise to forecasts of economic return.

j) any award of punitive or exemplary damages, or any fines or penalties (whether contractual or other), except that if an action is brought against the Insured for any Claim falling within the coverage which also seeks punitive or exemplary damages, then the Insurer will afford a defence to such action in accordance with the Investigation, Defence and Settlement section of this Policy, but without any liability whatsoever for such punitive or exemplary damages.

k) the administration, receivership, insolvency or bankruptcy of the Insured.

l) all actual or alleged losses, liabilities, Damages, injuries, defence costs, costs or expense(s) directly or indirectly arising out of, contributed by, caused by, resulting from, or in connection with any of the following regardless of any other cause or event contributing concurrently or in any other sequence of the loss:

i) war, invasion, acts of foreign enemies, hostilities or warlike operations (whether war be declared or not), civil war, mutiny, revolution, rebellion, insurrection, uprising, military or usurped power, confiscation by order of any public authority or government de jure or de facto, martial law;
ii) riots, strikes, or civil commotion; or
iii) any Act of Terrorism.

This Policy also excludes from coverage all actual or alleged losses, liabilities, Damages, injuries, defence costs, costs or expenses directly or indirectly arising out of, contributed by, caused by, resulting from, or in connection with any action taken in controlling, preventing, suppressing, retaliating against, or responding to i), ii), and/or iii) above.

If the Insurers allege that by reason of this exclusion any actual or alleged losses, liabilities, Damages, injuries, defence costs, costs or expenses is not covered by this insurance agreement the burden of proving the contrary shall be upon the Insured.

In the event any portion of this exclusion is found to be invalid or unenforceable, the remainder shall remain in full force and effect.

m) i) liability imposed by or arising from any nuclear liability act, law or statute, or any law amendatory thereof;
ii) bodily injury or property damage with respect to which an Insured under this Policy is also insured under a contract of nuclear energy liability insurance (whether the Insured is unnamed in such contract and whether or not it is legally enforceable by the Insured) issued by the Nuclear Insurance Association of Canada or any other Insurer or group or pool of Insurers or would be an Insured under any such Policy but for its termination upon exhaustion of its limit of liability;

iii) bodily injury or property damage resulting directly or indirectly from the Nuclear Energy Hazard arising from:

a. the ownership, maintenance, operation or use of a Nuclear Facility by or on behalf of an Insured;
b. the furnishing by an Insured of services, materials, parts or equipment in connection with the planning, construction, maintenance, operation or use of any Nuclear Facility; and
c. the possession, consumption, use, handling, disposal or transportation of Fissionable Substances, or of other Radioactive Material (except radioactive isotopes, away from a Nuclear Facility, which have reached the final stage of fabrication so as to be useable for any scientific, medical, agricultural, commercial or industrial purpose) used, distributed, handled or sold by an Insured.

n). any Claim which is actually or allegedly, in whole or in part, directly or indirectly arising out of, resulting from, connected to, aggravated by, based upon or attributable to the use of or exposure to asbestos or material or products containing asbestos, unless such Claim was the direct result of a negligent act, error or omission in the performance or the failure to perform Professional Services usual to the Insured's Business as stated in Item 3 of the Declarations.

o) any Claim which is actually or allegedly, in whole or in part, directly or indirectly arising out of, resulting from, connected to, aggravated by, based upon or attributable to the presence, growth, proliferation, spread, or activity of a biological agent, including mould, fungus, spores, mildew, mushrooms, yeast or bio-contaminants or any by-product therefrom, unless such Claim was the direct result of a negligent act, error or omission in the

performance or the failure to perform Professional Services usual to the Insured's Business as stated in Item 3 of the Declarations.

p) the cost to repair or replace faulty workmanship in any construction, erection, fabrication, installation, assembly or manufacturing process performed or provided by an Insured, including materials, parts or equipment furnished in connection therewith.

q) any Professional Services undertaken from an office situated in the United States of America or in any territories which operate under the laws of the United States of America.

r) or where the action is brought in a court of law in the United States of America or any judgment, award, payment, settlement or proceedings are made within territories which operate under the laws of the United States of America or where any order or proceedings are made anywhere in the world to enforce such judgment, award, payment or settlement either in whole or in part.

CONDITIONS

a) **LIMIT OF LIABILITY:**

i) Each Claim Limit

Subject to the provision with respect to the aggregate limit, as stated in Condition a)ii), the Limit of Liability stated in Item 5a of the Declarations is the total Limit of Liability for loss sustained by one or more persons or organizations as a result of any one Claim.

ii) Aggregate

This Policy is subject to an aggregate Limit of Liability as stated in Item 5b of the Declarations. This aggregate Limit of Liability is the maximum amount which will be paid under this Policy for all Claims made and reported during the Policy Period as stated in Item 4 of the Declarations.

b) **DEDUCTIBLE:**

The Deductible, as stated in Item 6 of the Declarations, shall apply to each and every Claim as defined in this Policy.

Amounts payable in the investigation and defence of any Claim and Supplementary Payments, shall be subject to application of the Deductible.

c) **CLAIMS NOTIFICATION:**

Upon receipt by or on behalf of the Insured of notice whether written or oral, of an intention by any person or body to make a Claim against the Insured or of any allegation of any negligent act, error or omission which might give rise to such a Claim, or on the discovery of any such negligent act, error or omission, the Insured, as a condition precedent to any indemnity being granted under this Policy, shall notify the person(s) named for that purpose under Notice of Loss as stated in Item 12 of the Declarations, for transmission to the Insurer as soon as reasonably practicable, but in no event later than the end of the Policy Period or the Extended Reporting Period if applicable, and shall provide full information respecting such knowledge.

If during the Policy Period, the Insured shall become aware of any circumstance or occurrence which may subsequently give rise to a Claim against them by reason of any negligent act, error or omission, the Insured, as a condition precedent to any indemnity being granted under this Policy, shall, during the Policy Period and as soon as reasonably practicable, but in no event later than the end of the Policy Period or the Extended Reporting Period if applicable, give written notice of such circumstance or occurrence to the person(s) named for that purpose under Notice of Loss as stated in Item 12 of the Declarations, for transmission to the Insurer. Any Claim which may subsequently be made against the Insured arising out of that negligent act, error or omission shall be deemed for the purpose of this insurance to have been made during this Policy Period.

d) **RETROACTIVE DATE:**

Where a retroactive date is specified in Item 8 of the Declarations, this insurance will not apply to Claims made against the Insured by reason of any negligent act, error or omission committed or alleged to have been committed prior to the said retroactive date.

e) **OTHER INSURANCE:**

Should a Claim arise for which the Insured is or would, but for the existence of this Policy, be entitled to indemnity under any other Policy or Policies, the Insurer shall not be liable except in respect of any excess beyond the amount which would have been payable under such other Policy or Policies had this Policy not been in effect.

f) **SUBROGATION:**

If any payment is made under this Policy in respect of a Claim hereunder, the Insurer is thereupon subrogated to all the Insured's rights of recovery thereto. However, the Insurer shall not exercise any such rights against any employee or former employee of the Insured unless the Claim has been brought about or contributed to by any dishonest, fraudulent, criminal or malicious act of the employee, it being understood that the Insurer shall at all times retain all the Insured's rights of recovery against any person or party who is not an employee of the Insured or former employee of the Insured.

g) **FRAUDULENT CLAIMS:**

If the Insured shall make any Claim knowing the Claim to be false or fraudulent, as regards amount or otherwise, such Claim will be excluded from coverage and this Policy shall be immediately cancelled.

h) **CANCELLATION OR TERMINATION:**

This Policy can be cancelled by the Insured by returning the Policy to the Authorized Representative of the Insurer as stated in Item 13 of the Declarations. The Insured can also cancel the Policy by written notice to the Authorized Representative of the Insurer as stated in Item 13 of the Declarations stating at what future date cancellation is to be effective. If the Insured cancels, earned premium shall be computed using the customary short rate table.

This Policy may be cancelled or terminated by the Authorized Representative of the Insurer as stated in Item 13 of the Declarations by mailing by registered post to the Insured at the address stated in the Declarations, written notice stating when such cancellation or termination shall be effective.

In the event that the Authorized Representative of the Insurer cancels the Policy,

i) because the Insured has failed to pay the premium when due; or
ii) because the Insured has failed to pay the applicable Deductible;

fifteen (15) days notice of cancellation will be given to the Authorized Representative of the Insurer as stated in Item 13 of the Declarations. In all other cases not less than the number of days notice of cancellation indicated in item 10.0 of the Declarations will be given to the Insured.

In the event of cancellation or termination of this Policy by the Authorized Representative of the Insurer as stated in Item 13 of the Declarations, earned premium shall be calculated on a pro-rata basis. Premium adjustment may be made either at the time of cancellation or termination is effected or as soon as practicable after cancellation or termination becomes effective, but payment or tender of unearned premium is not a condition of cancellation or termination.

i) **CHANGES:**

Notice to any Agent and/or Broker or knowledge possessed by any Agent and/or Broker or by any other person shall not effect a waiver or a change in any part of this Policy or estop the Insurer from asserting any right under the terms of this Policy; nor shall the terms of this Policy be waived or changed except by endorsement issued to form a part of this Policy, signed by a duly Authorized Representative of the Insurer.

j) **AUDIT:**

The Authorized Representative of the Insurer may examine and audit the Insured's books and records at any time during the Policy Period and within three (3) years after the final termination, cancellation or expiry of this Policy as far as they are related to this Policy.

k) **DECLARATIONS:**

By acceptance of this Policy, the Insured agrees:

i) that the application shall be considered a part of this Policy as though physically attached hereto and that the statements therein and those stated in the Policy Declarations are the Insured's agreements and representations; and
ii) that this Policy is issued in reliance upon the truth of such representations; and
iii) that this Policy shall not apply to any Claims or suits which arise out of any allegations, circumstances or Claims known to the Insured prior to the issuance of this Policy or for any other Claims or circumstances which are disclosed in the application; and
iv) that this Policy embodies all agreements existing between the Insured and the Insurer or any of their agents relating to this Policy.

l) **DISPUTE:**

This Policy shall be governed by the applicable Canadian Law unless otherwise stated to the contrary. If any dispute arises in connection with the formulation, validity or interpretation of this Policy, it is understood and agreed by both the Insured and Insurer that the dispute will be referred to non-binding mediation at a convenient venue for both parties (failing agreement on this, the mediation shall be held in Toronto, Ontario). Mediation shall be initiated by the delivery of a written notice of request for mediation by one party to the other. Each party shall bear the expenses of its own presentation and shall jointly and equally bear with the other party the expenses of the mediation. Failing mutual agreement on a suitable mediator, a mediator shall be appointed by application to the President of the provincial Law Society where the Insured is situated.

If mediation cannot resolve the dispute then such dispute shall be submitted to the exclusive jurisdiction of the Provincial courts where the Insured is situated. Both parties agree to comply with all requirements necessary to give such court jurisdiction. All matters arising hereunder shall be determined in accordance with the law and practice of such court.

m) **TERMS OF POLICY CONFORMED TO STATUTE:**

Any term, condition, limitation or exclusion of this Policy which is in conflict with the laws of the province or territory in which this Policy is delivered, are hereby amended to conform to such laws.

n) **ASSIGNMENT:**

No assignment or transfer of any Insured's rights under this Policy shall bind the Insurers.

EXTENSIONS

a) **LOSS OF DOCUMENTS**

If during the Policy Period the Insured shall discover, and shall within seven (7) days of the date of discovery give written notice thereof to the Authorized Representative of the Insurer stated in Item 10 of the Declarations, that any Documents, the property of, or entrusted to, the Insured which now or hereafter are, or by them supposed, or believed to be in their hands or in the hands of any other party or parties to or with whom such Documents have been entrusted, lodged or deposited by the Insured in the ordinary course of business, have whilst within the territorial limits been destroyed or damaged or lost or mislaid and after diligent search cannot be found, this Policy shall pay on behalf of the Insured for:

i) any liabilities of whatsoever nature which they may incur to third parties in consequence of such Documents having been so destroyed, damaged, lost or mislaid;
ii) all reasonable costs, charges and expenses of whatsoever nature incurred by the Insured in replacing and/or restoring such Documents;

provided always that:

a. the amount of any Claim for costs and expenses as above shall be supported by bills and/or accounts, which shall be subject to approval by some competent person to be nominated by the Insurer with the approval of the Insured;
b. no liability shall attach hereto for any loss brought about or contributed to by the dishonesty of any of the Insured's Partners, Directors, Officers or employees;

c. on payment of any loss hereunder, the Insured shall subrogate to the Insurer their right of procedure against any other person or persons for recovery thereof;
d. notwithstanding the Deductible amount as set forth in the Declarations, all Claims to which this Extension applies are subject to a Deductible of CAD1,000.00;
e. this Insurance does not cover any Liability whatsoever arising out of any consequence of war, invasion, act of foreign enemy, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection or military usurped power. This exclusion shall not apply in respect of liability or loss caused by explosive devices provided that no state of war exists in the country where the contract is undertaken.

b) **LIBEL AND SLANDER**

The Insurer agrees to pay on behalf of the Insured all sums which the Insured shall become legally liable to pay as Damages as a result of any Claim or Claims made against the Insured and reported to the Insurer during the Policy Period for Libel and Slander by reason of words written or spoken by:

i) the Insured; or
ii) any partner or previous partner of the Insured; or
iii) any person or party employed, or previously employed, by the Insured;

in or about the conduct of the Insured's Business as stated in Item 3 of the Declarations.

However, this Extension excludes:

a. a publication or utterance of a libel or slander if the first injurious publication or utterance of the same or similar material by or on behalf of the Insured was made prior to the effective date of this Policy;
b. libel or slander or the publication or utterance of defamatory or disparaging material concerning any person or organization or goods, products, or services made by or at the direction of the Insured with the knowledge of the falsity thereof.

c) **BREACH OF COPYRIGHT**

The Insurer will pay on behalf of the Insured all sums which the Insured shall become legally liable to pay as Damages in respect of a Claim first made against the Insured and reported to the Insurer during the Policy Period arising out of and resulting from or based upon or connected with any inadvertent breach of patent, design, trademark, trade name, copyright or action for passing off a product committed by or on behalf of the Insured in or about the conduct of the Insured's Business as stated in Item 3 of the Declarations.

However, this Extension excludes liability for Claims arising by reason of, or in consequence of the suspension or cancellation of registration or other rights or privileges by virtue of which the products are distributed or sold.

d) **DISHONESTY OF EMPLOYEES**

Notwithstanding Exclusion c) and Condition g) of this Policy, the Insurer will pay on behalf of the Insured all sums which the Insured shall become legally liable to pay as Damages in respect of a Claim first made against the Insured and reported to the Insurer during the Policy Period brought about, or contributed to, by any dishonest, fraudulent, criminal or malicious act of any person employed or engaged, or previously employed or engaged, by the Insured. However, this extension excludes any dishonest, fraudulent, criminal or malicious act of any Officer or Partner or Director of the Insured.

e) **BREACH OF CONFIDENTIALITY**

The Insurer will pay on behalf of the Insured all sums which the Insured shall become legally liable to pay as Damages in respect of a Claim first made against the Insured and reported to the Insurer during the Policy Period in respect of an unintentional breach of confidentiality, actionable as such, committed by or on behalf of the Insured in or about the conduct of the Insured's Business as stated in Item 3 of the Declarations.

f) **INNOCENT INSURED**

Whenever coverage under this Policy would be excluded, suspended or lost because of non-compliance with any condition relating to the giving of notice to the Insurer with respect to which any other Insured shall be in default solely because of the failure to give such notice or concealment of such failure by one or more Insureds responsible for the loss or damage otherwise insured hereunder, the Insurer agrees that such insurance as would otherwise be afforded under this Policy shall cover and be paid with respect to those Insureds who did not

personally commit or personally participate in committing or personally acquiesce in or remain passive after having personal knowledge of:

i) one or more of the acts, errors omissions described in any such exclusion; or
ii) such failure to give notice;

provided that if the condition be one with which such Insured can comply, after receiving knowledge thereof, the Insured entitled to the benefit of Condition d) COOPERATION OF THE INSURED shall comply with such condition promptly after obtaining knowledge of the failure of any other Insured to comply therewith.

With respect to this provision, the Insurer's obligation to pay in such event shall be in excess of the Deductible and in excess of the full extent of any assets of any Insured to whom the exclusion applies. In no event shall the Insurer's obligation to pay exceed the aggregate Limit of Liability stated in Item 5b of the Declarations.

g) **JOINT VENTURE**

The Insurer will pay on behalf of the Insured all sums which the Insured shall become legally liable to pay as Damages, whether joint or several, arising out of any joint venture or consortium arrangement but only where such liability arises out a Claim first made against the Insured and reported to the Insurer during the Policy Period and is in respect of the Insured's Business as stated in Item 3 of the Declarations whilst a member of the joint venture or consortium arrangement whether or not the joint venture or consortium arrangement is conducted through a separate legal entity.

h) **EXTENDED REPORTING PERIOD**

If this policy is terminated by Insurers for any reason other than for non-payment of premium or fraudulent claims, as per Condition h), the Insured shall have the right to extend the insurance afforded by this policy to apply to Claims first made against the Insured during the period of 30 days following immediately upon the effective date of termination, but only in respect of any negligent act, error or omission committed before such termination date and otherwise covered by this insurance.

Furthermore, the Insured shall have the right:

i) upon payment of an additional premium of 75% of the last annual premium, to extend the insurance afforded by this Policy to apply to Claims first made against the Insured during the period of twelve (12) months;
ii) upon payment of an additional premium of 125% of the last annual premium, to extend the insurance afforded by this Policy to apply to Claims first made against the Insured during the period of twenty four (24) months;
iii) upon payment of an additional premium of 150% of the last annual premium, to extend the insurance afforded by this Policy to apply to Claims first made against the Insured during the period of thirty six (36) months;

following immediately the termination date, but only in respect of any negligent act, error or omission committed before such termination date and otherwise covered by this insurance.

This right to purchase the extended reporting period must be exercised by notice in writing to the Authorized Representative of the Insurer as stated in Item 13 of the Declarations not later than thirty (30) days after the termination date of this Policy and must include the additional premium required thereof. If such notice and premium payment are not given to the Authorized Representative of the Insurer as stated in Item 13 of the Declarations, the Insured shall not at a later date be able to exercise such right.

The Limit of Liability hereunder shall not in any way be increased by virtue of this extended reporting period. This extended reporting period shall immediately terminate on the effective date of any other insurance which replaces the coverage afforded by such extended reporting period.

i) **REPUTATION PROTECTION**

The Insurer will pay on behalf of the Insured reasonable fees, costs and expenses, incurred with the Insurer's prior written consent in retaining a public relations consultant for the sole purpose of protecting the Insured's professional reputation in connection with any Claim covered by this Policy.

The maximum amount payable by Insurers under this Extension shall be CAD 50,000.00 in the aggregate which shall be part of and not in addition to the Limit of Liability as stated in Item 5b of the Declarations.

j) **COMPUTER COVERAGE**

The Insurer will pay on behalf of the Insured all sums which the Insured shall become legally liable to pay as Damages in respect of a Claim first made against the Insured and reported to the Insurer during the Policy Period arising out of computer services that constitute part of the Professional Services that are performed by the Insured In or about the Insured's Business as stated in Item 3 of the Declarations. These services include computer services that are in connection with proposed or actual construction projects from feasibility studies to design, to construction, to the commissioning and the provision of such computer services or software to others.

k) **INTELLECTUAL PROPERTY RIGHTS INFRINGEMENT**

The Insurer will pay on behalf of the Insured all sums which the Insured shall become legally liable to pay as Damages in respect of a Claim first made against the Insured and reported to the Insurer during the Policy Period arising out of the Insured's infringement of any intellectual property right in or about the conduct of the Insured's Business as stated in Item 3 of the Declarations.

THE FOLLOWING ARE IN RESPECT OF CERTAIN UNDERWRITERS AT LLOYD'S PARTICIPATION:

SEVERAL LIABILITY CLAUSE

PLEASE NOTE – This notice contains important information. PLEASE READ CAREFULLY

The liability of an insurer under this contract is several and not joint with other insurers party to this contract. An insurer is liable only for the proportion of liability it has underwritten. An insurer is not jointly liable for the proportion of liability underwritten by any other insurer. Nor is an insurer otherwise responsible for any liability of any other insurer that may underwrite this contract.

The proportion of liability under this contract underwritten by an insurer (or, in the case of a Lloyd's syndicate, the total of the proportions underwritten by all the members of the syndicate taken together) is shown in this contract. In the case of a Lloyd's syndicate, each member of the syndicate (rather than the syndicate itself) is an insurer. Each member has underwritten a proportion of the total shown for the syndicate (that total itself being the total of the proportions underwritten by all the members of the syndicate taken together). The liability of each member of the syndicate is several and not joint with other members. A member is liable only for that member's proportion. A member is not jointly liable for any other member's proportion. Nor is any member otherwise responsible for any liability of any other insurer that may underwrite this contract. The business address of each member is Lloyd's, One Lime Street, London EC3M 7HA. The identity of each member of a Lloyd's syndicate and their respective proportion may be obtained by writing to Market Services, Lloyd's, at the above address.

Although reference is made at various points in this clause to "this contract" in the singular, where the circumstances so require this should be read as a reference to contracts in the plural.

LMA5096 (Combined Certificate)

SERVICE OF SUIT CLAUSE (CANADA)
(Action against Insurer)

In any action to enforce the obligations of the Underwriters they can be designated or named as "Lloyd's Underwriters" and such designation shall be binding on the Underwriters as if they had each been individually named as defendant. Service of such proceedings may validly be made upon the Attorney In Fact in Canada for Lloyd's Underwriters, whose address for such service is 1155, rue Metcalfe, Suite 2220, Montreal, Quebec, H3B 2V6.

LMA5028

INSURE IN CANADA A RISK

For Purpose of the Insurance Companies Acts (Canada), this documentation was issued in the course of Lloyds Underwriters Insurance business in Canada

LSW 1669

SANCTION LIMITATION AND EXCLUSION CLAUSE

No (re)insurer shall be deemed to provide cover and no (re)insurer shall be liable to pay any claim or provide any benefit hereunder to the extent that the provision of such cover, payment of such claim or provision of such benefit would expose that (re)insurer to any sanction, prohibition or restriction under United Nations resolutions or the trade or economic sanctions, laws or regulations of the European Union, United Kingdom or United States of America.

15/09/10
LMA3100

NOTICE CONCERNING PERSONAL INFORMATION

How we use your information

By purchasing insurance from certain Underwriters at Lloyd's, London ("Lloyd's"), a customer provides Lloyd's with his or her consent to the collection, use and disclosure of personal information. Consent is subject to the customer's understanding of the nature, purpose and consequences of the collection, use or disclosure of their personal information.

Information is collected and stored for the following purposes:

- the communication with Lloyd's policyholders
- the underwriting of policies
- the evaluation of claims
- the analysis of business results
- purposes required or authorized by law

What personal information we collect about you

We collect, process and store the following personal information about you:

- Name
- Address including postal code and country
- Policy number
- Claim number
- Credit card details
- Bank account details

We also collect information about you when you visit www.lloyds.com. Further details can be found on our online Privacy & Cookies policy at http://www.lloyds.com/common/privacy-and-cookies-statement.

We will not use your personal information for marketing purposes and we will not sell your personal information to other parties.

Who we disclose your information to

For the purposes identified, personal information may be disclosed to Lloyd's related or affiliated organisations or companies, their agents/mandataires, and to certain non-related or unaffiliated organisations or companies, including service providers. These entities may be located outside Canada therefore a customer's information may be processed in a foreign jurisdiction (the United Kingdom and the European Union) and their information may be accessible to law enforcement and national security authorities of that jurisdiction.

Disclosure without consent

The following are reasonable grounds to permit the disclosure of personal information without the knowledge or consent of a customer:

- Detecting or suppressing fraud

- Investigating or preventing financial abuse
- For communication with the next to kin or authorized representative of an injured, ill or deceased individual
- Investigating a breach of an agreement or a contravention of the laws of Canada or a foreign jurisdiction
- Witness statement necessary to assess, process or settle insurance claims
- Information produced in the course of employment and the disclosure is consistent with the purpose it was produced for

How to access your information and/or contact us

To access and request correction or deletion of your information, or to obtain written information about Lloyd's policies and practices in respect of service providers located outside Canada, please contact the Ombudsman at info@lloyds.ca. The Ombudsman will also answer customer's questions about the collection, use, disclosure or storage of their personal information by such Lloyd's service providers.

Further information about Lloyd's personal information protection policy may be obtained from the customer's broker or by contacting Lloyd's on: 514 861 8361, 1 877 455 6937, or through info@lloyds.ca.

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LSW1543C

LLOYD'S UNDERWRITERS' POLICYHOLDERS' COMPLAINT PROTOCOL

Lloyd's strives to enhance your customer experience with us through superior service and innovative insurance products.

We have developed a formal complaint handling protocol in accordance with the Insurance Companies Act of Canada to ensure your concerns as our valued customer are addressed expeditiously by our representatives. This protocol will assist you in understanding the steps we will undertake to help resolve any dispute which may arise with our product or service. All complaints will be handled in a professional manner. All complaints will be investigated, acted upon, and responded to in writing or by telephone by a Lloyd's representative promptly after the receipt of the complaint. If you are not satisfied with our products or services, you can take the following steps to address the issue:

- Firstly, please contact the broker who arranged the insurance on your behalf about your concerns so that he or she may have the opportunity to help resolve the situation.

- If your broker is unable to help resolve your concerns, we ask that you provide us in writing an outline of your complaint along with the name of your broker and your policy number.

Please forward your complaint to:

Lloyd's Underwriters

Attention: Complaints Officer:

1155 rue Metcalfe, Suite 2220, Montréal (Québec) H3B 2V6

Tel: 1-877-455-6937 - Fax: (514) 861-0470

E-mail: info@lloyds.ca

Your complaint will be directed to the appropriate business contact for handling. They will write to you within two business days to acknowledge receipt of your complaint and to let you know when you can expect a full response. If need be, we will also engage internal staff in Lloyd's Policyholder and Market Assistance Department in London, England, who will respond directly to you, and in the last stages, they will issue a final letter of position on your complaint.

In the event that your concerns are still not addressed to your satisfaction**,** you have the right to continue your pursuit to have your complaint reviewed by the following organizations:

General Insurance OmbudService (GIO) assists in the resolution of conflicts between insurance customers and their insurance companies. The GIO can be reached at:

Toll free number: 1-877-225-0446

www.giocanada.org

For Quebec clients:

Autorité des marchés financiers (AMF). The regulation of insurance companies in Quebec is administered by the AMF. If you remain dissatisfied with the manner in which your complaint has been handled, or with the results of the complaint protocol, you may send your complaint to the AMF who will study your file and who may recommend mediation, if it deems this action appropriate and if both parties agree to it. The AMF can be reached at

Toll Free: 1-877-525-0337

Québec: (418) 525-0337

Montréal: (514) 395-0311

www.lautorite.qc.ca

If you have a complaint specifically about Lloyd's Underwriters' complaints handling procedures you may contact the Financial Consumer Agency of Canada (FCAC).

Financial Consumer Agency of Canada (FCAC) provides consumers with accurate and objective information about financial products and services, and informs Canadians of their rights and responsabilities when dealing with financial institutions. FCAC also ensures compliance with the federal consumer protection laws that apply to banks and federally incorporated trust, loan and insurance companies. The FCAC does not get involved in individual disputes. The FCAC can be reached at:

427 Laurier Avenue West, 6th Floor, Ottawa ON K1R 1B9

Services in English: 1-866-461-FCAC (3222)

Services in French: 1-866-461-ACFC (2232)

www.fcac-acfc.gc.ca

09/14
LSW1542F

Code of Consumer Rights and Responsibilities

Insurers (including Lloyd's Underwriters), along with the brokers and agents who sell home, auto and business insurance are committed to safeguarding your rights both when you shop for insurance and when you submit a claim following a loss. Your rights include the right to be informed fully, to be treated fairly, to timely complaint resolution, and to privacy. These rights are grounded in the contract between you and your insurer and the insurance laws of your province. With rights, however, come responsibilities including, for example, the expectation that you will provide complete and accurate information to your insurer. Your policy outlines other important responsibilities. Insurers and their distribution networks, and governments also have important roles to play in ensuring that your rights are protected.

Right to Be Informed

You can expect to access clear information about your policy, your coverage, and the claims settlement process. You have the right to an easy-to-understand explanation of how insurance works and how it will meet your needs. You also have a right to know how insurers calculate price based on relevant facts. Under normal circumstances, insurers will advise an insurance customer or the customer’s intermediary of changes to, or the cancellation of a policy within a reasonable prescribed period prior to the expiration of the policy, if the customer provides information required for determining renewal terms of the policy within the time prescribed, which could vary by province, but is usually 45 days prior to expiry of the policy.

You have the right to ask who is providing compensation to your broker or agent for the sale of your insurance. Your broker or agent will provide information detailing for you how he or she is paid, by whom, and in what ways.

You have a right to be told about insurers' compensation arrangements with their distribution networks. You have a right to ask the broker or agent with whom you deal for details of how and by whom it is being paid. Brokers and agents are committed to providing information relating to ownership, financing, and other relevant facts.

Responsibility to Ask Questions and Share Information

To safeguard your right to purchase appropriate coverage at a competitive price, you should ask questions about your policy so that you understand what it covers and what your obligations are under it. You can access information through one-on-one meetings with your broker or agent. You have the option to shop the marketplace for the combination of coverages and service levels that best suits your insurance needs. To maintain your protection against loss, you must promptly inform your broker or agent of any change in your circumstances.

Right to Complaint Resolution

Insurers, their brokers and agents are committed to high standards of customer service. If you have a complaint about the service you have received, you have a right to access Lloyd's Underwriters' complaint resolution process for Canada. Your agent or broker can provide you with information about how you can ensure that your complaint is heard and promptly handled. Consumers may also contact their respective provincial insurance regulator for information. Lloyd's is a member of an independent complaint resolution office, the General Insurance OmbudService.

Responsibility to Resolve Disputes

You should always enter into the dispute resolution process in good faith, provide required information in a timely manner, and remain open to recommendations made by independent observers as part of that process.

Right to Professional Service

You have the right to deal with insurance professionals who exhibit a high ethical standard, which includes acting with honesty, integrity, fairness and skill. Brokers and agents must exhibit extensive knowledge of the product, its coverages and its limitations in order to best serve you.

Right to Privacy

Because it is important for you to disclose any and all information required by an insurer to provide the insurance coverage that best suits you, you have the right to know that your information will be used for the purpose set out in the privacy statement made available to you by your broker, agent or insurance representative. This information will not be disclosed to anyone except as permitted by law. You should know that Lloyd's Underwriters are subject to Canada's privacy laws - with respect to their business in Canada.

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LSW1565C

COMPLIANCE WITH THE LAW

Without prejudice to any of the rights or obligations otherwise specified in the Agreement, the Coverholder shall ensure that all acts necessary under the law applicable for the legal and proper handling of all insurances bound or intended to be bound shall be carried.

IDENTIFICATION OF INSURER/ACTION AGAINST INSURER

This insurance has been entered into in accordance with the authorization granted to the Coverholder by the Underwriting Members of the Syndicates whose definitive numbers and proportions are shown in the Table attached to the Agreement shown in the List of Subscribing Companies (hereinafter referred to as the 'the Underwriters"). The Underwriters shall be liable hereunder each for his own part and not one for another in proportion to the several sums that each of them has subscribed to the said Agreement.

In any action to enforce the obligation of the Underwriters they can be designated or named as "Lloyd's Underwriters" and such designation shall be binding on the Underwriters as if they had each been individually named as defendant. Service of such proceedings may validly be made upon the Attorney In Fact for Lloyd's Underwriters, whose address for such service is 1155 rue Metcalfe, suite 2220, Montreal, Quebec, H3B 2V6.

NOTICE

Any notice to the Underwriters may be validly given to the Coverholder.

07/05
LSW1550

CYBER LIMITED EXCLUSION AND DATA EXCLUSION for Professional Indemnity

(for use on non-US professional indemnity policies)

1 This Policy excludes any actual or alleged loss, damage, liability, claim, fine, penalty, cost (including, but not limited to, defence cost and mitigation cost) or expense of whatsoever nature directly or indirectly caused by, contributed to by, resulting from, arising out of or in connection with:

1.1 a **Cyber Incident,** unless subject to the provisions of paragraph 3;

1.2 a **Cyber Act**; or

1.3 a breach of **Data Protection Law** by the Insured, or parties acting for the Insured, involving access to, processing of, use of or operation of any **Computer System** or **Data,** including notification costs, crisis consultancy costs, credit monitoring expenses, replacement of actual credit or payment cards, forensic expenses, public relations expenses or legal advice and services.

2 Any cover for the costs of reconstituting or recovering lost or damaged documents owned or controlled by the Insured in this Policy shall not apply to **Data**.

3. Subject to all the terms, conditions, limitations and exclusions of this Policy or any endorsement thereto, sub-paragraph 1.1 shall not apply to any otherwise covered claim arising out of any actual or alleged breach of Professional Duty by the Insured involving access to, processing of, use of or operation of any **Computer System** or **Data** unless such actual or alleged breach of Professional Duty by the Insured is caused by, contributed to by, resulting from, arising out of or in connection with a **Cyber Act**.

Definitions

4 **Cyber Act** means an unauthorised, malicious or criminal act or series of related unauthorised, malicious or criminal acts, regardless of time and place, or the threat or hoax thereof involving access to, processing of, use of or operation of any **Computer System**.

5 **Cyber Incident** means:

5.1 any error or omission or series of related errors or omissions involving access to, processing of, use of or operation of any **Computer System**; or

5.2 any partial or total unavailability or failure or series of related partial or total unavailability or failures to access, process, use or operate any **Computer System**.

6 **Computer System** means any computer, hardware, software, communications system, electronic device (including, but not limited to, smart phone, laptop, tablet, wearable device), server, cloud or microcontroller including any similar system or any configuration of the aforementioned and including any associated input, output, data storage device, networking equipment or back up facility, owned or operated by the Insured or any other party.

7 **Data** means information, facts, concepts, code or any other information of any kind that is recorded or transmitted in a form to be used, accessed, processed, transmitted or stored by a **Computer System**.

8 **Data Protection Law** means all applicable data protection and privacy legislation, regulations in any country, province, state, territory or jurisdiction which governs the use, confidentiality, integrity, security and protection of personal data, and any guidance or codes of practice issued by any data protection regulator or authority from time to time (all as amended, updated or re-enacted from time to time).

LMA5531
17 December 2020

Named Insured: R Squared environmental Inc.
Policy Number: PI-ENV-32131-001
Effective Date: May 31, 2022

For insurance policies issued to Named Insureds in the provinces of Alberta and British Columbia, please refer to the Statutory Conditions applicable to your Province(s).

Statutory Conditions - Alberta
(applicable in the province of Alberta). Subject to certain exceptions set out in the Insurance Act and regulations thereunder, the Statutory Conditions are deemed to be part of every contract of insurance in force in the province of Alberta. (**Statutory Conditions** 1 and 6 to 13 apply only to contracts that include insurance against loss or damage to property).

1. Misrepresentation

If a person applying for insurance falsely describes the property to the prejudice of the insurer, or misrepresents or fraudulently omits to communicate any circumstance that is material to be made known to the insurer in order to enable it to judge the risk to be undertaken, the contract is void as to any property in relation to which the misrepresentation or omission is material.

2. Property of Others

The insurer is not liable for loss or damage to property owned by a person other than the insured unless

(a) otherwise specifically stated in the contract, or

(b) the interest of the insured in that property is stated in the contract.

3. Change of Interest

The insurer is liable for loss or damage occurring after an authorized assignment under the *Bankruptcy and Insolvency Act* (Canada) or a change of title by succession, by operation of law or by death.

4. Material Change in Risk

(1) The insured must promptly give notice in writing to the insurer or its agent of a change that is

(a) material to the risk, and

(b) within the control and knowledge of the insured.

(2) If an insurer or its agent is not promptly notified of a change under subparagraph (1) of this condition, the contract is void as to the part affected by the change.

(3) If an insurer or its agent is notified of a change under subparagraph (1) of this condition, the insurer may

(a) terminate the contract in accordance with Statutory Condition 5, or

(b) notify the insured in writing that, if the insured desires the contract to continue in force, the insured must, within 15 days after receipt of the notice, pay to the insurer an additional premium specified in the notice.

(4) If the insured fails to pay an additional premium when required to do so under subparagraph (3)(b) of this condition, the contract is terminated at that time and Statutory Condition 5(2)(a) applies in respect of the unearned portion of the premium.

5. Termination of Insurance

(1) The contract may be terminated

(a) by the insurer giving to the insured 15 days' notice of termination by registered mail or 5 days' written notice of termination personally delivered, or

(b) by the insured at any time on request.

(2) If the contract is terminated by the insurer,

(a) the insurer must refund the excess of premium actually paid by the insured over the prorated premium for the expired time, but in no event may the prorated premium for the expired time be less than any minimum retained premium specified in the contract, and

(b) the refund must accompany the notice unless the premium is subject to adjustment or determination as to amount, in which case the refund must be made as soon as practicable.

(3) If the contract is terminated by the insured, the insurer must refund as soon as practicable the excess of premium actually paid by the insured over the short rate premium for the expired time specified in the contract, but in no event may the short rate premium for the expired time be less than any minimum retained premium specified in the contract.

(4) The 15-day period referred to in subparagraph (1)(a) of this condition starts to run on the day the registered letter or notification of it is delivered to the insured's postal address.

6. Requirements After Loss

(1) On the happening of any loss or damage to insured property, the insured must, if the loss or damage is covered by the contract, in addition to observing the requirements of Statutory Condition 9,

(a) immediately give notice in writing to the insurer,

(b) deliver as soon as practicable to the insurer a proof of loss in respect of the loss or damage to the insured property verified by statutory declaration

(i) giving a complete inventory of that property and showing in detail quantities and costs of that property and particulars of the amount of loss claimed,

(ii) stating when and how the loss occurred, and if caused by fire or explosion due to ignition, how the fire or explosion originated, so far as the insured knows or believes,

(iii) stating that the loss did not occur through any wilful act or neglect or the procurement, means or connivance of the insured,

(iv) stating the amount of other insurances and the names of other insurers,

(v) stating the interest of the insured and of all others in that property with particulars of all liens, encumbrances and other charges on that property,

(vi) stating any changes in title, use, occupation, location, possession or exposure of the property since the contract was issued, and

(vii) stating the place where the insured property was at the time of loss,

(c) if required by the insurer, give a complete inventory of undamaged property showing in detail quantities and cost of that property, and

(d) if required by the insurer and if practicable,

(i) produce books of account and inventory lists,

(ii) furnish invoices and other vouchers verified by statutory declaration, and

(iii) furnish a copy of the written portion of any other relevant contract.

(2) The evidence given, produced or furnished under subparagraph (1)(c) and (d) of this condition must not be considered proofs of loss within the meaning of Statutory Conditions 12 and 13.

7. Fraud

Any fraud or wilfully false statement in a statutory declaration in relation to the particulars required under Statutory Condition 6 invalidates the claim of the person who made the declaration.

8. Who May Give Notice and Proof

Notice of loss under Statutory Condition 6(1)(a) may be given and the proof of loss under Statutory Condition 6(1)(b) may be made

(a) by the agent of the insured if

(i) the insured is absent or unable to give the notice or make the proof, and

(ii) the absence or inability is satisfactorily accounted for,

or

(b) by a person to whom any part of the insurance money is payable, if the insured refuses to do so, or in the circumstances described in clause (a) of this condition.

9. Salvage

(1) In the event of loss or damage to insured property, the insured must take all reasonable steps to prevent further loss or damage to that property and to prevent loss or damage to other property insured under the contract, including, if necessary, removing the property to prevent loss or damage or further loss or damage to the property.

(2) The insurer must contribute on a prorated basis towards any reasonable and proper expenses in connection with steps taken by the insured under subparagraph (1) of this condition.

10. Entry, Control, Abandonment

After loss or damage to insured property, the insurer has

(a) an immediate right of access and entry by accredited representatives sufficient to enable them to survey and examine the property, and to make an estimate of the loss or damage, and

(b) after the insured has secured the property, a further right of access and entry by accredited representatives sufficient to enable them to appraise or estimate the loss or damage, but

(i) without the insured's consent, the insurer is not entitled to the control or possession of the insured property, and

(ii) without the insurer's consent, there can be no abandonment to it of the insured property.

11. In Case of Disagreement

(1) In the event of disagreement as to the value of the insured property, the value of the property saved, the nature and extent of the repairs or replacements required or, if made, their adequacy, or the amount of the loss or damage, those questions must be determined using the applicable dispute resolution process set out in the *Insurance Act* whether or not the insured's right to recover under the contract is disputed, and independently of all other questions.

(2) There is no right to a dispute resolution process under this condition until

(a) a specific demand is made for it in writing, and

(b) the proof of loss has been delivered to the insurer.

12. When Loss Payable

Unless the contract provides for a shorter period, the loss is payable within 60 days after the proof of loss is completed in accordance with Statutory Condition 6 and delivered to the insurer.

13. Repair or Replacement

(1) Unless a dispute resolution process has been initiated, the insurer, instead of making payment, may repair, rebuild or replace the insured property lost or damaged, on giving written notice of its intention to do so within 30 days after receiving the proof of loss.

(2) If the insurer gives notice under subparagraph (1) of this condition, the insurer must begin to repair, rebuild or replace the property within 45 days after receiving the proof of loss and must proceed with all due diligence to complete the work within a reasonable time.

14. Notice

(1) Written notice to the insurer may be delivered at, or sent by registered mail to, the chief agency or head office of the insurer in the province.

(2) Written notice to the insured may be personally delivered at, or sent by registered mail addressed to, the insured's last known address as provided to the insurer by the insured.

Statutory Conditions – British Columbia
(applicable in the province of British Columbia). Subject to certain exceptions set out in the Insurance Act and regulations thereunder, the Statutory Conditions are deemed to be part of every contract of insurance in force in the province of British Columbia. (**Statutory Conditions** 1 and 6 to 13 apply only to contracts that include insurance against loss or damage to property).

1. Misrepresentation

If a person applying for insurance falsely describes the property to the prejudice of the insurer, or misrepresents or fraudulently omits to communicate any circumstance that is material to be made known to the insurer in order to enable it to judge the risk to be undertaken, the contract is void as to any property in relation to which the misrepresentation or omission is material.

2. Property of others

The insurer is not liable for loss or damage to property owned by a person other than the insured unless

(a) otherwise specifically stated in the contract, or

(b) the interest of the insured in that property is stated in the contract.

3. Change of interest

The insurer is liable for loss or damage occurring after an authorized assignment under the *Bankruptcy and Insolvency Act* (Canada) or a change of title by succession, by operation of law or by death.

4. Material change in risk

(1) The insured must promptly give notice in writing to the insurer or its agent of a change that is

(a) material to the risk, and

(b) within the control and knowledge of the insured.

(2) If an insurer or its agent is not promptly notified of a change under subparagraph (1) of this condition, the contract is void as to the part affected by the change.

(3) If an insurer or its agent is notified of a change under subparagraph (1) of this condition, the insurer may

(a) terminate the contract in accordance with Statutory Condition 5, or

(b) notify the insured in writing that, if the insured desires the contract to continue in force, the insured must, within 15 days after receipt of the notice, pay to the insurer an additional premium specified in the notice.

(4) If the insured fails to pay an additional premium when required to do so under subparagraph (3) (b) of this condition, the contract is terminated at that time and Statutory Condition 5 (2) (a) applies in respect of the unearned portion of the premium.

5. Termination of insurance

(1) The contract may be terminated

(a) by the insurer giving to the insured 15 days' notice of termination by registered mail or 5 days' written notice of termination personally delivered, or

(b) by the insured at any time on request.

(2) If the contract is terminated by the insurer,

(a) the insurer must refund the excess of premium actually paid by the insured over the prorated premium for the expired time, but in no event may the prorated premium for the expired time be less than any minimum retained premium specified in the contract, and

(b) the refund must accompany the notice unless the premium is subject to adjustment or determination as to amount, in which case the refund must be made as soon as practicable.

(3) If the contract is terminated by the insured, the insurer must refund as soon as practicable the excess of premium actually paid by the insured over the short rate premium for the expired time specified in the contract, but in no event may the short rate premium for the expired time be less than any minimum retained premium specified in the contract.

(4) The 15 day period referred to in subparagraph (1) (a) of this condition starts to run on the day the registered letter or notification of it is delivered to the insured's postal address.

6. Requirements after loss

(1) On the happening of any loss of or damage to insured property, the insured must, if the loss or damage is covered by the contract, in addition to observing the requirements of Statutory Condition 9,

(a) immediately give notice in writing to the insurer,

(b) deliver as soon as practicable to the insurer a proof of loss in respect of the loss or damage to the insured property verified by statutory declaration,

(i) giving a complete inventory of that property and showing in detail quantities and cost of that property and particulars of the amount of loss claimed,

(ii) stating when and how the loss occurred, and if caused by fire or explosion due to ignition, how the fire or explosion originated, so far as the insured knows or believes,

(iii) stating that the loss did not occur through any wilful act or neglect or the procurement, means or connivance of the insured,

(iv) stating the amount of other insurances and the names of other insurers,

(v) stating the interest of the insured and of all others in that property with particulars of all liens, encumbrances and other charges on that property,

(vi) stating any changes in title, use, occupation, location, possession or exposure of the property since the contract was issued, and

(vii) stating the place where the insured property was at the time of loss,

(c) if required by the insurer, give a complete inventory of undamaged property showing in detail quantities and cost of that property, and

(d) if required by the insurer and if practicable,

(i) produce books of account and inventory lists,

(ii) furnish invoices and other vouchers verified by statutory declaration, and

(iii) furnish a copy of the written portion of any other relevant contract.

(2) The evidence given, produced or furnished under subparagraph (1) (c) and (d) of this condition must not be considered proofs of loss within the meaning of Statutory Conditions 12 and 13.

7. Fraud

Any fraud or wilfully false statement in a statutory declaration in relation to the particulars required under Statutory Condition 6 invalidates the claim of the person who made the declaration.

8. Who may give notice and proof

Notice of loss under Statutory Condition 6 (1) (a) may be given and the proof of loss under Statutory Condition 6 (1) (b) may be made

(a) by the agent of the insured, if

(i) the insured is absent or unable to give the notice or make the proof, and

(ii) the absence or inability is satisfactorily accounted for, or

(b) by a person to whom any part of the insurance money is payable, if the insured refuses to do so or in the circumstances described in clause (a) of this condition.

9. Salvage

(1) In the event of loss or damage to insured property, the insured must take all reasonable steps to prevent further loss or damage to that property and to prevent loss or damage to other property insured under the contract, including, if necessary, removing the property to prevent loss or damage or further loss or damage to the property.

(2) The insurer must contribute on a prorated basis towards any reasonable and proper expenses in connection with steps taken by the insured under subparagraph (1) of this condition.

10. Entry, control, abandonment

After loss or damage to insured property, the insurer has

(a) an immediate right of access and entry by accredited representatives sufficient to enable them to survey and examine the property, and to make an estimate of the loss or damage, and

(b) after the insured has secured the property, a further right of access and entry by accredited representatives sufficient to enable them to appraise or estimate the loss or damage, but

(i) without the insured's consent, the insurer is not entitled to the control or possession of the insured property, and

(ii) without the insurer's consent, there can be no abandonment to it of the insured property.

11. In case of disagreement

(1) In the event of disagreement as to the value of the insured property, the value of the property saved, the nature and extent of the repairs or replacements required or, if made, their adequacy, or the amount of the loss or damage, those questions must be determined using the applicable dispute resolution process set out in the *Insurance Act*, whether or not the insured's right to recover under the contract is disputed, and independently of all other questions.

(2) There is no right to a dispute resolution process under this condition until

(a) a specific demand is made for it in writing, and

(b) the proof of loss has been delivered to the insurer.

12. When loss payable

Unless the contract provides for a shorter period, the loss is payable within 60 days after the proof of loss is completed in accordance with Statutory Condition 6 and delivered to the insurer.

13. Repair or replacement

(1) Unless a dispute resolution process has been initiated, the insurer, instead of making payment, may repair, rebuild or replace the insured property lost or damaged, on giving written notice of its intention to do so within 30 days after receiving the proof of loss.

(2) If the insurer gives notice under subparagraph (1) of this condition, the insurer must begin to repair, rebuild or replace the property within 45 days after receiving the proof of loss, and must proceed with all due diligence to complete the work within a reasonable time.

14. Notice

(1) Written notice to the insurer may be delivered at, or sent by registered mail to, the chief agency or head office of the insurer in the province.

(2) Written notice to the insured may be personally delivered at, or sent by registered mail addressed to, the insured's last known address as provided to the insurer by the insured.

Policy Number: PI-ENV-32131-001
Insured: R Squared environmental Inc.
Effective: May 31, 2022

PROJECT MANAGEMENT SERVICES

It is understood and agreed that the Definition of "Professional Services" Includes Project Management Services which are performed by the Named Insured in the ordinary and usual course of their professional practice.

All other terms and conditions remain unchanged.

Victor Canada
500-1400 Blair Towers Place
Ottawa, Ontario K1J 9B8
Telephone 613-786-2000
Facsimile 613-786-2001
Toll Free 800-267-6684
www.victorinsurance.ca

Application

Errors and Omissions Insurance for Environmental Consultants

Submitting Broker, please complete the following to assist us in processing this submission:

Name of Brokerage: _____

Name of Broker Contact: _____

Brokerage Address: _____ City: _____ Postal Code: _____

For renewal purposes only: Policy Number: _____ ISN (Client's Number): _____

THE APPLICANT

1. Name of Applicant: R Squared Environmental Inc.

   If more than one legal entity, please indicate the relationship between each: _____

   (Please note that an insurance policy cannot be shared unless there is a financial interest.)

2. Website Address (if applicable): rsquaredenviro.com

3. Address: Box 471 Dalmeny, SK, S0K 1E0

4. Location of Branch Offices: Dalmeny, SK

5. Date operations began: 1 Mar 2022

6. The Applicant is a:

   ☐ Proprietorship ☐ Partnership ☑ Corporation ☐ Other (specify): _____

7. Please describe briefly the firm's general business practices and operations:

   Environmental Remediation and Assessment

8. Please specify the approximate percentage of the following services provided by the Applicant (including services sublet to consultants) relative to total revenue. The total must equal 100%.

Services	%	Services	%
Asbestos Consulting	0	Architecture	0
Environmental Consulting including Risk Management	30	Civil Engineering	0
Environmental Investigations, Studies and Assessments	35	Electrical Engineering	0
Environmental Audits		Mechanical Engineering	0
Development and Design of Environmental Abatement Plans	35	Structural Engineering	0
Underground Storage Tank Consultant	0	Soil Engineering	0
Biological Environmental Consulting	0	Land Surveying	0
Chemical Environmental Consulting	0	Other (specify)	0
Physical Environmental Consulting	0		
Analytical Laboratory Services	0	TOTAL	100%

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9. Please describe briefly the Applicant's specialty in terms of projects undertaken:
Environmental Remediation and Assessment

10. Principal(s) Qualifications:

Name of Principal Registered	Education Degree	Date and Place Acquired	Years with Firm
Ryan Riess, M.Sc. P.Eng	M.Sc. Enviro. Eng	2006 U of S	
	B.Eng. Chem Eng	2004 U of S	
	B.Sc. Biochemistry	2003 U of S	

11. Total Personnel:

Personnel	Total Number	Province in Which Licensed
Principals (as above)	1	AB, SK, MB
Professional Registered Personnel		
Technical Personnel Not Registered		
Field Personnel		
Clerical and Accounting Employees		
Administrative Employees	1	
Others (specify _____)		
TOTAL		

PLEASE PROVIDE RÉSUMÉS FOR ALL THE PROFESSIONAL REGISTERED PERSONNEL (INCLUDING PRINCIPALS).

12. Do any of the principals or professional registered personnel do any foreign work? YES ☐ NO ☑
If yes, please provide details:

13. Have any of those listed in question 10 ever been the subject of disciplinary action by authorities as a result of their professional activities? YES ☐ NO ☑
If yes, please provide details:

14. Please indicate the Applicant's gross annual fees or income for the past year and anticipated gross fees or income for the upcoming year derived from the following categories. Exclude all fees derived from participation in any joint venture.

Services	Last 12 months or last fiscal year	Anticipated next 12 months or next fiscal year
Asbestos Abatement Consulting, Planning & Analysis		
Asbestos Removal Management		
Environmental Consulting including Risk Management		25000
Environmental Audits of Real Estate		25000
Operational Audits of Manufacturing Plants		
Regulatory Compliance Audits, Compliance Programs, Audits/ Surveys Reviews, Analytical Test Result and Criteria Reviews, Permit Assistance, Client Liaison to Regulatory Agencies		
Environmental Impact Assessment and Feasibility Studies		10000
Site Assessments including Sampling and Analysis		30000
Subsurface Investigation including Sampling and Analysis		30000
Analytical Laboratory Services		30000
Environmental Field Monitoring		

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Services	Last 12 months or last fiscal year	Anticipated next 12 months or next fiscal year
Hydrology Studies, Sampling and Analysis		
Toxicity Reduction Evaluations		
Public Health Risk Assessment		
Industrial Hygiene and Safety Services, Pollution Monitoring and Analysis		
Litigation Support		5000
Underground Storage Tank Management and Removal		5000
Consulting Engineering and Design of:		
☐ Sanitary Landfill Systems		
☐ Materials Recovery Facilities		
☑ Site Remediation Systems		40000
☐ Waste Minimization Systems		
☐ Waste Water Treatment Systems		
☐ Sewer Water and Other Pipeline Facilities		
☑ Environmental Remediation Plans		40000
Hazardous Waste Disposal Quality Assurance		
Services for Storing, Treating, Discharging, Applying, Disposing or Transporting Hazardous Materials		
Other (please specify: _____)		
TOTAL GROSS ANNUAL FEES		240000

15. Please indicate the percentage of gross annual fees emanating from services performed outside of Canada:

(a) Last 12 months/last fiscal year: 0 % U.S.A. 0 % Overseas

(b) Anticipated next 12 months/next fiscal year: 0 % U.S.A. 0 % Overseas

16. Please indicate the percentage of the Applicant's gross annual fees attributable to the following type of client for the last 12 months/last fiscal year.

Type of Client	Percentage
Federal Government and any Agency/Department thereof	%
Provincial, Municipal or Local Government and Agency/Department Thereof	%
Real Estate Developers	%
Other Private or Public Held Corporations	%
Other Individuals, Partnerships or Joint Ventures	%
Other (specify _____)	%
TOTAL	%

17. Do more than 50% of the Applicant's fees emanate from any one single client? YES ☐ NO ☐

If yes, please provide details:

_____

18. Does the Applicant utilize independent consultants such as chemists, hydrologists, ecologists, etc.? YES ☐ NO ☐

If yes, please describe the work or services which are subcontracted by the Applicant to others and the criteria utilized in the selection of such subcontractors, design professionals or consultants.

_____

_____

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19. Does the Applicant usually require proof of professional liability insurance from the subconsultants? YES ☐ NO ☐

If yes, please indicate the approximate percentage of contracts or mandates undertaken during the last 12 months for which proof of insurance was obtained from all subconsultants: _____%

20. When performing professional services, does the Applicant use standard form contracts? YES ☐ NO ☐

If yes, please provide details:

_____

21. Does the Applicant or any related company engage in actual decommissioning, remediation, cleanup, removal, containment, detoxification or neutralization of any property, pollutants or contaminants? YES ☐ NO ☐

22. Does the Applicant or any related company enter into contracts wherein they assume responsibility for any of the activities mentioned in question 21 above? YES ☐ NO ☐

23. Does the Applicant wholly or partly own, manage or otherwise control any other firm or organization (whether directly or indirectly) or is the Applicant wholly or partly owned, operated, managed or otherwise controlled by any other person, firm or organization (whether directly or indirectly)? YES ☐ NO ☐

If yes, please describe any interrelationship:

_____

24. Is any LEGISLATION currently in force governing the practice of the Applicant? YES ☐ NO ☐

If yes, please provide relevant extracts.

25. Please provide a complete description of each of the Applicant's 10 largest jobs in the last five years. Specify the name of the client, services provided, gross accrued income and the date services were completed or will be completed.

_____

_____

26. Please provide a copy of the Applicant's current brochures and include any other current literature advertising their capabilities.

INSURANCE COVERAGE - If you are renewing your policy with Victor, do not complete this section.

27. (a) Has the Applicant ever previously purchased professional liability or errors and omissions insurance? YES ☐ NO ☑

(b) If yes, please provide the following details for the last three years:

Insurer	Policy Period	Expiring Premium	Limit	Deductible
_____	_____	$_____	$_____	$_____
_____	_____	$_____	$_____	$_____
_____	_____	$_____	$_____	$_____

(c) With respect to (b) above, please indicate if such coverage was offered on an occurrence basis or claims-made basis:

_____

If claims-made, what was the retroactive date of the policy (dd/mm/yyyy)? _____

28. Has insurance coverage ever been declined or cancelled or the renewal thereof been refused? YES ☐ NO ☑

If yes, please provide details:

_____

29. Has any application for similar insurance been made on behalf of the Applicant, any predecessors in business or present partners, directors, officers or employees ever been declined or has such insurance been cancelled or renewal refused? YES ☐ NO ☑

If yes, please provide details:

_____

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LOSS EXPERIENCE

30. (a) In the past, has the Applicant or any of their employees ever been the recipient of any allegations of professional negligence in writing or verbally? YES ☐ NO ☑

(b) Is the Applicant or any of their employees aware of any facts, circumstances or situations which may reasonably give rise to a claim, other than as advised above? YES ☐ NO ☑

31. Does the Applicant or any of its partners, officers, directors or employees have any knowledge or information of their licence having been suspended or their having been fined or reprimanded during the last five years? YES ☐ NO ☑

If yes to any of the above, please provide details:

WITHOUT LIMITATION OF ANY OTHER REMEDY AVAILABLE TO THE INSURERS, IT IS AGREED THAT, IF THERE BE KNOWLEDGE OF ANY SUCH FACT, CIRCUMSTANCE OR SITUATION, ANY CLAIM OR ACTION SUBSEQUENTLY EMANATING THEREFROM IS EXCLUDED FROM COVERAGE UNDER THE PROPOSED INSURANCE.

LIMITS REQUESTED

32. Please indicate limit and deductible required:

Limit:
- ☐ $250,000 per claim/$500,000 annual aggregate
- ☑ $500,000 per claim/$1,000,000 annual aggregate
- ☑ $1,000,000 per claim/$2,000,000 annual aggregate
- ☑ $2,000,000 per claim/$2,000,000 annual aggregate

Deductible: ☐ $5,000 ☑ $10,000 ☑ Other: $ 25000

Please note that the proposed insurance will be effective at a date determined by the insurers.

APPLICANT'S CONSENT TO THE TRANSMISSION OF THE INFORMATION CONTAINED IN THE APPLICATION FORM

I hereby acknowledge that the information collected in the Application form is acquired by my insurance broker to be transmitted to Victor Insurance Managers Inc. for the sole purpose of obtaining an insurance policy, and will be kept confidential.

Moreover, I authorize Victor Insurance Managers Inc., its insurers or service providers to:

- conduct verification, using outside sources, of the information contained in the Application form, in attached documentation and in subsequently provided documentation;
- in the event of a claim, transmit the submitted and verified information to loss adjusters, lawyers or other similar offices for the purposes of investigating, defending, negotiating or settling any claims, as required.

For more information on Victor's privacy policy, please contact privacypolicyinquiries@victorinsurance.com.

DECLARATIONS AND SIGNATURE

The undersigned Applicant for this insurance declares that, to the best of their knowledge and belief, the statements set forth herein are true and correct, and that reasonable efforts have been made to obtain sufficient information to facilitate the proper and accurate completion of this Application form. The undersigned agrees that, if any significant change in the condition of the Applicant is discovered between the date of this Application form and the effective date of the policy, which would render this Application form inaccurate or incomplete, notice of such change will be reported immediately in writing to the Insurance Manager.

Although the signing of this Application form does not bind the Applicant to purchase the insurance, the undersigned Applicant further agrees that this form and the information furnished pursuant hereto shall be the basis of the contract should a policy be issued and this form will become part of the policy.

Ryan Riess

Name of Applicant (please print)

Ryan Riess

Signature of Applicant

30/05/2022

Date (dd/mm/yyyy)

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GESTIONNAIRES D'ASSURANCES | SUM | STRATEGIC UNDERWRITING MANAGERS INC

A subsidiary of ONE80 INTERMEDIARIES

1001 De Maisonneuve Blvd W, Suite 900, Montréal, QC, H3A 3C8
T: 514-845-7861 or 1-855-845-7861 | F: 514-844-7862
www.assurancesum.ca

18 King St. E., Suite 300 Toronto, ON M5C 1C4
T: 416-603-7864 or 1-877-603-7864 | F: 416-603-7861
www.suminsurance.ca

COMMERCIAL GENERAL LIABILITY POLICY
NEW POLICY
POLICY NUMBER: SUM-CGL-32129-001

DECLARATIONS

NAMED INSURED: R Squared environmental Inc.

ENTITY: Limited Liability Company

MAILING ADDRESS: PO Box 471
Dalmeny, SK, S0K 1E0

POLICY PERIOD: **FROM:** May 31, 2022 **TO**: May 31, 2023

12.01 a.m. standard time at the mailing address of the Named Insured as stated herein.

LIMITS OF INSURANCE:	**Deductible**	**Limit of Insurance**
Coverage A - Bodily Injury and Property Damage Liability		
I. Per Occurrence	$1,000	$2,000,000
II. Products-Completed Operations Aggregate	n/a	$2,000,000
Coverage B – Personal and Advertising Injury Liability (any one person or organization)	$1,000	$2,000,000
Coverage C – Medical Payments (any one person)	n/a	$25,000
Coverage D – Tenants Legal Liability (any one premises)	$1,000	$250,000
General Aggregate (Applicable to Coverages A, B and C)	n/a	$2,000,000

DEDUCTIBLE BASIS: **Per Occurrence Basis**

This summary is intended only as a brief outline and does not alter any of the coverages, conditions, exclusions or provisions contained in the policy.

SCHEDULE OF ENDORSEMENTS APPLICABLE TO THIS POLICY: See page 3

This policy contains a clause which may limit the amount payable

ADVANCE LIABILITY PREMIUM: (excluding any applicable taxes and installment fees)	$3,125.00
MINIMUM ANNUAL PREMIUM:	$3,125.00
MINIMUM RETAINED PREMIUM:	$781.25
ADJUSTMENT RATE:	flat Revenue (per $1,000)
BROKER INFORMATION:	
Legal Name:	Harvard / Western Insurance
Address:	3615 E Quance St, Regina, SK, S4V 3A4
BUSINESS OF INSURED:	environmental consultant and incidental contracting
COMPANIES PROVIDING INSURANCE:	See List of Subscribing Companies Endorsement

Important information for customers

This Policy Contains a Clause(s) which May Limit The Amount Payable.

This policy may include more than one form of coverage insuring various items, each with its own specific deductible. Various provisions in this policy may restrict coverage. Read this entire policy carefully to determine rights, duties and what is and is not covered.

Important – terms and conditions may differ from your previous policy. Please read all documents. In return for the payment of the premium, and subject to all the terms of this policy, we agree with you to provide the insurance as stated in this policy, subject to all the conditions, exclusions and stipulations contained in the forms attached. Insurance is provided for any of those coverages for which forms are attached and specific amounts of insurance are stated, subject to any applicable limits of liability.



Signed by Strategic Underwriting Managers Inc., a subsidiary of One80 Intermediaries on behalf of the Companies providing insurance.

Authorized Representative

This policy contains a clause which may limit the amount payable

NAME OF INSURED: R Squared environmental Inc.

POLICY NUMBER: SUM-CGL-32129-001

SCHEDULE OF ENDORSEMENTS:

Privacy Information
Code of Consumer Rights and Responsibilities
Cyber Exclusion Liability
LMA5396 Communicable Disease Exclusion
Alberta and British Columbia statutory conditions endorsement - SUM STAT 01-08-2012
Forest fire fighting expenses - SUM E-26 (Each occurrence limit: $250,000 Aggregate limit: $250,000)
Pollution exclusion absolute - SUM E-47
SUM SPF #6 (Limit: $2,000,000)

This policy contains a clause which may limit the amount payable

Named Insured: R Squared environmental Inc.
Policy Number: SUM-CGL-32129-001
Effective Date: May 31, 2022

List of Subscribing Companies Endorsement

We, the Subscribing Companies, as shown below or as amended by endorsement to this Coverage Form, shall severally (not jointly or jointly and severally) share and pay, in the percentages shown below, each of the Limits of Insurance shown in the policy Declarations.

Furthermore, all claims payments and related costs and expenses payable under this Coverage Form shall also be shared in the same percentages listed below.

No.	Subscribing Company	Limits of Insurance Percentage	Premium in Dollars
1	Aviva Insurance Company of Canada	50.00%	$1,562.50
2	Sovereign General Insurance Company	30.00%	$937.50
3	Trisura Guarantee Insurance Company	20.00%	$625.00
	Total	**100%**	**$3,125.00**

This policy contains a clause which may limit the amount payable

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

Throughout this Coverage Form the words "you" and "your" refer to the Named Insured shown in the Declarations, and any other person or organization qualifying as a Named Insured under Paragraph 3. of Section II – Who is an Insured. The words "we", "us" and "our" refer to the subscribing companies providing this insurance and identified in the List of Subscribing Companies Endorsement attaching to and forming part of this Coverage Form.

The word "insured" means any person or organization qualifying as such under Section II – Who Is An Insured.

Other words and phrases that appear in quotation marks have special meaning. Refer to Section V –Definitions.

Various provisions in this Coverage Form restrict coverage. Read the entire Coverage Form carefully to determine rights, duties and what is and is not covered.

SECTION I – COVERAGES

COVERAGE A. BODILY INJURY and PROPERTY DAMAGE LIABILITY

1. Insuring Agreement

a. We will pay those sums that the insured becomes legally obligated to pay as "compensatory damages" because of "bodily injury" or "property damage" to which this insurance applies. We will have the right and duty to defend the insured against any "action" seeking those "compensatory damages". However, we will have no duty to defend the insured against any "action" seeking "compensatory damages" for "bodily injury" or "property damage" to which this insurance does not apply. We may, at our discretion, investigate any "occurrence" and settle any claim or "action" that may result. But:

(1) The amount we will pay for "compensatory damages" is limited as described in Section III – Limits Of Insurance; and
(2) Our right and duty to defend end when we have used up the applicable limit of insurance in the payment of judgments or settlements under Coverages A, B or medical expenses under Coverage C.

No other obligation or liability to pay sums or perform acts or services is covered unless explicitly provided for under Supplementary Payments – Coverages A, B and D.

b. This insurance applies to "bodily injury" and "property damage" only if:

(1) The "bodily injury" or "property damage" is caused by an "occurrence" that takes place in the "coverage territory"; and
(2) The "bodily injury" or "property damage" occurs during the policy period; and
(3) Prior to the policy period, no insured listed under Paragraph 1. of Section II – Who Is An Insured and no "employee" authorized by you to give or receive notice of an "occurrence" or claim, knew that the "bodily injury" or "property damage" had occurred, in whole or in part. If such a listed insured or authorized "employee" knew, prior to the policy period, that the "bodily injury" or "property damage" occurred, then any continuation, change or resumption of such "bodily injury" or "property damage" during or after the policy period will be deemed to have been known prior to the policy period.

c. "Bodily injury" or "property damage" which occurs during the policy period and was not, prior to the policy period, known to have occurred by any insured listed under Paragraph 1. of Section II – Who Is An Insured or any "employee" authorized by you to give or receive notice of an "occurrence" or claim, includes any continuation, change or resumption of that "bodily injury" or "property damage" after the end of the policy period.

d. "Bodily injury" or "property damage" will be deemed to have been known to have occurred at the earliest time when any insured listed under Paragraph 1. of Section II – Who Is An Insured or any "employee" authorized by you to give or receive notice of an "occurrence" or claim:

(1) Reports all, or any part, of the "bodily injury" or "property damage" to us or any other insurer;
(2) Receives a written or verbal demand or claim for "compensatory damages" because of the "bodily injury" or "property damage"; or
(3) Becomes aware by any other means that "bodily injury" or "property damage" has occurred or has begun to occur.

e. "Compensatory damages" because of "bodily injury" include "compensatory damages" claimed by any person or organization for care, loss of services or death resulting at any time from the "bodily injury".

2. Exclusions

This insurance does not apply to:

a. Expected or Intended Injury

"Bodily injury" or "property damage" expected or intended from the standpoint of the insured. This exclusion does not apply to "bodily injury" resulting from the use of reasonable force to protect persons or property.

b. Contractual Liability

"Bodily injury" or "property damage" for which the insured is obligated to pay "compensatory damages" by reason of the assumption of liability in a contract or agreement. This exclusion does not apply to liability for "compensatory damages":

(1) That the insured would have in the absence of the contract or agreement; or
(2) Assumed in a contract or agreement that is an "insured contract", provided the "bodily injury" or "property damage" occurs subsequent to the execution of the contract or agreement. Solely for the purposes of liability assumed in an "insured contract", reasonable legal fees and necessary litigation expenses incurred by or for a party other than an insured are deemed to be "compensatory damages" because of "bodily injury" or "property damage", provided:

    (a) Liability to such party for, or for the cost of, that party's defense has also been assumed in the same "insured contract"; and
    (b) Such legal fees and litigation expenses are for defense of that party against a civil or alternative dispute resolution proceeding in which "compensatory damages" to which this insurance applies are alleged.

c. Workers' Compensation and Similar Laws

Any obligation of the insured under a workers' compensation, disability benefits or unemployment or employment compensation law or any similar law.

d. Employer's Liability

"Bodily injury" to:

(1) An "employee" of the insured arising out of and in the course of:

    (a) Employment by the insured; or
    (b) Performing duties related to the conduct of the insured's business; or

(2) The spouse, child, parent, brother or sister of that "employee" as a consequence of Paragraph 2. d. (1) above.

This exclusion applies:

(i) Whether the insured may be liable as an employer or in any other capacity; and
(ii) To any obligation to share "compensatory damages" with or repay someone else who must pay "compensatory damages" because of the injury.

This exclusion does not apply to:

(a) Liability assumed by the insured under an "insured contract"; or
(b) A claim made or an "action" brought by a Canadian resident "employee" on whose behalf contributions are made by or required to be made by you under the provisions of any Canadian provincial or territorial workers' compensation law, if cover or benefits have been denied by any Canadian Workers' Compensation Authority.

e. Aircraft or Watercraft

"Bodily injury" or "property damage" arising out of the ownership, maintenance, use or entrustment to others by or on behalf of any insured of:

(i) Any aircraft, air cushion vehicle or watercraft; or
(ii) Any premises for the purpose of an airport or aircraft landing area and all operations necessary or incidental thereto.

Use includes operation and "loading or unloading."

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage" involved the ownership, maintenance, use or entrustment to others of any aircraft or watercraft.

This exclusion does not apply to:

(1) A watercraft while ashore on premises you own or rent;
(2) A watercraft that is:
    (a) Less than 10 metres long; and
    (b) Not being used to carry persons or property for a charge;
(3) "Bodily injury" to an "employee" of the insured on whose behalf contributions are made by or required to be made by the insured under the provisions of any Canadian provincial or territorial workers' compensation law, if the "bodily injury" results from an "occurrence" involving watercraft.

f. Automobile

"Bodily injury" or "property damage" arising directly or indirectly, in whole or in part, out of the ownership, use or entrustment to others by or on behalf of the insured of any "automobile". Use includes operation and "loading or unloading". This exclusion applies regardless of any other contributing or aggravating cause or event that contributes concurrently or in any sequence to the "bodily injury" or "property damage".

This exclusion also applies to:

(a) any motorized snow vehicle or its trailers falling within the definition of "automobile".

(b) any vehicle while being used in any speed or demolition contest or in any stunting activity or in practice or preparation for any such contest or activity whether or not it is required by law to be insured under a contract evidenced by a motor vehicle liability policy.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage" involved the ownership, use or entrustment to others of any "automobile".

This exclusion does not apply to:

(1) "Bodily injury" to an "employee" of the insured on whose behalf contributions are made by or required to be made by the insured under the provisions of any Canadian provincial or territorial workers' compensation law.
(2) "Bodily injury" or "property damage" arising out of a defective condition in, or improper maintenance of, any "automobile" owned by the Insured while leased to others for a period of 30 days or more provided the lessee is obligated under contract to ensure that the "automobile" is insured.
(3) the ownership, use or operation of machinery, apparatus or equipment mounted on or attached to any vehicle while at the site of the use or operation of such equipment, but this exception does not apply when such equipment is used for the purpose of "loading or unloading".

g. Damage To Property

"Property damage" to:

(1) Property you own, rent, or occupy, including any costs or expenses incurred by you, or any other person, organization or entity, for repair, replacement, enhancement, restoration or maintenance of such property for any reason, including prevention of injury to a person or damage to another's property;
(2) Premises you sell, give away or abandon, if the "property damage" arises out of any part of those premises;
(3) Property loaned to you;
(4) Personal property in your care, custody or control;
(5) That particular part of real property on which you or any contractors or subcontractors working directly or indirectly on your behalf are performing operations, if the "property damage" arises out of those operations; or
(6) That particular part of any property that must be restored, repaired or replaced because "your work" was incorrectly performed on it.

Paragraph (2) of this exclusion does not apply if the premises are "your work" and were never occupied, rented or held for rental by you.

Paragraphs (3), (4), (5) and (6) of this exclusion do not apply to liability assumed under a sidetrack agreement.

Paragraph (6) of this exclusion does not apply to "property damage" included in the "products-completed operations hazard".

h. Damage To Your Product

"Property damage" to "your product" arising out of it or any part of it.

i. Damage To Your Work

"Property damage" to "your work" arising out of it or any part of it and included in the "products-completed operations hazard".

This exclusion does not apply if the damaged work or the work out of which the damage arises was performed on your behalf by a subcontractor.

j. Damage To Impaired Property or Property Not Physically Injured

"Property damage" to "impaired property" or property that has not been physically injured, arising out of:

(1) A defect, deficiency, inadequacy or dangerous condition in "your product" or "your work"; or
(2) A delay or failure by you or anyone acting on your behalf to perform a contract or agreement in accordance with its terms.

This exclusion does not apply to the loss of use of other property arising out of sudden and accidental physical injury to "your product" or "your work" after it has been put to its intended use.

k. Recall of Products, Work or Impaired Property

"Compensatory damages" claimed for any loss, cost or expense incurred by you or others for the loss of use, withdrawal, recall, inspection, repair, replacement, adjustment, removal or disposal of:

(1) "Your product";
(2) "Your work"; or
(3) "Impaired property";

if such product, work, or property is withdrawn or recalled from the market or from use by any person or organization because of a known or suspected defect, deficiency, inadequacy or dangerous condition in it.

l. Electronic Data

"Compensatory damages" arising out of the loss of, loss of use of, damage to, corruption of, inability to access, or inability to manipulate "electronic data".

m. Personal and Advertising Injury

"Bodily injury" arising out of "personal and advertising injury".

n. Professional Services

"Bodily injury" (other than "incidental medical malpractice injury"), or "property damage" due to the rendering of or failure to render by you or on your behalf of any "professional services" for others, or any error or omission, malpractice or mistake in providing those services.

o. Abuse

a. Claims or "actions" arising directly or indirectly from "abuse" committed or alleged to have been committed by an insured, including the transmission of disease arising out of any act of "abuse".

b. Claims or "actions" based on your practices of "employee" hiring, acceptance of "volunteer workers" or supervision or retention of any person alleged to have committed "abuse".

c. Claims or "actions" alleging knowledge by an insured of, or failure to report, the alleged "abuse" to the appropriate authority(ies).

p. Damage from Blasting, Pile Driving, Removal or Weakening of Support

"Property damage" arising out of:

(1) The use of explosives for blasting;
(2) Vibration from pile driving or caisson work; or
(3) The removal or weakening of support of any property, building or land whether such support be natural or otherwise.

This exclusion does not apply:

(1) To "property damage" arising out of work performed on your behalf by any contractor or sub-contractor; or
(2) To "property damage" included within the "products-completed operations hazard".

q. Asbestos – see Common Exclusions

r. Fungi or Spores – see Common Exclusions

s. Nuclear– see Common Exclusions

t. Pollution – see Common Exclusions

u. Terrorism – see Common Exclusions

v. War Risks – see Common Exclusions

COVERAGE B. PERSONAL and ADVERTISING INJURY LIABILITY

1. Insuring Agreement

a. We will pay those sums that the insured becomes legally obligated to pay as "compensatory damages" because of "personal and advertising injury" to which this insurance applies. We will have the right and duty to defend the insured against any "action" seeking those "compensatory damages". However, we will have no duty to defend the insured against any "action" seeking "compensatory damages" for "personal and advertising injury" to which this insurance does not apply. We may, at our discretion, investigate any offense and settle any claim or "action" that may result. But:

(1) The amount we will pay for "compensatory damages" is limited as described in Section III – Limits Of Insurance; and
(2) Our right and duty to defend end when we have used up the applicable limit of insurance in the payment of judgments or settlements under Coverages A, B or medical expenses under Coverage C.

No other obligation or liability to pay sums or perform acts or services is covered unless explicitly provided for under Supplementary Payments – Coverages A, B and D.

b. This insurance applies to "personal and advertising injury" caused by an offense arising out of your business but only if the offense was committed in the "coverage territory" during the policy period.

2. Exclusions

This insurance does not apply to:

a. Knowing Violation Of Rights Of Another

"Personal and advertising injury" caused by or at the direction of the insured with the knowledge that the act would violate the rights of another and would inflict "personal and advertising injury".

b. Material Published With Knowledge Of Falsity

"Personal and advertising injury" arising out of oral or written publication of material, if done by or at the direction of the insured with knowledge of its falsity.

c. Material Published Prior To Policy Period

"Personal and advertising injury" arising out of oral or written publication of material whose first publication took place before the beginning of the policy period.

d. Criminal Acts

"Personal and advertising injury" arising out of a criminal act committed by or at the direction of the insured.

e. Contractual Liability

"Personal and advertising injury" for which the insured has assumed liability in a contract or agreement. This exclusion does not apply to liability for "compensatory damages" that the insured would have in the absence of the contract or agreement.

f. Breach Of Contract

"Personal and advertising injury" arising out of a breach of contract, except an implied contract to use another's advertising idea in your "advertisement".

g. Quality Or Performance Of Goods – Failure To Conform To Statements

"Personal and advertising injury" arising out of the failure of goods, products or services to conform with any statement of quality or performance made in your "advertisement".

h. Wrong Description Of Prices

"Personal and advertising injury" arising out of the wrong description of the price of goods, products or services stated in your "advertisement".

i. Infringement Of Copyright, Patent, Trademark or Trade Secret

"Personal and advertising injury" arising out of the infringement of copyright, patent, trademark, trade secret or other intellectual property rights.

However, this exclusion does not apply to infringement, in your "advertisement", of copyright, trade dress or slogan.

j. Insureds In Media and Internet Type Businesses

"Personal and advertising injury" committed by an insured whose business is:

(1) Advertising, broadcasting, publishing or telecasting;

(2) Designing or determining content of web-sites for others; or

(3) An Internet search, access, content or service provider.

However, this exclusion does not apply to Paragraphs 22. a., b. and c. of "personal and advertising injury" under the Definitions Section.

For the purposes of this exclusion, the placing of frames, borders or links, or advertising, for you or others anywhere on the Internet, is not by itself, considered the business of advertising, broadcasting, publishing or telecasting.

k. Electronic Chatrooms or Bulletin Boards

"Personal and advertising injury" arising out of an electronic chatroom or bulletin board the insured hosts, owns, or over which the insured exercises control.

l. Unauthorized Use Of Another's Name or Product

"Personal and advertising injury" arising out of the unauthorized use of another's name or product in your e-mail address, domain name or metatag, or any other similar tactics to mislead another's potential customers.

m. Asbestos – see Common Exclusions

n. Fungi or Spores – see Common Exclusions

o. Nuclear– see Common Exclusions

p. Pollution – see Common Exclusions

q. Terrorism – see Common Exclusions

r. War Risks – see Common Exclusions

COVERAGE C. MEDICAL PAYMENTS

1. Insuring Agreement

a. We will pay medical expenses as described below for "bodily injury" caused by an accident:

(1) On premises you own or rent;
(2) On ways next to premises you own or rent; or
(3) Because of your operations;

provided that:

(1) The accident takes place in the "coverage territory" and during the policy period;
(2) The expenses are incurred and reported to us within one year of the date of the accident; and
(3) The injured person submits to examination, at our expense, by physicians of our choice as often as we reasonably require.

b. We will make these payments regardless of fault. These payments will not exceed the applicable limit of insurance as described in Section III – Limits of Insurance. We will pay reasonable expenses for:

(1) First aid administered at the time of an accident;
(2) Necessary medical, surgical, x-ray and dental services, including prosthetic devices; and
(3) Necessary ambulance, hospital, professional nursing and funeral services.

2. Exclusions

We will not pay expenses for "bodily injury":

a. Any Insured

To any insured, except "volunteer workers".

b. Hired Person

To a person hired to do work for or on behalf of any insured or a tenant of any insured.

c. Injury On Normally Occupied Premises

To a person injured on that part of premises you own or rent that the person normally occupies.

d. Workers Compensation and Similar Laws

To a person, whether or not an "employee" of any insured, if benefits for the "bodily injury" are payable or must be provided under a workers' compensation or disability benefits law or a similar law.

e. Athletics Activities

To a person injured while practicing, instructing or participating in any physical exercises or games, sports or athletic contests.

f. Products-Completed Operations Hazard

Included within the "products-completed operations hazard".

g. Coverage A Exclusions

Excluded under Coverage A.

COVERAGE D. TENANTS' LEGAL LIABILITY

1. Insuring Agreement

a. We will pay those sums that the insured becomes legally obligated to pay as "compensatory damages" because of "property damage" to which this insurance applies. This insurance applies only to "property damage" to premises of others rented to you or occupied by you. We will have the right and duty to defend the insured against any "action" seeking those "compensatory damages". However, we will have no duty to defend the insured against any "action" seeking "compensatory damages" for "property damage" to which this insurance does not apply. We may, at our discretion, investigate any "occurrence" and settle any claim or "action" that may result. But:

(1) The amount we will pay for "compensatory damages" is limited as described in Section III – Limits Of Insurance; and
(2) Our right and duty to defend end when we have used up the applicable limit of insurance in the payment of judgments or settlements under Coverage D.

No other obligation or liability to pay sums or perform acts or services is covered unless explicitly provided for under Supplementary Payments – Coverages A, B and D.

b. This insurance applies to "property damage" only if:

(1) The "property damage" is caused by an "occurrence" that takes place in the "coverage territory";
(2) The "property damage" occurs during the policy period; and
(3) Prior to the policy period, no insured listed under Paragraph 1. of Section II – Who Is An Insured and no "employee" authorized by you to give or receive notice of an "occurrence" or claim, knew that the "property damage" had occurred, in whole or in part. If such a listed insured or authorized "employee" knew, prior to the policy period, that the "property damage" occurred, then any continuation, change or resumption of such "property damage" during or after the policy period will be deemed to have been known prior to the policy period.

c. "Property damage" which occurs during the policy period and was not, prior to the policy period, known to have occurred by any insured listed under Paragraph 1. of Section II – Who Is An Insured or any "employee" authorized by you to give or receive notice of an "occurrence" or claim, includes any continuation, change or resumption of that "property damage" after the end of the policy period.

d. "Property damage" will be deemed to have been known to have occurred at the earliest time when any insured listed under Paragraph 1. of Section II – Who Is An Insured or any "employee" authorized by you to give or receive notice of an "occurrence" or claim:

(1) Reports all, or any part, of the "property damage" to us or any other insurer;
(2) Receives a written or verbal demand or claim for "compensatory damages" because of the "property damage"; or
(3) Becomes aware by any other means that "property damage" has occurred or has begun to occur.

2. Exclusions

This insurance does not apply to:

a. Expected or Intended Injury

"Property damage" expected or intended from the standpoint of the insured.

b. Contractual Liability

"Property damage" for which the insured is obligated to pay "compensatory damages" by reason of the assumption of liability in a contract or agreement. This exclusion does not apply to liability for "compensatory damages" that the insured would have in the absence of the contract or agreement.

c. Asbestos – see Common Exclusions

d. Fungi or Spores – see Common Exclusions

e. Nuclear– see Common Exclusions

f. Pollution – see Common Exclusions

g. Terrorism – see Common Exclusions

h. War Risks – see Common Exclusions

COMMON EXCLUSIONS – COVERAGES A, B, C and D

This insurance does not apply to:

1. Asbestos

"Bodily injury", "property damage", or "personal and advertising injury" related to or arising from any actual or alleged liability for any legal remedy of any kind whatsoever (including but not limited to damages, interest, mandatory or other injunctive relief, statutory orders or penalties, legal or other costs, or expenses of any kind) in respect of actual or threatened loss, damage, cost or expense directly or indirectly caused by, resulting from, in consequence of or in any way involving, asbestos or any materials containing asbestos in whatever form or quantity, including any costs or expenses incurred to prevent, respond to, test for, monitor, abate, mitigate, remove, cleanup, contain, remediate, treat, detoxify, neutralize, assess or otherwise deal with or dispose of asbestos or any materials containing asbestos in what ever form or quantity.

This exclusion applies regardless of any other contributing or aggravating cause or event that contributes concurrently or in any sequence to the "bodily injury", "property damage" or "personal and advertising injury".

2. Fungi or Spores

a. "Bodily injury", "property damage", "personal and advertising injury" or " any other cost, loss or expense incurred by others, arising directly or indirectly from the actual, alleged or threatened inhalation of, ingestion of, contact with, exposure to, existence of, presence of, spread of, reproduction, discharge or other growth of any "fungi" or "spores" however caused, including any costs or expenses incurred to prevent, respond to, test for, monitor, abate, mitigate, remove, cleanup, contain, remediate, treat, detoxify, neutralize, assess or otherwise deal with or dispose of "fungi" or "spores";

b. Any supervision, instructions, recommendations, warnings, or advice given or which should have been given in connection with a. above; or

c. Any obligation to pay damages, share damages with or repay someone else who must pay damages because of such injury or damage referred to in a. or b. above.

This exclusion applies regardless of any other contributing or aggravating cause or event that contributes concurrently or in any sequence to the "bodily injury", "property damage" or "personal and advertising injury".

This exclusion shall not apply to "bodily injury" or "property damage" which results directly from:

1. a "products-completed operations hazard" not otherwise excluded by this Coverage Form;

The most we will pay under this exception for all "bodily injury" and "property damage" in any policy period is $250,000.

The Limit of Insurance provided by this exception shall be included in and is not in addition to any other Limits of Insurance provided for "bodily injury" or "property damage" under this Coverage Form.

3. Nuclear Energy Liability

a. Liability imposed by or arising from any nuclear liability act, law or statute, or any law amendatory thereof;

b. "Bodily injury", "property damage" or "personal and advertising injury" with respect to which an insured under this Coverage Form is also insured under a contract of nuclear energy liability insurance (whether the insured is unnamed in such contract and whether or not it is legally enforceable by the insured) issued by the Nuclear Insurance Association of Canada or any other insurer or group or pool of insurers or would be an insured under any such policy but for its termination upon exhaustion of its limit of liability;

c. "Bodily injury", "property damage" or "personal and advertising injury" resulting directly or indirectly from the "nuclear energy hazard" arising from:

(1) The ownership, maintenance, operation or use of a "nuclear facility" by or on behalf of an insured;
(2) the furnishing by an insured of services, materials, parts or equipment in connection with the planning, construction, maintenance, operation or use of any "nuclear facility";
(3) the possession, consumption, use, handling, disposal or transportation of "fissionable substances", or of other "radioactive material" (except radioactive isotopes, away from a nuclear facility, which have reached the final stage of fabrication so as to be useable for any scientific, medical, agricultural, commercial or industrial purpose) used, distributed, handled or sold by an insured.

This exclusion applies regardless of any other contributing or aggravating cause or event that contributes concurrently or in any sequence to the "bodily injury", "property damage" or "personal and advertising injury.

4. Pollution

(1) "Bodily injury", "property damage" or "personal and advertising injury" arising out of the actual, alleged or threatened spill, discharge, emission, dispersal, seepage, leakage, migration, release or escape of "pollutants":

(a) At or from any premises, site or location which is or was at any time owned or occupied by, or rented or loaned to, any insured. However, this subparagraph does not apply to:

(i) "Bodily injury" if sustained within a building and caused by smoke, fumes, vapour or soot from equipment used to heat, cool or dehumidify the building, or equipment that is used to heat water for personal use, by the building's occupants or their guests;
(ii) "Bodily injury" or "property damage" for which you may be held liable, if you are a contractor and the owner or lessee of such premises, site or location has been added to your policy as an additional insured with respect to your ongoing operations performed for that additional insured at that premises, site or location and such premises, site or location is not and never was owned or occupied by, or rented or loaned to, any insured, other than that additional insured; or
(iii) "Bodily injury" or "property damage" arising out of heat, smoke or fumes from a "hostile fire";

(b) At or from any premises, site or location which is or was at any time used by or for any insured or others for the handling, storage, disposal, processing or treatment of waste;

(c) Which are or were at any time transported, handled, stored, treated, disposed of, or processed as waste by or for:
(i) Any insured; or
(ii) Any person or organization for whom you may be legally responsible; or

(d) At or from any premises, site or location on which any insured or any contractors or subcontractors working directly or indirectly on any insured's behalf are performing operations if the "pollutants" are brought on or to the premises, site or location in connection with such operations by such insured, contractor or subcontractor. However, this subparagraph does not apply to:
(i) "Bodily injury" or "property damage" arising out of the escape of fuels, lubricants or other operating fluids which are needed to perform the normal electrical, hydraulic or mechanical functions necessary for the operation of mobile equipment that is not an "automobile" or its parts, if such fuels, lubricants or other operating fluids escape from a mobile equipment part designed to hold, store or receive them. This exception does not apply if the "bodily injury" or "property damage" arises out of the intentional discharge, dispersal or release of the fuels, lubricants or other operating fluids, or if such fuels, lubricants or other operating fluids are brought on or to the premises, site or location with the intent that they be discharged, dispersed or released as part of the operations being performed by such insured, contractor or subcontractor;
(ii) "Bodily injury" or "property damage" sustained within a building and caused by the release of gases, fumes or vapours from materials brought into that building in connection with operations being performed by you or on your behalf by a contractor or subcontractor; or
(iii) "Bodily injury" or "property damage" arising out of heat, smoke or fumes from a "hostile fire".

(e) At or from any premises, site or location on which any insured or any contractors or subcontractors working directly or indirectly on any insured's behalf are performing operations if the operations are to test for, monitor, clean up, remove, contain, treat, detoxify or neutralize, or in any way respond to, or assess the effects of, "pollutants".

(2) Any loss, cost or expense arising out of any:
(a) Request, demand, order or statutory or regulatory requirement that any insured or others test for, monitor, clean up, remove, contain, treat, detoxify or neutralize, or in any way respond to, or assess the effects of, "pollutants"; or
(b) Claim or "action" by or on behalf of a governmental authority for "compensatory damages" because of testing for, monitoring, cleaning up, removing, containing, treating, detoxifying or neutralizing, or in any way responding to, or assessing the effects of, "pollutants".

However, this Section (2) does not apply to liability for "compensatory damages" because of "property damage" that the insured would have in the absence of such request, demand, order or statutory or regulatory requirement, or such claim or "action" by or on behalf of a governmental authority.

5. Terrorism

"Bodily injury", "property damage" or "personal and advertising injury" arising directly or indirectly, in whole or in part, out of "terrorism" or out of any activity or decision of a government agency or other entity to prevent, respond to or terminate "terrorism". This exclusion applies regardless of any other contributing or aggravating cause or event that contributes concurrently or in any sequence to the "bodily injury", "property damage" or "personal and advertising injury".

6. War Risks

"Bodily injury", "property damage" or "personal and advertising injury" arising directly or indirectly, in whole or in part, out of war, invasion, act of foreign enemy, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection or military power. This exclusion applies regardless of any other contributing or aggravating cause or event that contributes concurrently or in any sequence to the "bodily injury", "property damage" or "personal and advertising injury".

SUPPLEMENTARY PAYMENTS – COVERAGES A, B and D

1. We will pay, with respect to any claim we investigate or settle, or any "action" against an insured we defend:

   a. All expenses we incur.
   b. The cost of bonds to release attachments, but only for bond amounts within the applicable limit of insurance. We do not have to furnish these bonds.
   c. All reasonable expenses incurred by the insured at our request to assist us in the investigation or defense of the claim or "action", including actual loss of earnings up to $250 a day because of time off from work.
   d. All costs assessed or awarded against the insured in the "action".
   e. Any interest accruing after entry of judgment upon that part of the judgment which is within the applicable limit of insurance and before we have paid, offered to pay, or deposited in court the part of the judgment that is within the applicable limit of insurance.

   These payments will not reduce the limits of insurance.

2. If we defend an insured against an "action" and an indemnitee of the insured is also named as a party to the "action", we will defend that indemnitee if all of the following conditions are met:

   a. The "action" against the indemnitee seeks "compensatory damages" for which the insured has assumed the liability of the indemnitee in a contract or agreement that is an "insured contract";
   b. This insurance applies to such liability assumed by the insured;
   c. The obligation to defend, or the cost of the defense of, that indemnitee, has also been assumed by the insured in the same "insured contract";
   d. The allegations in the "action" and the information we know about the "occurrence" are such that no conflict appears to exist between the interests of the insured and the interests of the indemnitee;
   e. The indemnitee and the insured ask us to conduct and control the defense of that indemnitee against such "action" and agree that we can assign the same counsel to defend the insured and the indemnitee; and
   f. The indemnitee:

      (1) Agrees in writing to:
         (a) Cooperate with us in the investigation, settlement or defense of the "action";
         (b) Immediately send us copies of any demands, notices, summonses or legal papers received in connection with the "action";
         (c) Notify any other insurer whose coverage is available to the indemnitee; and
         (d) Cooperate with us with respect to coordinating other applicable insurance available to the indemnitee; and
      (2) Provides us with written authorization to:
         (a) Obtain records and other information related to the "action"; and
         (b) Conduct and control the defense of the indemnitee in such "action".

   So long as the above conditions are met, legal fees incurred by us in the defense of that indemnitee, necessary litigation expenses incurred by us and necessary litigation expenses incurred by the indemnitee at our request will be paid as Supplementary Payments. Notwithstanding the provisions of Paragraph 2.b. (2) of Section I – Coverage A – Bodily Injury and Property Damage Liability, such payments will not be deemed to be "compensatory damages" for "bodily injury" and "property damage" and will not reduce the limits of insurance.

   Our obligation to defend an insured's indemnitee and to pay for legal fees and necessary litigation expenses as Supplementary Payments ends when:

   a. We have used up the applicable limit of insurance in the payment of judgments or settlements; or

   b. The conditions set forth above, or the terms of the agreement described in Paragraph f. above, are no longer met.

SECTION II – WHO IS AN INSURED

1. If you are designated in the Declarations as:

   a. An individual, you and your spouse are insureds, but only with respect to the conduct of a business of which you are the sole owner.
   b. A partnership, limited liability partnership or joint venture, you are an insured. Your members, your partners, and their spouses are also insureds, but only with respect to the conduct of your business.
   c. A limited liability company, you are an insured. Your members are also insureds, but only with respect to the conduct of your business. Your managers are insureds, but only with respect to their duties as your managers.
   d. An organization other than a partnership, limited liability partnership, joint venture or limited liability company, you are an insured. Your "executive officers" and directors are insureds, but only with respect to their duties as your officers or directors. Your shareholders are also insureds, but only with respect to their liability as shareholders.
   e. A trust, you are an insured. Your trustees are also insureds, but only with respect to their duties as trustees.

2. Each of the following is also an insured:

   a. Your "volunteer workers" only while performing duties related to the conduct of your business, or your "employees", other than either your "executive officers" (if you are an organization other than a partnership, limited liability partnership, joint venture or limited liability company) or your managers (if you are a limited liability company), but only for acts within the scope of their employment by you or while performing duties related to the conduct of your business. However, none of these "employees" or "volunteer workers" are insureds for:

      (1) "Bodily injury" or "personal and advertising injury":
         (a) To you, to your partners or members (if you are a partnership, limited liability partnership or joint venture), to your members (if you are a limited liability company), to a co-"employee" while in the course of his or her employment or performing duties related to the conduct of your business, or to your other "volunteer workers" while performing duties related to the conduct of your business;
         (b) To the spouse, child, parent, brother or sister of that co-"employee" or "volunteer worker" as a consequence of Paragraph (1) (a) above;
         (c) For which there is any obligation to share "compensatory damages" with or repay someone else who must pay "compensatory damages" because of the injury described in Paragraphs (1)(a) or (b) above;
         (d) Arising out of his or her providing or failing to provide professional health care services; or
         (e) To any person who at the time of injury is entitled to benefits under any workers' compensation or disability benefits law or a similar law.
      (2) "Property damage" to property:

         (a) Owned, occupied or used by

         (b) Rented to, in the care, custody or control of, or over which physical control is being exercised for any purpose by

         you, any of your "employees", "volunteer workers", any partner or member (if you are a partnership, limited liability partnership or joint venture), or any member (if you are a limited liability company).

   b. Any person (other than your "employee" or "volunteer worker"), or any organization while acting as your real estate manager.

   c. Any person or organization having proper temporary custody of your property if you die, but only:

      (1) With respect to liability arising out of the maintenance or use of that property; and

      (2) Until your legal representative has been appointed.

   d. Your legal representative if you die, but only with respect to duties as such. That representative will have all your rights and duties under this Coverage Form.

3. Any organization you newly acquire or form, other than a partnership, limited liability partnership or joint venture or limited liability company, and over which you maintain ownership or majority interest, will qualify as a Named Insured if there is no other similar insurance available to that organization. However:

   a. Coverage under this provision is afforded only until the 90th day after you acquire or form the organization or the end of the policy period, whichever is earlier;
   b. Coverages A and D do not apply to "bodily injury" or "property damage" that occurred before you acquired or formed the organization; and
   c. Coverage B does not apply to "personal and advertising injury" arising out of an offense committed before you acquired or formed the organization.

   No person or organization is an insured with respect to the conduct of any current or past partnership, limited liability partnership, joint venture or limited liability company that is not shown as a Named Insured in the Declarations.

SECTION III – LIMITS OF INSURANCE

1. The Limits of Insurance shown in the Declarations and the rules below fix the most we will pay regardless of the number of:

   a. Insureds;
   b. Claims made or "actions" brought; or
   c. Persons or organizations making claims or bringing "actions".

2. The General Aggregate Limit is the most we will pay for the sum of:

   a. "Compensatory damages" under Coverage A, except "compensatory damages" because of "bodily injury" or "property damage" included in the "products-completed operations hazard";
   b. "Compensatory damages" under Coverage B; and
   c. Medical expenses under Coverage C.

3. The Products-Completed Operations Aggregate Limit is the most we will pay under Coverage A for "compensatory damages" because of "bodily injury" and "property damage" included in the "products-completed operations hazard".

4. Subject to 2. or 3. above, whichever applies, the Each Occurrence Limit is the most we will pay for the sum of:

   a. "Compensatory damages" under Coverage A; and
   b. Medical expenses under Coverage C

   because of all "bodily injury" and "property damage" arising out of any one "occurrence".

5. Subject to 2. above, the Personal and Advertising Injury Limit is the most we will pay under Coverage B for the sum of all "compensatory damages" because of all "personal and advertising injury" sustained by any one person or organization.

6. The Tenants' Legal Liability Limit is the most we will pay under Coverage D for "compensatory damages" because of "property damage" to any one premises.

7. Subject to 4. above, the Medical Expense Limit is the most we will pay under Coverage C for all medical expenses because of "bodily injury" sustained by any one person

The Limits of Insurance of this Coverage Form apply separately to each consecutive annual period and to any remaining period of less than 12 months, starting with the beginning of the policy period shown in the Declarations, unless the policy period is extended after issuance for an additional period of less than 12 months. In that case, the additional period will be deemed part of the last preceding period for purposes of determining the Limits of Insurance.

8. Deductible

1. Our obligation under Bodily Injury Liability, Property Damage Liability and Tenants' Legal Liability to pay "compensatory damages" on your behalf applies only to the amount of "compensatory damages" in excess of any deductible amounts stated in the Declarations as applicable to such coverages, and the limits of insurance applicable to each "occurrence" for Bodily Injury Liability and Property Damage Liability and any one premises for Tenants' Legal Liability will be reduced by the amount of such deductible. The Products -Completed Operations Aggregate Limit and the General Aggregate Limit for such coverages shall not be reduced by the application of such deductible amount.

2. The deductible amounts stated in the Declarations apply as follows:

   A. Per Claim Basis - if the deductible is on a per claim basis, the deductible amount applies:
      1) Under Coverage A:
         a. Bodily Injury Liability or Property Damage Liability respectively:
            (i) To all "compensatory damages" because of "bodily injury" sustained by one person, or
            (ii) To all "compensatory damages" because of "property damage" sustained by one person or organization, as the result of any one "occurrence".
         b. Bodily Injury Liability and Property Damage Liability combined, to all "compensatory damages" because of "bodily injury" and "property damage" sustained by one person or organization as the result of any one "occurrence".
      2) Under Coverage D. Tenants' Legal Liability, to all "compensatory damages" because of "property damage" sustained by one person or organization as the result of any one "occurrence".

   B. Per Occurrence Basis - if the deductible is on a per occurrence basis, the deductible amount applies:
      1) Under Coverage A:
         a. Bodily Injury Liability or Property Damage Liability respectively:
            (i) To all "compensatory damages" because of "bodily injury" as the result of any one "occurrence", or
            (ii) To all "compensatory damages" because of "property damage" as the result of any one "occurrence",

      regardless of the number of persons or organizations who sustain "compensatory damages" because of that "occurrence".

b. Bodily Injury Liability and Property Damage Liability combined, to all "compensatory damages" because of "bodily injury" and "property damage" as the result of any one "occurrence", regardless of the number of persons or organizations who sustain "compensatory damages" because of that "occurrence".

2) Under Coverage D. Tenants' Legal Liability, to all "compensatory damages" because of "property damage" as the result of any one "occurrence", regardless of the number of persons or organizations who sustain "compensatory damages" because of that "occurrence".

3. The terms of this insurance, including those with respect to:

a) our right and duty to defend any "action" seeking those "compensatory damages"; and
b) your duties in the event of an "occurrence", claim or "action"

apply irrespective of the application of the deductible amount.

4. We may pay any part or all of the deductible amount to effect settlement of any claim or "action" and, upon notification of the action taken, you shall promptly reimburse us for such part of the deductible amount as has been paid by us.

SECTION IV – COMMERCIAL GENERAL LIABILITY CONDITIONS

1. Bankruptcy

Bankruptcy or insolvency of the insured or of the insured's estate will not relieve us of our obligations under this Coverage Form.

2. Canadian Currency Clause

All limits of insurance, premiums and other amounts as expressed in this policy are in Canadian currency.

3. Changes.

This Coverage Form contains all the agreements between you and us concerning the insurance afforded. The first Named Insured shown in the Declarations is authorized to make changes in the terms of this Coverage Form with our consent. This Coverage Form's terms can be amended or waived only by endorsement issued by us and made a part of this Coverage Form.

4. Duties In The Event Of Occurrence, Offense, Claim or Action

a. You must see to it that we are notified as soon as practicable of an "occurrence" or an offense which may result in a claim. To the extent possible, notice should include:

(1) How, when and where the "occurrence" or offense took place;
(2) The names and addresses of any injured persons and witnesses; and
(3) The nature and location of any injury or damage arising out of the "occurrence" or offense.

b. If a claim is made or "action" is brought against any insured, you must:

(1) Immediately record the specifics of the claim or "action" and the date received; and
(2) Notify us as soon as practicable.

You must see to it that we receive written notice of the claim or "action" as soon as practicable.

c. You and any other involved insured must:

(1) Immediately send us copies of any demands, notices, summonses or legal papers received in connection with the claim or "action";
(2) Authorize us to obtain records and other information;
(3) Cooperate with us in the investigation or settlement of the claim or defense against the "action"; and
(4) Assist us, upon our request, in the enforcement of any right against any person or organization which may be liable to the insured because of injury or damage to which this insurance may also apply.

d. No insured will, except at that insured's own cost, voluntarily make a payment, assume any obligation, or incur any expense, other than for first aid, without our consent.

5. Examination Of Your Books and Records.

We may examine and audit your books and records as they relate to this Coverage Form at any time during the policy period and up to three years afterward.

6. Inspections and Surveys

1. We have the right to:

a. Make inspections and surveys at any time;
b. Give you reports on the conditions we find; and
c. Recommend changes.

2. We are not obligated to make any inspections, surveys, reports or recommendations and any such actions we do undertake relate only to insurability and the premiums to be charged. We do not make safety inspections. We do not undertake to perform the duty of any person or organization to provide for the health or safety of workers or the public. And we do not warrant that conditions:

   a. Are safe or healthful; or
   b. Comply with laws, regulations, codes or standards.

3. Paragraphs 1. and 2. of this condition apply not only to us, but also to any rating, advisory, rate service or similar organization which makes insurance inspections, surveys, reports or recommendations.

4. Paragraph 2. of this condition does not apply to any inspections, surveys, reports or recommendations we may make relative to certification, under provincial or municipal statutes, ordinances, bylaws or regulations, of boilers, pressure vessels or elevators.

7. Legal Action Against Us

No person or organization has a right under this Coverage Form:

a. To join us as a party or otherwise bring us into an "action" asking for "compensatory damages" from an insured; or
b. To sue us on this Coverage Form unless all of its terms have been fully complied with.

A person or organization may sue us to recover on an agreed settlement or on a final judgment against an insured; but we will not be liable for "compensatory damages" that are not payable under the terms of this Coverage Form or that are in excess of the applicable limit of insurance. An agreed settlement means a settlement and release of liability signed by us, the insured and the claimant or the claimant's legal representative.

8. Other Insurance

If other valid and collectible insurance is available to the insured for a loss we cover under Coverages A, B or D of this Coverage Form, our obligations are limited as follows:

a. Primary Insurance

This insurance is primary except when b. below applies. If this insurance is primary, our obligations are not affected unless any of the other insurance is also primary. Then, we will share with all that other insurance by the method described in c. below.

b. Excess Insurance

This insurance is excess over:

(1) Any of the other insurance, whether primary, excess, contingent or on any other basis:

   (a) That is Property Insurance which also includes but is not limited to Builder's Risk, Installation Floater or similar coverage for "your work" or for premises of others rented to you or occupied by you;

   (b) If the loss arises out of the maintenance or use of watercraft to the extent not subject to Exclusion e. of Section I – Coverage A – Bodily Injury and Property Damage Liability

(2) Any other primary insurance available to you covering liability for "compensatory damages" arising out of the premises or operations or products-completed operations for which you have been added as an additional insured by attachment of an endorsement.

When this insurance is excess, we will have no duty under Coverages A, B or D to defend the insured against any "action" if any other insurer has a duty to defend the insured against that "action". If no other insurer defends, we will undertake to do so, but we will be entitled to the insured's rights against all those other insurers.

When this insurance is excess over other insurance, we will pay only our share of the amount of the loss, if any, that exceeds the sum of:

(1) The total amount that all such other insurance would pay for the loss in the absence of this insurance; and
(2) The total of all deductible and self-insured amounts under all that other insurance.

We will share the remaining loss, if any, with any other insurance that is not described in this Excess Insurance provision and was not bought specifically to apply in excess of the Limits of Insurance shown in the Declarations of this policy.

c. Method Of Sharing

If all of the other insurance permits contribution by equal shares, we will follow this method also. Under this approach each insurer contributes equal amounts until it has paid its applicable limit of insurance or none of the loss remains, whichever comes first.

If any of the other insurance does not permit contribution by equal shares, we will contribute by limits. Under this method, each insurer's share is based on the ratio of its applicable limit of insurance to the total applicable limits of insurance of all insurers.

9. Premium Adjustment

a. We will compute all premiums for this Coverage Form in accordance with our rules and rates.

b. The Advance Liability Premium shown in the Declarations is a deposit premium only. At the end of each policy period we will compute the earned premium for that period. If such earned premium is greater than the liability premium initially charged, the first Named Insured shall pay the excess to us. If, however, the earned premium is less than the liability premium initially charged, we will return the excess to the first Named Insured subject to the retention of the minimum liability premium shown in the Declarations.

c. The first Named Insured must keep records of the information we need for premium computation, and send us copies at such times as we may request.

10. Premiums

The first Named Insured shown in the Declarations:

a. Is responsible for the payment of all premiums; and
b. Will be the payee for any return premiums we pay.

11. Representations Or Fraud

By accepting this policy, you agree:

a. The statements in the Declarations are accurate and complete;
b. Those statements are based upon representations you made to us;
c. We have issued this policy in reliance upon your representations; and
d. This policy is void in any case of fraud by you as it relates to this policy or any claim under this policy.

12. Separation Of Insureds, Cross Liability

Except with respect to the Limits of Insurance, and any rights or duties specifically assigned in this Coverage Form to the first Named Insured, this insurance applies:

a. As if each Named Insured were the only Named Insured; and
b. Separately to each insured against whom claim is made or "action" is brought.

13. Termination

a. The first Named Insured shown in the Declarations may terminate this policy by mailing or delivering to us advance written notice of termination.

b. Subject to paragraph c. below, we may terminate this policy by giving to the first Named Insured

(1) 5 days written notice of termination personally delivered, or
(2) 15 days notice of termination by registered mail if termination is for non-payment of premium, or
(3) 30 days notice of termination by registered mail if termination is for any other reason.

Registered mail termination takes effect 15 or 30 days after receipt of the letter by the post office to which it is addressed, depending upon the reason for termination.

c. To the extent that the Civil Code of the Province of Quebec is applicable to this policy General Conditions and Provisions as set out in the Civil Code of the Province of Quebec apply. Accordingly, we may terminate this policy by giving to the first Named Insured

(1) 15 days notice of termination by registered mail if termination is for non-payment of premium, or
(2) 30 days notice of termination by registered mail if termination is for any other reason..

Registered mail termination takes effect 15 or 30 days after receipt of the notice at the last known address of the first Named Insured, depending upon the reason for termination.

d. The policy period will end on the date termination takes effect.

e. If this policy is terminated, we will send the first Named Insured any premium refund due. If we terminate, the refund will be pro rata. If the first Named Insured terminates, the refund may be less than pro rata. The termination will be effective even if we have not made or offered a refund.

14. Transfer Of Rights Of Recovery Against Others To Us

If the insured has rights to recover all or part of any payment we have made under this Coverage Form, those rights are transferred to us. The insured must do nothing after loss to impair them. At our request, the insured will bring "action" or transfer those rights to us and help us enforce them.

15. Transfer Of Your Rights and Duties Under This Coverage Form

Your rights and duties under this Coverage Form may not be transferred without our written consent except in the case of death of an individual Named Insured.

If you die, your rights and duties will be transferred to your legal representative but only while acting within the scope of duties as your legal representative. Until your legal representative is appointed, anyone having proper temporary custody of your property will have your rights and duties but only with respect to that property.

SECTION V – DEFINITIONS

1. "Abuse" means any act or threat involving molestation, harassment, corporal punishment or any other form of physical, sexual or mental abuse.
2. "Action" means a civil proceeding in which "compensatory damages" because of "bodily injury", "property damage" or "personal and advertising injury" to which this insurance applies are alleged. "Action" includes:
   a. An arbitration proceeding in which such "compensatory damages" are claimed and to which the insured must submit or does submit with our consent; or
   b. Any other alternative dispute resolution proceeding in which such "compensatory damages" are claimed and to which the insured submits with our consent.
3. "Advertisement" means a notice that is broadcast or published to the general public or specific market segments about your goods, products or services for the purpose of attracting customers or supporters. For the purposes of this definition:
   a. Notices that are published include material placed on the Internet or on similar electronic means of communication; and
   b. Regarding web-sites, only that part of a web-site that is about your goods, products or services for the purposes of attracting customers or supporters is considered an advertisement.
4. "Automobile" means a land motor vehicle, trailer or semi trailer that is required by law to be insured under a contract evidenced by a motor vehicle liability policy, or any vehicle insured under such a contract, including any attached machinery or equipment.
5. "Bodily injury" means bodily injury, sickness or disease sustained by a person, including death resulting from any of these at any time.
6. "Compensatory damages" means damages due or awarded in payment for actual injury or economic loss. "Compensatory damages" does not include punitive or exemplary damages or the multiple portion of any multiplied damage award.
7. "Coverage territory" means:
   a. Canada and the United States of America (including its territories and possessions).
   b. International waters or airspace, but only if the injury or damage occurs in the course of travel or transportation between any places included in a. above; or
   c. All other parts of the world if the injury or damage arises out of:
      (1) Goods or products made or sold by you in the territory described in a. above;
      (2) The activities of an insured person whose home is in the territory described in a. above, but is away for a short time on your business; or
      (3) "Personal and advertising injury" offenses that take place through the Internet or similar electronic means of communication

   provided the insured's responsibility to pay "compensatory damages" is determined in an "action" on the merits, in the territory described in a. above or in a settlement we agree to.
8. "Electronic data" means information, facts or programs stored as or on, created or used on, or transmitted to or from computer software, including systems and applications software, hard or floppy disks, CD-ROMS, tapes, drives, cells, data processing devices or any other media which are used with electronically controlled equipment.
9. "Employee" includes a "leased worker" and a "temporary worker".
10. "Executive officer" means a person holding any of the officer positions created by your charter, constitution, by-laws or any other similar governing document.
11. "Fissionable substance" means any prescribed substance that is, or from which can be obtained, a substance capable of releasing atomic energy by nuclear fission.
12. "Fungi" includes, but is not limited to, any form or type of mould, yeast, mushroom or mildew whether or not allergenic, pathogenic or toxigenic, and any substance, vapour or gas produced by, emitted from or arising out of any "fungi" or "spores" or resultant mycotoxins, allergens or pathogens.
13. "Hostile fire" means one which becomes uncontrollable or breaks out from where it was intended to be.
14. "Impaired property" means tangible property, other than "your product" or "your work", that cannot be used or is less useful because:
    a. It incorporates "your product" or "your work" that is known or thought to be defective, deficient, inadequate or dangerous; or
    b. You have failed to fulfill the terms of a contract or agreement;

    if such property can be restored to use by:
    a. The repair, replacement, adjustment or removal of "your product" or "your work"; or
    b. Your fulfilling the terms of the contract or agreement.
15. "Incidental medical malpractice injury" means "bodily injury" arising out of the rendering of or failure to render, during the policy period, the following services:
    i) medical, surgical, dental, x-ray or nursing services or treatment or the furnishing of food or beverages in connection therewith; or
    ii) the furnishing or dispensing of drugs or medical, dental or surgical supplies or appliances;

    by any insured or any indemnitee causing the "incidental medical malpractice injury" who is not engaged in the business or occupation of providing any of the services described in i) and ii) above.

16. "Insured contract" means:
    a. A contract for a lease of premises. However, that portion of the contract for a lease of premises that indemnifies any person or organization for damage to premises while rented to you or temporarily occupied by you with permission of the owner is not an "insured contract";
    b. A sidetrack agreement;
    c. An easement or license agreement in connection with vehicle or pedestrian private railroad crossings at grade;
    d. Any other easement agreement;
    e. An obligation, as required by ordinance or bylaw, to indemnify a municipality, except in connection with work for a municipality;
    f. An elevator maintenance agreement;
    g. That part of any other contract or agreement pertaining to your business (including an indemnification of a municipality in connection with work performed for a municipality) under which you assume the tort liability of another party to pay for "compensatory damages" because of "bodily injury" or "property damage" to a third person or organization, provided the "bodily injury" or "property damage" is caused, in whole or in part, by you or by those acting on your behalf. Tort liability means a liability that would be imposed by law in the absence of any contract or agreement.

       Paragraph g. does not include that part of any contract or agreement:

       (1) That indemnifies an architect, engineer or surveyor for injury or damage arising out of:

          (a) Preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
          (b) Giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage; or

       (2) Under which the insured, if an architect, engineer or surveyor, assumes liability for an injury or damage arising out of the insured's rendering or failure to render "professional services", including those listed in (1) above and supervisory, inspection, architectural or engineering activities.

17. "Leased worker" means a person leased to you by a labour leasing firm under an agreement between you and the labour leasing firm, to perform duties related to the conduct of your business. "Leased worker" does not include a "temporary worker".

18. "Loading or unloading" means the handling of property:
    a. After it is moved from the place where it is accepted for movement into or onto an

       (1) aircraft or watercraft ;
       (2) "automobile" by means of attached machinery that is designed for and used exclusively for the purpose of loading and unloading of the "automobile" to which it is attached and has no other purpose;
    b. While it is in or on an aircraft, watercraft or "automobile"; or
    c. While it is being removed from an
       (1) aircraft or watercraft;
       (2) "automobile" by means of attached machinery that is designed for and used exclusively for the purpose of loading and unloading of the "automobile" to which it is attached and has no other purpose;
       to the place where it is finally delivered;

       but "loading or unloading" does not include the movement of property by means of a mechanical device, other than a hand truck, that is not attached to the aircraft, watercraft or "automobile".

19. "Nuclear energy hazard" means the radioactive, toxic, explosive, or other hazardous properties of "radioactive material".

20. "Nuclear facility" means:

    a) any apparatus designed or used to sustain nuclear fission in a self-supporting chain reaction or to contain a critical mass of plutonium, thorium and uranium or any one or more of them;
    b) any equipment or device designed or used for (i) separating the isotopes of plutonium, thorium and uranium or any one or more of them, (ii) processing or packaging waste;
    c) any equipment or device used for the processing, fabricating or alloying of plutonium, thorium or uranium enriched in the isotope uranium 233 or in the isotope uranium 235, or any one or more of them if at any time the total amount of such material in the custody of the insured at the premises where such equipment or device is located consists of or contains more than 25 grams of plutonium or uranium 233 or any combination thereof, or more than 250 grams of uranium 235;
    d) any structure, basin, excavation, premises or place prepared or used for the storage or disposal of waste "radioactive material";

    and includes the site on which any of the foregoing is located, together with all operations conducted thereon and all premises used for such operations.

21. "Occurrence" means an accident, including continuous or repeated exposure to substantially the same general harmful conditions.

22. "Personal and advertising injury" means injury, including consequential "bodily injury", arising out of one or more of the following offenses:

    a. False arrest, detention or imprisonment;
    b. Malicious prosecution;
    c. The wrongful eviction from, wrongful entry into, or invasion of the right of private occupancy of a room, dwelling or premises that a person occupies, committed by or on behalf of its owner, landlord or lessor;
    d. Oral or written publication, in any manner, of material that slanders or libels a person or organization or disparages a person's or organization's goods, products or services;

e. Oral or written publication, in any manner, of material that violates a person's right of privacy;
f. The use of another's advertising idea in your "advertisement"; or
g. Infringing upon another's copyright, trade dress or slogan in your "advertisement".

23. "Pollutants" mean any solid, liquid, gaseous or thermal irritant or contaminant, including smoke, odour, vapour, soot, fumes, acids, alkalis, chemicals and waste. Waste includes materials to be recycled, reconditioned or reclaimed.

24. "Products-completed operations hazard":
    a. Includes all "bodily injury" and "property damage" occurring away from premises you own or rent and arising out of "your product" or "your work" except:
        (1) Products that are still in your physical possession; or
        (2) Work that has not yet been completed or abandoned. However, "your work" will be deemed completed at the earliest of the following times:
            (a) When all of the work called for in your contract has been completed.
            (b) When all of the work to be done at the job site has been completed if your contract calls for work at more than one job site.
            (c) When that part of the work done at a job site has been put to its intended use by any person or organization other than another contractor or subcontractor working on the same project.

            Work that may need service, maintenance, correction, repair or replacement, but which is otherwise complete, will be treated as completed.

    b. Does not include "bodily injury" or "property damage" arising out of the existence of tools, uninstalled equipment or abandoned or unused materials.

25. "Professional services" shall include but not be limited to:
    a. Medical, surgical, dental, x-ray or nursing service or treatment, or the furnishing of food or beverages in connection therewith;
    b. Any professional service or treatment conducive to health;
    c. Professional services of a pharmacist;
    d. The furnishing or dispensing of drugs or medical, dental or surgical supplies or appliances;
    e. The handling or treatment of deceased human bodies including autopsies, organ donations or other procedures;
    f. Any cosmetic, body piercing, tonsorial, massage, physiotherapy, chiropody, hearing aid, optical or optometrical services or treatments;
    g. The preparation or approval of maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications;
    h. Supervisory, inspection, architectural, design or engineering services;
    i. Accountant's, advertiser's, notary's (Quebec), public notary's, paralegal's, lawyer's, real estate broker's or agent's, insurance broker's or agent's, travel agent's, financial institution's, or consultant's professional advices or activities;
    j. Any computer programming or re-programming, consulting, advisory or related services; or
    k. Claim, investigation, adjustment, appraisal, survey or audit services.

26. "Property damage" means:
    a. Physical injury to tangible property, including all resulting loss of use of that property. All such loss of use shall be deemed to occur at the time of the physical injury that caused it; or
    b. Loss of use of tangible property that is not physically injured. All such loss of use shall be deemed to occur at the time of the "occurrence" that caused it.

    For the purposes of this insurance, "electronic data" is not tangible property.

27. "Radioactive material" means uranium, thorium, plutonium, neptunium, their respective derivatives and compounds, radioactive isotopes of other elements and any other substances which may be designated by any nuclear liability act, law or statute, or any law amendatory thereof, as being prescribed substances capable of releasing atomic energy, or as being requisite for the production, use or application of atomic energy.

28. "Spores" includes, but is not limited to, any reproductive particle or microscopic fragment produced by, emitted from or arising out of any "fungi".

29. "Temporary worker" means a person who is retained by you under a contract of service to substitute for a permanent "employee" on leave or to meet seasonal or short-term workload conditions.

30. "Terrorism" means an ideologically motivated unlawful act or acts, including but not limited to the use of violence or force or threat of violence or force, committed by or on behalf of any group(s), organization(s) or government(s) for the purpose of influencing any government and/or instilling fear in the public or a section of the public.

31. "Volunteer worker" means a person who is not your "employee", and who donates his or her work and acts at the direction of and within the scope of duties determined by you, and is not paid a fee, salary or other compensation by you or anyone else for their work performed for you.

32. "Your product":
    a. Means:
        (1) Any goods or products, other than real property, manufactured, sold, handled, distributed or disposed of by:
            (a) You;
            (b) Others trading under your name; or
            (c) A person or organization whose business or assets you have acquired; and
        (2) Containers (other than vehicles), materials, parts or equipment furnished in connection with such goods or products.
    b. Includes
        (1) Warranties or representations made at any time with respect to the fitness, quality, durability, performance or use of "your product"; and
        (2) The providing of or failure to provide warnings or instructions.
    c. Does not include vending machines or other property rented to or located for the use of others but not sold.

33. "Your work":
    a. Means:
        (1) Work or operations performed by you or on your behalf; and
        (2) Materials, parts or equipment furnished in connection with such work or operations.
    b. Includes
        (1) Warranties or representations made at any time with respect to the fitness, quality, durability, performance or use of "your work", and
        (2) The providing of or failure to provide warnings or instructions.

Description 0f Terms Used For Rating Basis In The Liability Rating Schedule

Area - The total number of square metres of floor space at the insured premises, excluding that portion of basements used exclusively for storage or that portion of the premises used for heating or air conditioning plant purposes.

Rates apply per 100 square metres of area.

Basic – A basic charge is in addition to the premium developed from the application of exposure charges and applies per location.

Cost of Work (For work sublet to others) - The total cost of all operations performed for you by independent contractors, including the cost of materials furnished, used or delivered for use in the execution of the work.

Rates apply per $1,000 of cost of work.

Admissions - The total number of persons, other than your employees , admitted to the event insured or to events conducted on the premises whether on paid admissions, tickets, complimentary tickets or passes.

Rates apply per 100 admissions.

Payroll - The total earnings for each owner, partner, executive officer and employee.

Rates apply per $1,000 of payroll.

Revenue - The gross amount of money charged for all work or services performed by or on your behalf or for goods and products sold and distributed by you or by others trading under the your name.

Rates apply per $1,000 of revenue.

Each - The unit of exposure is indicated in the Liability Rating Schedule.

Rates apply per unit of exposure.

Units - A single room or group of rooms intended for occupancy as separate living quarters by a family, by a group of unrelated persons living together or by a person living alone.

Rates apply per unit.

Other – Rates apply per designated article. (i.e. person, object, event)

Privacy Information

Our Privacy Policy And Commitment To Protecting Your Privacy
Strategic Underwriting Managers Inc. ("SUM") is committed to protecting and keeping private our policyholders' Personal Information. Our Privacy Policy sets out principles on the collection, retention, use and disclosure of Personal Information. All employees are required to comply with the Privacy Policy in the execution of their daily activities.

At SUM we identify to our customers the purpose for collecting their Personal Information at or prior to its actual collection. Our customers in turn must consent to its collection implicitly, or expressly in order for us to use it for those purposes. We are committed to ensure that the Personal Information collected on our customers is only used for the purpose for which it was originally intended.

SUM shall collect, retain, use and disclose your Personal Information in accordance with our Privacy Policy. If we require your Personal Information for any other purpose other than as identified in our Privacy Policy, SUM will seek your consent prior to using it.

We issue an insurance policy with the understanding that, in addition to providing your consent, you have obtained the consent from all persons named in your insurance policy for the collection, retention, use and disclosure of their Personal Information, for the purposes we have identified.

What We Will NOT Do With Your Information
We **do not** sell customer information to anyone. Nor do we share customer information with organizations outside of our company that would use it to contact you about their own products or services.

We Strive To Protect Your Personal Information
All employees, independent brokers, agents, suppliers, and others as permitted by the criteria outlined in our Privacy Policy, who are granted access to customer records, understand the importance of keeping this information protected and confidential. They are clearly advised they are to use the information only for the purposes intended.

We've also established physical and systems safeguards, along with the proper processes, to protect customer information from unauthorized access or use.

SUM may internally share your Personal Information as permitted by the Privacy Policy. We may also use service providers located outside of Canada or related companies located outside of Canada to collect, use, retain or disclose your Personal Information as permitted by the criteria outlined in our Privacy Policy. In such circumstances, we will attempt to contractually protect your Personal Information, however, it may be subject to the laws of that jurisdiction and may be accessed by the courts, law enforcement and national security services of that jurisdiction.

Your Privacy Choices
You may withdraw your consent at any time (subject to legal or contractual obligations and on providing us reasonable notice) by contacting our Privacy Officer in writing. Please be aware that withdrawing your consent may prevent us from providing you with any requested product or service.

We may amend our Privacy Policy from time to time. For a copy of our Privacy Policy or for more information about our Privacy Policy and procedures, our member companies or to view jurisdictions where your Personal Information may be collected, used, retained or disclosed, please visit our website at www.suminsurance.ca, or contact our Privacy Officer, Jeff Somerville, at:

Strategic Underwriting Managers Inc.
18 King Street East, Suite 300
Toronto, Ontario M5C 1C4
Telephone: 1-877-603-7864 or 416-603-7864 Fax: 416-603-7861
E-mail: jeff.somerville@suminsurance.ca

CODE OF CONSUMER RIGHTS AND RESPONSIBILITIES

The staff of Strategic Underwriting Managers Inc. (along with the brokers who sell business insurance), are committed to safeguarding your rights when you shop for insurance and when you submit a claim following a loss. Your rights include the right to be fully informed, to be treated fairly, to timely complaint resolution, and to privacy. These rights are grounded in the contract between you and your insurer and the insurance laws of your province. With rights, however, come responsibilities including, for example, the expectation that you will provide complete and accurate information to your insurer. Your policy outlines other important responsibilities. Insurers and their distribution networks, and governments also have important roles to play in ensuring that your rights are protected.

Right To Be Informed
You can expect to access clear information about your policy, your coverage, and the claims settlement process. You have the right to an easy-to-understand explanation of how insurance works and how it will meet your needs. You also have a right to know how insurers calculate price based on relevant facts. Under normal circumstances, insurers will advise an insurance customer or the customer's intermediary of changes to, or the cancellation of a policy, at least thirty days prior to the expiration of the policy, if the customer provides information required for determining renewal terms of the policy at least forty-five days prior to the expiration of the policy.

You have the right to ask who is providing compensation to your broker or agent for the sale of your insurance. Your broker or agent will provide you written information that details how or she is paid, by whom, and in what ways.

Insurance companies will disclose their compensation arrangements with their distribution networks. Brokers and agents are committed to providing information relating to ownership, financing, and other relevant facts.

Responsibility to ask questions and share information
To safeguard your right to purchase appropriate coverage at a competitive price, you should ask questions about your policy so that you can understand what it covers and what your obligations are. You can access information through brochures and websites, as well as through one-on-one meetings with your broker, agent, or company representative. You have the option to shop the marketplace for the combination of coverages and service levels that best suits your insurance needs. To maintain your protection against loss, you must promptly inform your insurance company or broker or agent of any change in your circumstances.

Right to complaint resolution
Insurance companies, their brokers and agents are committed to high standards of customer service. If you have a complaint about the service you have received, you have a right to access your company's complaint resolution process. Your insurer, agent or broker can provide you with information about how you can ensure that your complaint is heard and promptly handled. Disputes involving claims settlement matters may be handled by the independent General Insurance OmbudService www.giocanada.org where your complaint may be referred to an independent mediator.

Responsibility to resolve disputes
You should always enter into the dispute resolution process in good faith, provide required information in a timely manner, and remain open to recommendations made by independent observers as part of that process.

Right to professional service
You have the right to deal with insurance professionals who exhibit a high ethical standard, which includes acting with honesty, integrity, fairness and skill. Brokers and agents must exhibit extensive knowledge of the product, its coverages and its limitations in order to best serve you. These standards are outlined in *A Consumer's Guide to Property and Casualty Insurance Transactions*, supported by members of the Insurance Brokers Association of Canada.

Right to privacy
Because it is important for you to disclose any and all information required by an insurer to provide the insurance coverage that best suits you, you have the right to know that your information will be used for the purpose set out in the privacy statement made available to you by your broker, agent or insurance representative. This information will not be disclosed to anyone except as permitted by law. You should know that insurers are subject to Canada's privacy laws.

CYBER EXCLUSION- LIABILITY

This policy excludes any **Cyber Loss** regardless of any other cause or event contributing concurrently or in any other sequence to the occasioning of the **Cyber Incident** and is applicable to all liability coverages and endorsements contained in the policy to which it is attached.

Cyber Loss means

Any loss, loss of use, damage, liability, claim, cost, expense of any nature, including but not limited to any statutory fine or penalty, directly or indirectly caused by, contributed to by, resulting from, arising out of or in connection with any **Cyber Incident** including but not limited to, any action taken in controlling, preventing, suppressing or remediating any **Cyber Incident**.

Cyber Incident

As used herein, a **Cyber incident** means:

i. Any unauthorized or malicious or criminal act or series of related unauthorized or malicious or criminal acts,
regardless of time and place, or the threat or hoax thereof; and/or

ii. Any failure to act, any error or omission or accident or event or series of related failures to act, errors or omission or accidents or events; and/or

iii. Any breach of duty, whether derived from law, statute, regulation, or trust or series of related breaches of duty, whether derived from law, statute, regulation or trust;

involving access to, processing of, maintenance of, corruption of, use or operation of any **Computer System** or any data by any person or group(s) of persons.

Computer System

As used herein, a **Computer System** means any computer, hardware, software, process, program, microchip, integrated circuit or similar device in computer equipment or non-computer equipment, information repository, communications system, electronic device (including, but not limited to, smart phone, laptop, tablet, wearable device), server, cloud or microcontroller including any similar system or any configuration of the aforementioned and including any associated input, output or data storage device, networking equipment or back-up facility, website or any other electronic data system, owned or operated by the Insured or any other party.

All other terms, conditions, exclusions and limitations of the policy are unchanged.

COMMUNICABLE DISEASE EXCLUSION

(For use on liability policies)

1. Notwithstanding any provision to the contrary within this policy, this policy does not cover all actual or alleged loss, liability, damage, compensation, injury, sickness, disease, death, medical payment, defence cost, cost, expense or any other amount, directly or indirectly and regardless of any other cause contributing concurrently or in any sequence, originating from, caused by, arising out of, contributed to by, resulting from, or otherwise in connection with a Communicable Disease or the fear or threat (whether actual or perceived) of a Communicable Disease.

2. For the purposes of this endorsement, loss, liability, damage, compensation, injury, sickness, disease, death, medical payment, defence cost, cost, expense or any other amount, includes, but is not limited to, any cost to clean-up, detoxify, remove, monitor or test for a Communicable Disease.

3. As used herein, a Communicable Disease means any disease which can be transmitted by means of any substance or agent from any organism to another organism where:

   3.1. the substance or agent includes, but is not limited to, a virus, bacterium, parasite or other organism or any variation thereof, whether deemed living or not, and

   3.2. the method of transmission, whether direct or indirect, includes but is not limited to, airborne transmission, bodily fluid transmission, transmission from or to any surface or object, solid, liquid or gas or between organisms, and

   3.3. the disease, substance or agent can cause or threaten bodily injury, illness, emotional distress, damage to human health, human welfare or property damage.

LMA5396

17 April 2020

Making a claim is simple and easy.

To report a claim:

#1: Email claims@suminsurance.ca

AND

#2: Contact Crawford Claims Alert

COMMERCIAL GENERAL LIABILITY POOL

1-888-218-2346

- **Toll free anywhere in North America**
- **24 hours a day – 7 days a week**
- **Bilingual claims support available**

or

rmsnewclaims@crawco.ca

Policies issued in Quebec

Report New claims to: licsclaims.montreal@crawco.ca

After hours emergency claims, please use the toll free number above

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Please identify the policy holder as an insured of the SUM Insurance CGL Liability Pool

Strategic Underwriting Managers Inc.

Named Insured: R Squared environmental Inc.
Policy Number: SUM-CGL-32129-001
Effective Date: May 31, 2022

For insurance policies issued to Named Insureds in the provinces of Alberta and British Columbia, please refer to the Statutory Conditions applicable to your Province(s).

Statutory Conditions - Alberta
(applicable in the province of Alberta). Subject to certain exceptions set out in the Insurance Act and regulations thereunder, the Statutory Conditions are deemed to be part of every contract of insurance in force in the province of Alberta. (**Statutory Conditions** 1 and 6 to 13 apply only to contracts that include insurance against loss or damage to property).

1. Misrepresentation

If a person applying for insurance falsely describes the property to the prejudice of the insurer, or misrepresents or fraudulently omits to communicate any circumstance that is material to be made known to the insurer in order to enable it to judge the risk to be undertaken, the contract is void as to any property in relation to which the misrepresentation or omission is material.

2. Property of Others

The insurer is not liable for loss or damage to property owned by a person other than the insured unless

(a) otherwise specifically stated in the contract, or

(b) the interest of the insured in that property is stated in the contract.

3. Change of Interest

The insurer is liable for loss or damage occurring after an authorized assignment under the *Bankruptcy and Insolvency Act* (Canada) or a change of title by succession, by operation of law or by death.

4. Material Change in Risk

(1) The insured must promptly give notice in writing to the insurer or its agent of a change that is

(a) material to the risk, and

(b) within the control and knowledge of the insured.

(2) If an insurer or its agent is not promptly notified of a change under subparagraph (1) of this condition, the contract is void as to the part affected by the change.

(3) If an insurer or its agent is notified of a change under subparagraph (1) of this condition, the insurer may

(a) terminate the contract in accordance with Statutory Condition 5, or

(b) notify the insured in writing that, if the insured desires the contract to continue in force, the insured must, within 15 days after receipt of the notice, pay to the insurer an additional premium specified in the notice.

(4) If the insured fails to pay an additional premium when required to do so under subparagraph (3)(b) of this condition, the contract is terminated at that time and Statutory Condition 5(2)(a) applies in respect of the unearned portion of the premium.

5. Termination of Insurance

(1) The contract may be terminated

(a) by the insurer giving to the insured 15 days' notice of termination by registered mail or 5 days' written notice of termination personally delivered, or

(b) by the insured at any time on request.

(2) If the contract is terminated by the insurer,

(a) the insurer must refund the excess of premium actually paid by the insured over the prorated premium for the expired time, but in no event may the prorated premium for the expired time be less than any minimum retained premium specified in the contract, and

(b) the refund must accompany the notice unless the premium is subject to adjustment or determination as to amount, in which case the refund must be made as soon as practicable.

(3) If the contract is terminated by the insured, the insurer must refund as soon as practicable the excess of premium actually paid by the insured over the short rate premium for the expired time specified in the contract, but in no event may the short rate premium for the expired time be less than any minimum retained premium specified in the contract.

(4) The 15-day period referred to in subparagraph (1)(a) of this condition starts to run on the day the registered letter or notification of it is delivered to the insured's postal address.

6. Requirements After Loss

(1) On the happening of any loss or damage to insured property, the insured must, if the loss or damage is covered by the contract, in addition to observing the requirements of Statutory Condition 9,

(a) immediately give notice in writing to the insurer,

(b) deliver as soon as practicable to the insurer a proof of loss in respect of the loss or damage to the insured property verified by statutory declaration

(i) giving a complete inventory of that property and showing in detail quantities and costs of that property and particulars of the amount of loss claimed,

(ii) stating when and how the loss occurred, and if caused by fire or explosion due to ignition, how the fire or explosion originated, so far as the insured knows or believes,

(iii) stating that the loss did not occur through any wilful act or neglect or the procurement, means or connivance of the insured,

(iv) stating the amount of other insurances and the names of other insurers,

(v) stating the interest of the insured and of all others in that property with particulars of all liens, encumbrances and other charges on that property,

(vi) stating any changes in title, use, occupation, location, possession or exposure of the property since the contract was issued, and

(vii) stating the place where the insured property was at the time of loss,

(c) if required by the insurer, give a complete inventory of undamaged property showing in detail quantities and cost of that property, and

(d) if required by the insurer and if practicable,

(i) produce books of account and inventory lists,

(ii) furnish invoices and other vouchers verified by statutory declaration, and

(iii) furnish a copy of the written portion of any other relevant contract.

(2) The evidence given, produced or furnished under subparagraph (1)(c) and (d) of this condition must not be considered proofs of loss within the meaning of Statutory Conditions 12 and 13.

7. Fraud

Any fraud or wilfully false statement in a statutory declaration in relation to the particulars required under Statutory Condition 6 invalidates the claim of the person who made the declaration.

8. Who May Give Notice and Proof

Notice of loss under Statutory Condition 6(1)(a) may be given and the proof of loss under Statutory Condition 6(1)(b) may be made

(a) by the agent of the insured if

(i) the insured is absent or unable to give the notice or make the proof, and

(ii) the absence or inability is satisfactorily accounted for,

or

(b) by a person to whom any part of the insurance money is payable, if the insured refuses to do so, or in the circumstances described in clause (a) of this condition.

9. Salvage

(1) In the event of loss or damage to insured property, the insured must take all reasonable steps to prevent further loss or damage to that property and to prevent loss or damage to other property insured under the contract, including, if necessary, removing the property to prevent loss or damage or further loss or damage to the property.

(2) The insurer must contribute on a prorated basis towards any reasonable and proper expenses in connection with steps taken by the insured under subparagraph (1) of this condition.

10. Entry, Control, Abandonment

After loss or damage to insured property, the insurer has

(a) an immediate right of access and entry by accredited representatives sufficient to enable them to survey and examine the property, and to make an estimate of the loss or damage, and

(b) after the insured has secured the property, a further right of access and entry by accredited representatives sufficient to enable them to appraise or estimate the loss or damage, but

(i) without the insured's consent, the insurer is not entitled to the control or possession of the insured property, and

(ii) without the insurer's consent, there can be no abandonment to it of the insured property.

11. In Case of Disagreement

(1) In the event of disagreement as to the value of the insured property, the value of the property saved, the nature and extent of the repairs or replacements required or, if made, their adequacy, or the amount of the loss or damage, those questions must be determined using the applicable dispute resolution process set out in the *Insurance Act* whether or not the insured's right to recover under the contract is disputed, and independently of all other questions.

(2) There is no right to a dispute resolution process under this condition until

(a) a specific demand is made for it in writing, and

(b) the proof of loss has been delivered to the insurer.

12. When Loss Payable

Unless the contract provides for a shorter period, the loss is payable within 60 days after the proof of loss is completed in accordance with Statutory Condition 6 and delivered to the insurer.

13. Repair or Replacement

(1) Unless a dispute resolution process has been initiated, the insurer, instead of making payment, may repair, rebuild or replace the insured property lost or damaged, on giving written notice of its intention to do so within 30 days after receiving the proof of loss.

(2) If the insurer gives notice under subparagraph (1) of this condition, the insurer must begin to repair, rebuild or replace the property within 45 days after receiving the proof of loss and must proceed with all due diligence to complete the work within a reasonable time.

14. Notice

(1) Written notice to the insurer may be delivered at, or sent by registered mail to, the chief agency or head office of the insurer in the province.

(2) Written notice to the insured may be personally delivered at, or sent by registered mail addressed to, the insured's last known address as provided to the insurer by the insured.

Named Insured: R Squared environmental Inc.
Policy Number: SUM-CGL-32129-001
Effective Date: May 31, 2022

Statutory Conditions – British Columbia
(applicable in the province of British Columbia). Subject to certain exceptions set out in the Insurance Act and regulations thereunder, the Statutory Conditions are deemed to be part of every contract of insurance in force in the province of British Columbia. (**Statutory Conditions** 1 and 6 to 13 apply only to contracts that include insurance against loss or damage to property).

1. Misrepresentation

If a person applying for insurance falsely describes the property to the prejudice of the insurer, or misrepresents or fraudulently omits to communicate any circumstance that is material to be made known to the insurer in order to enable it to judge the risk to be undertaken, the contract is void as to any property in relation to which the misrepresentation or omission is material.

2. Property of others

The insurer is not liable for loss or damage to property owned by a person other than the insured unless

(a) otherwise specifically stated in the contract, or

(b) the interest of the insured in that property is stated in the contract.

3. Change of interest

The insurer is liable for loss or damage occurring after an authorized assignment under the *Bankruptcy and Insolvency Act* (Canada) or a change of title by succession, by operation of law or by death.

4. Material change in risk

(1) The insured must promptly give notice in writing to the insurer or its agent of a change that is

(a) material to the risk, and

(b) within the control and knowledge of the insured.

(2) If an insurer or its agent is not promptly notified of a change under subparagraph (1) of this condition, the contract is void as to the part affected by the change.

(3) If an insurer or its agent is notified of a change under subparagraph (1) of this condition, the insurer may

(a) terminate the contract in accordance with Statutory Condition 5, or

(b) notify the insured in writing that, if the insured desires the contract to continue in force, the insured must, within 15 days after receipt of the notice, pay to the insurer an additional premium specified in the notice.

(4) If the insured fails to pay an additional premium when required to do so under subparagraph (3) (b) of this condition, the contract is terminated at that time and Statutory Condition 5 (2) (a) applies in respect of the unearned portion of the premium.

5. Termination of insurance

(1) The contract may be terminated

(a) by the insurer giving to the insured 15 days' notice of termination by registered mail or 5 days' written notice of termination personally delivered, or

(b) by the insured at any time on request.

(2) If the contract is terminated by the insurer,

(a) the insurer must refund the excess of premium actually paid by the insured over the prorated premium for the expired time, but in no event may the prorated premium for the expired time be less than any minimum retained premium specified in the contract, and

(b) the refund must accompany the notice unless the premium is subject to adjustment or determination as to amount, in which case the refund must be made as soon as practicable.

(3) If the contract is terminated by the insured, the insurer must refund as soon as practicable the excess of premium actually paid by the insured over the short rate premium for the expired time specified in the contract, but in no event may the short rate premium for the expired time be less than any minimum retained premium specified in the contract.

(4) The 15 day period referred to in subparagraph (1) (a) of this condition starts to run on the day the registered letter or notification of it is delivered to the insured's postal address.

6. Requirements after loss

(1) On the happening of any loss of or damage to insured property, the insured must, if the loss or damage is covered by the contract, in addition to observing the requirements of Statutory Condition 9,

(a) immediately give notice in writing to the insurer,

(b) deliver as soon as practicable to the insurer a proof of loss in respect of the loss or damage to the insured property verified by statutory declaration,

(i) giving a complete inventory of that property and showing in detail quantities and cost of that property and particulars of the amount of loss claimed,

(ii) stating when and how the loss occurred, and if caused by fire or explosion due to ignition, how the fire or explosion originated, so far as the insured knows or believes,

(iii) stating that the loss did not occur through any wilful act or neglect or the procurement, means or connivance of the insured,

(iv) stating the amount of other insurances and the names of other insurers,

(v) stating the interest of the insured and of all others in that property with particulars of all liens, encumbrances and other charges on that property,

(vi) stating any changes in title, use, occupation, location, possession or exposure of the property since the contract was issued, and

(vii) stating the place where the insured property was at the time of loss,

(c) if required by the insurer, give a complete inventory of undamaged property showing in detail quantities and cost of that property, and

(d) if required by the insurer and if practicable,

(i) produce books of account and inventory lists,

(ii) furnish invoices and other vouchers verified by statutory declaration, and

(iii) furnish a copy of the written portion of any other relevant contract.

(2) The evidence given, produced or furnished under subparagraph (1) (c) and (d) of this condition must not be considered proofs of loss within the meaning of Statutory Conditions 12 and 13.

7. Fraud

Any fraud or wilfully false statement in a statutory declaration in relation to the particulars required under Statutory Condition 6 invalidates the claim of the person who made the declaration.

8. Who may give notice and proof

Notice of loss under Statutory Condition 6 (1) (a) may be given and the proof of loss under Statutory Condition 6 (1) (b) may be made

(a) by the agent of the insured, if

(i) the insured is absent or unable to give the notice or make the proof, and

(ii) the absence or inability is satisfactorily accounted for, or

(b) by a person to whom any part of the insurance money is payable, if the insured refuses to do so or in the circumstances described in clause (a) of this condition.

9. Salvage

(1) In the event of loss or damage to insured property, the insured must take all reasonable steps to prevent further loss or damage to that property and to prevent loss or damage to other property insured under the contract, including, if necessary, removing the property to prevent loss or damage or further loss or damage to the property.

(2) The insurer must contribute on a prorated basis towards any reasonable and proper expenses in connection with steps taken by the insured under subparagraph (1) of this condition.

10. Entry, control, abandonment

After loss or damage to insured property, the insurer has

(a) an immediate right of access and entry by accredited representatives sufficient to enable them to survey and examine the property, and to make an estimate of the loss or damage, and

(b) after the insured has secured the property, a further right of access and entry by accredited representatives sufficient to enable them to appraise or estimate the loss or damage, but

(i) without the insured's consent, the insurer is not entitled to the control or possession of the insured property, and

(ii) without the insurer's consent, there can be no abandonment to it of the insured property.

11. In case of disagreement

(1) In the event of disagreement as to the value of the insured property, the value of the property saved, the nature and extent of the repairs or replacements required or, if made, their adequacy, or the amount of the loss or damage, those questions must be determined using the applicable dispute resolution process set out in the *Insurance Act*, whether or not the insured's right to recover under the contract is disputed, and independently of all other questions.

(2) There is no right to a dispute resolution process under this condition until

(a) a specific demand is made for it in writing, and

(b) the proof of loss has been delivered to the insurer.

12. When loss payable

Unless the contract provides for a shorter period, the loss is payable within 60 days after the proof of loss is completed in accordance with Statutory Condition 6 and delivered to the insurer.

13. Repair or replacement

(1) Unless a dispute resolution process has been initiated, the insurer, instead of making payment, may repair, rebuild or replace the insured property lost or damaged, on giving written notice of its intention to do so within 30 days after receiving the proof of loss.

(2) If the insurer gives notice under subparagraph (1) of this condition, the insurer must begin to repair, rebuild or replace the property within 45 days after receiving the proof of loss, and must proceed with all due diligence to complete the work within a reasonable time.

14. Notice

(1) Written notice to the insurer may be delivered at, or sent by registered mail to, the chief agency or head office of the insurer in the province.

(2) Written notice to the insured may be personally delivered at, or sent by registered mail addressed to, the insured's last known address as provided to the insurer by the insured.

Named Insured: R Squared environmental Inc.
Policy Number: SUM-CGL-32129-001
Effective Date: May 31, 2022

THIS ENDORSEMENT CHANGES THE POLICY.
PLEASE READ IT CAREFULLY.

FOREST FIRE FIGHTING EXPENSES ENDORSEMENT

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

1. Paragraph 1. Insuring Agreement of SECTION 1 – COVERAGES – COVERAGE A. BODILY INJURY and PROPERTY DAMAGE LIABILITY is extended to include costs and expenses for controlling and extinguishing forest fires which you are legally obligated to pay under the provisions of any applicable provincial or territorial law, ordinance or regulation.

2. The Limits of Insurance Shown in the Declarations as applicable to form number 000102 – Commercial General Liability Coverage Form do not apply with respect to coverage provided by this endorsement. Only the Limits of Insurance shown in the Declarations as applicable to form 240100 – Forest Fire Fighting Expenses Endorsement apply to coverage provided by this endorsement.

3. With respect only to coverage provided by this endorsement, SECTION III - LIMITS OF INSURANCE is deleted and replaced by the following:

SECTION III – LIMITS OF INSURANCE

1. The Limits of Insurance shown in the Declarations, and the rules below fix the most we will pay regardless of the number of:

   a) Insureds;

   b) Claims made or "actions" brought; or

   c) Persons or organizations making claims or bringing "actions".

2. The Forest Fire Fighting Expenses Endt - Aggregate Limit is the most we will pay for all such costs and expenses insured hereunder.

3. Subject to 2. above the Forest Fire Fighting Expenses Endt - Each Occurrence Limit is the most we will pay for such costs and expenses arising out of any one "occurrence".

   The Forest Fire Fighting Expenses Endt - Aggregate Limit shall apply separately to each consecutive annual period and to any remaining period of less than 12 months, starting with the beginning of the policy period shown in the Declarations unless the policy period is extended after issuance for an additional period of less than 12 months. In that case, the additional period will be deemed part of the last preceding period for the purposes of determining the Limit of Insurance.

   For the purpose of determining the limits of insurance for coverage provided by this endorsement, any act, error or omission together with all related acts, errors or omissions which legally obligate you to pay costs and expenses for controlling and extinguishing forest fires under the provisions of any applicable provincial or territorial law, ordinance or regulation in connection with one forest fire will be considered one "occurrence".

4. a. Our obligation under the coverage provided by this endorsement to pay costs and expenses on your behalf applies only to the amount of costs and expenses in excess of the deductible amount shown in the Declarations and the Forest Fire Fighting Expenses Endt - Each Occurrence Limit will be reduced by the amount of such deductible. The Forest Fire Fighting Expenses Endt -Aggregate Limit shall not be reduced by the application of the deductible amount.

b. The deductible amount applies to all costs and expenses as the result of any one claim.

c. The terms of this insurance, including those relating to:

   1) Our right and duty to defend any "action" seeking those costs and expenses; and

   2) Your duties in the event of an "occurrence", claim or "action";

   apply irrespective of the application of the deductible amount.

d. We may pay any part or all of the deductible amount to effect settlement of any claim or "action" and, upon notification of the action taken, you shall promptly reimburse us for such part of the deductible amount as has been paid by us.

5. With respect only to coverage provided by this endorsement, SECTION V – DEFINITIONS is amended as follows:

a. The definition of "coverage territory" is deleted and replaced by the following:

   7. "Coverage territory" means Canada.

6. With respect only to coverage provided by this endorsement:

   a. Any costs and expenses for controlling and extinguishing forest fires which you are legally obligated to pay under the provisions of any applicable provincial or territorial law, ordinance or regulation shall be deemed to be "compensatory damages" and "property damage".

   b. Any act, error or omission which legally obligates you to pay costs and expenses for controlling and extinguishing forest fires under the provisions of any applicable provincial or territorial law, ordinance or regulation shall be deemed to be caused by an "occurrence".

Premium: Included

Named Insured: R Squared environmental Inc.
Policy Number: SUM-CGL-32129-001
Effective Date: May 31, 2022

THIS ENDORSEMENT CHANGES THE POLICY.
PLEASE READ IT CAREFULLY.

ABSOLUTE POLLUTION EXCLUSION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

Exclusion 4. of COMMON EXCLUSIONS - COVERAGES A, B, C AND D is replaced by the following:

1. a. "Bodily injury", "personal injury" or "property damage" arising out of the actual, alleged, potential or threatened spill, discharge, emission, dispersal, seepage, leakage, migration, release or escape of pollutants.

   b. Any loss, cost or expense arising out of any request, demand or order that any insured or others test for, monitor, clean up, remove, contain, treat, detoxify, decontaminate, stabilize, remediate or neutralize or in any way respond to, or assess the effects of pollutants.

"Pollutants" means any solid, liquid, gaseous or thermal irritant or contaminant, including smoke, odour, vapour, soot, fumes, acids, alkalis, chemicals and waste. Waste includes materials to be recycled, reconditioned or reclaimed.

Premium: Included

Named Insured: R Squared environmental Inc.
Policy Number: SUM-CGL-32129-001
Effective Date: May 31, 2022

NON OWNED AUTOMOBILE
SPF#6

WHEREAS AN APPLICATION HAS BEEN MADE BY THE APPLICANT (HEREINAFTER CALLED THE INSURED) TO THE INSURER FOR A CONTRACT OF AUTOMOBILE INSURANCE AND THE SAID APPLICATION FORMS PART OF THIS CONTRACT OF INSURANCE AND IS AS FOLLOWS: -

ITEMS **APPLICATION**

1. FULL NAME OF THE APPLICANT: AS PER DECLARATIONS

   POSTAL ADDRESS: AS PER DECLARATIONS

   (INCLUDING COUNTY OR DISTRICT)

   APPLICANT IS: AS PER DECLARATIONS

2. POLICY PERIOD - AS PER DECLARATIONS

   12.01 A.M. STANDARD TIME AT THE APPLICANT'S ADDRESS STATED HEREIN AS TO EACH OF SAID DATES

3. THE AUTOMOBILES IN RESPECT OF WHICH INSURANCE IS TO BE PROVIDED ARE THOSE NOT OWNED IN WHOLE OR IN PART BY, NOR LICENSED IN THE NAME OF THE APPLICANT, USED IN THE APPLICANT'S BUSINESS OF: AS PER DECLARATIONS

4. THE APPLICANT'S PARTNERS, OFFICERS, EMPLOYEES AND AGENTS AS OF THE DATE OF THIS APPLICATION ARE AS FOLLOWS:

LOCATION

PARTNERS, OFFICERS AND EMPLOYEES WHO REGULARLY USE AUTOMOBILES NOT OWNED BY THE APPLICANT IN THE APPLICANT'S BUSINESS

ALL OTHER PARTNERS, OFFICERS AND EMPLOYEES

ALL APPLICANT'S AGENTS

	(CLASS "A1" PRIVATE PASSENGER)		**(CLASS "A2" COMMERCIAL)**		**(CLASS "B")**		**(CLASS "C")**	
NUMBER	RATE	PREMIUM	NUMBER	RATE	PREMIUM	NUMBER	RATE	PREMIUM	NUMBER	RATE	PREMIUM

C O V E R E D I F A N Y T O B E R E P O R T E D

5. "HIRED AUTOMOBILES" - THE AUTOMOBILES HIRED BY THE APPLICANT ARE AS FOLLOWS:

   TYPE OF AUTOMOBILE

   ESTIMATED COST OF HIRE

   RATES PER $100 OF COST OF HIRE

   ADVANCE PREMIUM: INCLUDED

C O V E R E D I F A N Y T O B E R E P O R T E D

THE ADVANCE PREMIUM IS SUBJECT TO ADJUSTMENT AT THE END OF THE POLICY PERIOD AS PROVIDED IN THE POLICY.

6. "AUTOMOBILES OPERATED UNDER CONTRACT" ON BEHALF OF THE APPLICANT ARE AS FOLLOWS:

   TYPE OF AUTOMOBILE AND DESCRIPTION OF USE

   ESTIMATED CONTRACT COST

   RATES PER $100 OF CONTRACT COST

   ADVANCE PREMIUM: INCLUDED

C O V E R E D I F A N Y T O B E R E P O R T E D

THE ADVANCE PREMIUM IS SUBJECT TO ADJUSTMENT AT THE END OF THIS POLICY PERIOD AS PROVIDED IN THE POLICY.

7. THIS APPLICATION IS MADE FOR INSURANCE AGAINST THE PERILS MENTIONED IN THIS ITEM AND UPON THE TERMS AND CONDITIONS OF THE INSURER'S CORRESPONDING STANDARD POLICY FORM AND FOR THE FOLLOWING SPECIFIED LIMIT.

INSURING AGREEMENT

SECTION A THIRD PARTY LIABILITY

PERILS

LEGAL LIABILITY FOR BODILY INJURY TO OR DEATH OF ANY PERSON OR DAMAGE TO PROPERTY OF OTHERS NOT IN THE CARE, CUSTODY OR CONTROL OF THE APPLICANT.

LIMIT

$ AS PER DECLARATIONS (EXCLUSIVE OF INTEREST AND COSTS) FOR LOSS OR DAMAGE RESULTING FROM BODILY INJURY TO OR THE DEATH OF ONE OR MORE PERSONS, AND FOR LOSS OR DAMAGE TO PROPERTY REGARDLESS OF THE NUMBER OF CLAIMS ARISING FROM ANY ONE ACCIDENT.

COMBINED PREMIUMS

$ AS PER DECLARATIONS

ENDORSEMENTS - AS PER DECLARATIONS

MINIMUM RETAINED PREMIUM $ AS PER DECLARATIONS

TOTAL PREMIUM

$ AS PER DECLARATIONS

8. HAS ANY INSURER CANCELLED, DECLINED OR REFUSED TO RENEW OR ISSUE AUTOMOBILE INSURANCE TO THE APPLICANT WITHIN THREE YEARS PRECEDING THIS APPLICATION? IF SO, STATE NAME OF INSURER. - AS KNOWN TO COMPANY

9. STATE PARTICULARS OF ALL ACCIDENTS OR CLAIMS ARISING OUT OF THE USE OR OPERATION IN HIS BUSINESS OF NON-OWNED AUTOMOBILES BY THE APPLICANT WITHIN THE THREE YEARS PRECEDING THIS APPLICATION.

INJURY TO PERSONS	**DAMAGE TO PROPERTY OF OTHERS**
AS KNOWN TO COMPANY	**AS KNOWN TO COMPANY**

10. ALL THE STATEMENTS IN THIS APPLICATION ARE TRUE AND THE APPLICANT HEREBY APPLIES FOR A CONTRACT OF AUTOMOBILE INSURANCE TO BE BASED ON THE TRUTH OF THE SAID STATEMENTS.

11. Where, (a) an applicant for a contract gives false particulars of the described automobile to be insured to the prejudice of the Insurer, or knowingly misrepresents or fails to disclose in the application any fact required to be stated therein; or (b) the Insured contravenes a term of the contract or commits a fraud; or (c) the Insured wilfully makes a false statement in respect of a claim under the contract, a claim by the Insured is invalid and the right of the Insured to recover indemnity is forfeited.

INSURING AGREEMENT

Now, Therefore, in Consideration of the payment of the premium specified and of the statements contained in the application and subject to the limits, terms, conditions, provisions, definitions and exclusions herein stated

SECTION A - THIRD PARTY LIABILITY

The Insurer agrees to indemnify the Insured against the liability imposed by law upon the Insured for loss or damage arising from the use or operation of any automobile not owned in whole or in part by or licensed in the name of the Insured, and resulting from

BODILY INJURY TO OR THE DEATH OF ANY PERSON OR DAMAGE TO PROPERTY OF OTHERS NOT IN THE CARE, CUSTODY OR CONTROL OF THE INSURED:

Provided always the Insurer shall not be liable under this Policy;

a) for any liability which arises from the use or operation of any automobile while personally driven by the Insured if the Insured is an individual; or

*b) for any liability imposed upon any person insured by this Policy:

(1) by any workmen's compensation law; or

(2) by any law for bodily injury to or the death of the Insured or any partner, officer or employee of the Insured while engaged in the business of the Insured; or

c) for any liability assumed by any person insured by this Policy voluntarily under any contract or agreement; or

d) for loss or damage to property carried in or upon an automobile personally driven by any person insured by this Policy or to any property owned or rented by, or in the care, custody or control of any such person; or

e) for any amount in excess of the limit stated in Item 7 of the application, and expenditures provided for in the Additional Agreements of this Policy; subject always to the provisions of the section of the Insurance Act (Automobile Insurance Part) relating to the nuclear energy hazard.

* Not applicable in the Province of Ontario

ADDITIONAL AGREEMENTS OF INSURER

Where indemnity is provided by this Policy, the Insurer further agrees:

1) upon receipt of notice of loss or damage caused to persons or property to serve any person insured by this Policy by such investigation thereof, or by such negotiations with the claimant, or by such settlement of any resulting claims, as may be deemed expedient by the Insurer; and

2) to defend in the name and on behalf of any person insured by this Policy and at the cost of the Insurer any civil action which may at any time be brought against such person on account of such loss or damage to persons or property; and

3) to pay all costs taxed against any person insured by this Policy in any civil action defended by the Insurer and any interest accruing after entry of judgment upon that part of the judgment which is within the limits of the Insurer's liability; and

4) in case the injury be to a person, reimburse any person insured by this Policy for outlay for such medical aid as may be immediately necessary at the time of such injury; and

5) be liable up to the minimum limit(s) prescribed for that province or territory of Canada in which the accident occurred, if that limit(s) is higher than the limit stated in section A of Item 7 of the application; and

6) not set up any defense to a claim that might not be set up if the Policy were a motor vehicle liability policy issued in the province or territory of Canada in which the accident occurred.

AGREEMENTS OF INSURED

Where indemnity is provided by this section, every person insured by this Policy

a) by the acceptance of this Policy, constitutes and appoints the Insurer his irrevocable attorney to appear and defend in any province or territory of Canada in which action is brought against the Insured arising out of the use or operation of an automobile with respect to which insurance is provided hereunder;

b) shall reimburse the Insurer, upon demand, in the amount which the Insurer has paid by reason of the provisions of any statute relating to automobile insurance and which the Insurer would not otherwise be liable to pay under this Policy.

GENERAL PROVISIONS AND DEFINITIONS

1. ADDITIONAL INSUREDS

The Insurer agrees to indemnify in the same manner and to the same extent as if named herein as the Insured, every partner, officer or employee of the Insured who, with the consent of the owner thereof, personally drives

a) in the business of the Insured stated in Item 3 of the application, any automobile not owned in whole or in part by or licensed in the name of

(i) the Insured, or

(ii) such additional insured person, or

(iii) any person or persons residing in the same dwelling premises as the Insured or such additional insured person, or

b) any automobile hired or leased in the name of the Insured except an automobile owned

in whole or in part or licensed in the name of such additional insured person.

2. TERRITORY

This Policy applies only to the use or operation of automobiles within Canada or the United States of America or upon a vessel plying between ports of those countries.

3. HIRED AUTOMOBILES DEFINED

The term "Hired Automobiles" as used in this Policy means automobiles hired or leased from others with or without drivers, used under the control of the Insured in the business stated in Item 3 of the application but shall not include any automobile owned in whole or in part by or licensed in the name of the Insured or any partner, officer or employee of the Insured.

4. AUTOMOBILES OPERATED UNDER CONTRACT DEFINED

The term "Automobiles Operated under Contract" as used in this Policy shall mean automobiles operated in the business of the Insured stated in Item 3 of the application where the complete supervision, direction and control of such automobiles remain with the owner thereof, but shall not include any automobile owned in whole or in part by or licensed in the name of the Insured or any partner, officer or employee of the Insured.

5. TWO OR MORE AUTOMOBILES

When two or more automobiles are insured hereunder the terms of this Policy shall apply separately to each, but a motor vehicle and a trailer or trailers attached thereto shall be held to be one automobile as respects limits of liability under Section A.

6. PREMIUM ADJUSTMENT

The Advance Premium stated in Item 5 of the application is computed on the estimated total "cost of hire" for the Policy Period. The words "cost of hire" as used herein mean the entire amount incurred for "Hired Automobiles" and drivers when such automobiles are hired with drivers or the amount incurred for hired automobiles and the wages paid to drivers when such drivers are employees of the Insured.

The Advance Premium stated in Item 6 of the application is computed on the estimated total "contract cost" for the Policy Period. The words "contract cost" as used herein mean the entire amount paid by the Insured for "Automobiles Operated under Contract" to the owners thereof.

The Advance Premiums are subject to adjustment at the end of the Policy Period when the Insured shall deliver to the Insurer a written statement of the total amounts expended for cost of hire during the Policy Period. If such amounts exceed the estimates stated in the application, the Insured shall immediately pay additional premium at the rates stated therein; if less, the Insurer shall return to the Insured the unearned premium when determined but the Insurer shall, in any event, receive or retain not less than the Minimum Retained premium stated therein.

The Insurer shall have the right and opportunity, whenever the268 Insurer so desires, to examine the books and records of the Insured to the extent they relate to the premium bases or the subject matter of this Policy.

STATUTORY CONDITIONS

(YUKON TERRITORY, NORTHWEST TERRITORIES, ALBERTA, ONTARIO, NEW BRUNSWICK, NOVA SCOTIA, PRINCE EDWARD ISLAND AND NEWFOUNDLAND)

(For use with S.P.F. No's. 1, 2, 4 and 6)

In these statutory conditions, unless the context otherwise requires, the word "Insured" means a person insured by this contract whether named or not.

NOTE: All of the Statutory Conditions contain the above wording. However, - in all of the Provinces and Territories using these standard, approved forms, only Statutory Conditions 1, 8 and 9 are made applicable to accident benefits insurance and uninsured motorist insurance where it is provided by the contract.

- in the Northwest Territories the definition of "insured person" must be read as containing in addition the words "and includes any person to whom benefits may be payable under the accident benefits set out in the Schedule to the Insurance Ordinance."

Material Change in Risk

1. 1) The Insured named in this contract shall promptly notify the Insurer or its local agent in writing of any change in the risk material to the contract and within the

Insured's knowledge.

2) Without restricting the generality of the foregoing, the words "change in the risk material to the contract" include:

a) any change in the insurable interest of the Insured named in this contract in the automobile by sale, assignment or otherwise, except through change of title by succession, death or proceedings under the Bankruptcy Act (Canada):

and in respect of insurance against loss of or damage to the automobile.

b) any mortgage, lien or encumberance affecting the automobile after the application for this contract;

c) any other insurance of the same interest, whether valid or not, covering loss or damage insured by this contract or any portion thereof.

NOTE: In Prince Edward Island Statutory Condition 1, sub-conditions 2 and 3 are identical with the above quoted Statutory Condition relating to material change in risk.

Prohibited Use by Insured

2. 1) The Insured shall not drive or operate the automobile,

a) unless the Insured is for the time being either authorized by law or qualified to drive or operate the automobile; or

b) while the Insured's licence to drive or operate an automobile is suspended or while the Insured's right to obtain a licence is suspended or while he is prohibited under order of any court from driving or operating an automobile; or

c) while the Insured is under the age of sixteen years or under such other age as is prescribed by the law of the province in which he resides at the time this contract is made as being the minimum age at which a licence or permit to drive an automobile may be issued to him; or

d) for any illicit or prohibited trade or transportation; or

e) in any race or speed test.

Prohibited Use by Others

2) The Insured shall not permit, suffer, allow or connive at the use of the automobile.

a) by any person,

(i) unless that person is for the time being either authorized by law or qualified to drive or operate the automobile; or

(ii) while that person is under the age of sixteen years or under such other age as is prescribed by the law of the province in which the person resides at the time this contract is made as being the minimum age at which a licence or permit to drive an automobile may be issued to the person; or

b) by any person who is a member of the household of the Insured while that person's licence to drive or operate an automobile is suspended or while his right to obtain a licence is suspended or while he is prohibited under order of any court from driving or operating an automobile; or

c) for any illicit or prohibited trade or transportation; or

d) in any race or speed test.

Requirements Where Loss or Damage to Persons or Property

3. 1) The Insured shall,

a) promptly give to the Insurer written notice, with all available particulars, of any accident involving loss or damage to persons or property and of any claim made on account of the accident;

b) verify by statutory declaration, if required by the Insurer, that the claim arose out of the use or operation of the automobile and that the person operating or responsible for the operation of the automobile at the time of the accident is a person insured under this contract; and

c) forward immediately to the Insurer every letter, document, advice or writ received by the Insured from or on behalf of the claimant.

2) The Insured shall not,

a) voluntarily assume any liability or settle any claim except at the Insured's

own cost; or

b) interfere in any negotiations for settlement or in any legal proceeding.

3) The Insured shall, whenever requested by the Insurer, aid in securing information and evidence and the attendance of any witness and shall co-operate with the Insurer, except in a pecuniary way, in the defence of any action or proceeding or in the prosecution of any appeal.

Requirements Where Loss or Damage to Automobile

4. 1) Where loss of or damage to the automobile occurs, the Insured shall, if the loss or damage is covered by this contract,

a) promptly give notice thereof in writing to the Insurer with the fullest information obtainable at the time;

b) at the expense of the Insurer, and as far as reasonably possible, protect the automobile from further loss or damage; and

c) deliver to the Insurer within ninety days after the date of the loss or damage a statutory declaration stating, to the best of the Insured's knowledge and belief, the place, time, cause and amount of the loss or damage, the interest of the Insured and of all others therein, the encumbrances thereon, all other insurance, whether valid or not, covering the automobile and that the loss or damage did not occur through any wilful act or neglect, procurement, means or connivance of the Insured.

2) Any further loss or damage accruing to the automobile directly or indirectly from a failure to protect it as required under subcondition (1) of this condition is not recoverable under this contract.

3) No repairs, other than those that are immediately necessary for the protection of the automobile from further loss or damage, shall be undertaken and no physical evidence of the loss or damage shall be removed,

a) without the written consent of the Insurer; or

b) until the Insurer has had a reasonable time to make the examination for which provision is made in statutory condition 5.

Examination of Insured

4) The Insured shall submit to examination under oath, and shall produce for examination at such reasonable place and time as is designated by the Insurer or its representative all documents in the Insured's possession or control that relate to the matters in question, and the Insured shall permit extracts and copies thereof to be made.

Insurer Liable for Cash Value of Automobile

5) The Insurer shall not be liable for more than the actual cash value of the automobile at the time any loss or damage occurs, and the loss or damage shall be ascertained or estimated according to that actual cash value with proper deduction for depreciation, however caused, and shall not exceed the amount that it would cost to or replace the automobile, or any part thereof, with material of like kind and quality, but, if any part of the automobile is obsolete and out of stock, the liability of the Insurer in respect thereof shall be limited to the value of that part at the time of loss or damage, not exceeding the maker's latest list price.

Repair or Replacement

6) Except where an appraisal has been made, the Insurer, instead of making payment, may, within a reasonable time, repair, rebuild or replace the property damaged or lost, with other of like kind and quality if, within seven days after the receipt of the proof of loss, it gives written notice of its intention to do so.

No Abandonment; Salvage

7) There shall be no abandonment of the automobile to the Insurer without the Insurer's consent. If the Insurer exercises the option to replace the automobile or pays the actual cash value of the automobile, the salvage, if any, shall vest in the Insurer.

In Case of Disagreement

8) In the event of disagreement as to the nature and extent of the repairs and replacements required, or as to their adequacy, if effected, or as to the amount payable in respect of any loss or damage, those questions shall be determined by the appraisal as provided under The Insurance Act (in Newfoundland, The Insurance Contracts Act) before there can be recovery under this contract, whether the right to recover on the contract is disputed or not, and independently of all other questions. There shall be no right to an appraisal until a specific demand therefor is made in writing and until after proof of loss has been delivered.

Inspection of Automobile

5. The Insured shall permit the Insurer at all reasonable times to inspect the automobile and its equipment.

Time and Manner of Payment of Insurance Money

6. 1) The Insurer shall pay the insurance money for which it is liable under this contract within sixty days after the proof of loss has been received by it or, where an appraisal is made under subcondition (8) of statutory condition 4, within fifteen days after the award is rendered by the appraisers.

When Action May be Brought

2) The Insured shall not bring an action to recover the amount of a claim under this contract unless the requirements of statutory conditions 3 and 4 are complied with or until the amount of the loss has been ascertained as therein provided or by a judgment against the Insured after trial of the issue or by agreement between the parties with the written consent of the Insurer.

Limitation of Actions

3) Every action or proceeding against the Insurer under this contract in respect of loss or damage to the automobile shall be commenced within one year next after the happening of the loss and not afterwards, and in respect of loss or damage to persons or property shall be commenced within one year next after the cause of action arose and not afterwards.

NOTE: In Yukon Territory, Northwest Territories and New Brunswick, the one year limitation period in sub-condition (3) should read "2 years".

In the case of Nova Scotia, Newfoundland and Prince Edward Island sub-condition (3) reads as follows:

"(3) Every action or proceeding under this contract against the Insurer in respect of a claim for indemnification for liability of the Insured for loss or damage to property of another person or for personal injury to or death of another person shall be commenced within two years after the liability of the Insured is established by a court of competent jurisdiction and not afterwards. Every other action or proceeding against the Insurer under this contract in respect of loss or damage to the automobile shall be commenced within two years from the time the loss or damage was sustained and not afterwards."

Who May Give Notice and Proofs of Claim

7. Notice of claim may be given and proofs of claim may be made by the agent of the Insured named in this contract in case of absence or inability of the Insured to give the notice or make the proof, such absence or inability being satisfactorily accounted for or, in the like case or if the Insured refuses to do so, by a person to whom any part of the insurance money is payable.

Termination

8. 1) This contract may be terminated,

a) by the Insurer giving to the Insured fifteen days' notice of termination by registered mail or five days' written notice of termination personally delivered.

b) by the Insured at any time on request.

2) Where this contract is terminated by the Insurer,

a) the Insurer shall refund the excess of premium actually paid by the insured over the pro rata premium for the expired time, but in no event shall the pro rata premium for the expired time be deemed to be less than any minimum retained premium specified; and

b) the refund shall accompany the notice unless the premium is subject to adjustment or determination as to the amount, in which case the refund shall be made as soon as practicable.

3) Where this contract is terminated by the Insured, the Insurer shall refund as soon as practicable the excess of premium actually paid by the Insured over the short rate premium for the expired time, but in no event shall the short rate premium for the expired time be deemed to be less than any minimum retained premium specified.

4) The refund may be made by money, postal or express company money order or cheque payable at par.

5) The fifteen days mentioned in clause (a) of subcondition (1) of this condition commences to run on the day following the receipt of the registered letter at the post office to which it is addressed.

NOTE: In the Northwest Territories, paragraph (a) of sub-condition 1 has the following words added:

"and by notifying the registrar of motor vehicles as required by the Vehicles Ordinance".

Notice

9. Any written notice to the Insurer may be delivered at, or sent by registered mail to, the chief agency or head office of the Insurer in the Province. Written notice may be given to the Insured named in this contract by letter personally delivered to him or by registered mail addressed to him at his latest post office address as notified to the Insurer. In this condition, the expression "registered" means registered in or outside Canada.

NOTE: In the Northwest Territories, the reference is to Territories and in the Yukon Territory the reference is to Territory rather than the Province.

In Witness Whereof, the Insurer has executed and attested these presents but this Policy shall not be valid unless countersigned by a duly authorized representative of the Insurer.

Premium: Included

ASSOCIATED ENVIRONMENTAL SITE ASSESSORS OF CANADA

CODE OF ETHICS

The purpose of this code is to establish clear and ethical guidelines for AESAC members. Should a member violate these Codes or Standards of Professionalism, their designation and membership may be revoked for a period of time and/or they may be expelled from the Association.

AESAC Members shall:

Be working or training in the field of environmental site assessments and working towards certification.

1. ***Conduct themselves in a professional manner at all times.***
2. ***Perform services with proper regard to safety, health and welfare of workers and the public and for the protection of the environment.***
3. ***Perform site assessments in accordance with the current CSA Standards for Environmental Site Assessments or equivalent standard applicable outside Canada.***
4. ***Undertake only such work as competent to perform by virtue of training and experience***
5. ***.Strive to maintain and improve professional standards in the field of environmental site assessments***
6. ***.Recognize the responsibilities he or she has to the public, the profession, their employer and all parties having an interest in environmental site assessments.***
7. ***Give independent objective opinions in any reports or information supplied to them in the course of an Environmental Site Assessment regardless of the source.***
8. ***Should be certain their client understands all the information presented in the final report and that suggestions and conclusions are carefully explained.***
9. ***Never be involved in an assessment where any direct or indirect conflict of interest may be cause for concern about the objectivity of the final report.***
10. ***Must be covered with adequate Errors & Omissions insurance when performing site assessments and supply AESAC documentation of such.***
11. ***In promoting environmental site assessments and obtaining assignments members must avoid misleading advertising which would be detrimental to the public interest.***
12. ***Respect the Professional reputation of other AESAC members.***
13. ***Respect the confidential relationship with other AESAC members as well as the***
14. ***confidential nature of site assessor/client relationship***
15. ***Not engage in any practice which is in violation of the law of the land.***

"AS A PREREQUISITE OF MEMBERSHIP ALL AESAC MEMBERS HAVE AGREED TO READ, AND ABIDE BY THIS CODE OF ETHICS AND CURRENT CSA STANDARDS FOR ENVIRONMENTAL SITE ASSESSMENTS"

Polson Environmental
Phase I Environmental Site Assessments
2001 St. Henry Avenue, Saskatoon, Saskatchewan, S7M 0P4
Phone: 306-652-7708, Cellular: 306-221-4569
Email: Johnpolson@shaw.ca Polsonenvironmental.com

John Polson. BAg., MSc., Site Assessor

Mr. Polson has been involved in the area of Environmental Impact Assessment since the early 1970's throughout Western Canada, particularly in the area of wildlife, baseline and environmental assessment of mines, hydro and linear and major industrial and agricultural developments in British Columbia, Saskatchewan, Alberta and the Northwest Territories.

Mr. Polson also has a good working knowledge of Agriculture since he graduated with a wildlife/ range management degree under Dr. VC Brink, one of the leaders in his field. Mr. Polson trained in photo interpretation under JD Mollard, one of the foremost photo interpreters in the world. Mr. Polson was trained as a Remote Sensing Specialist under the tutorship of Harley Poikrant /Manitoba Remote Sensing Centre. The Centre is a leader in the field.

Mr. Polson began conducting Phase I Site Assessments in 1995 and has been a long-time member of the Association of Environmental Site Assessors of Canada where he completed training in 1996. AESAC – Associated Environmental Site Assessors of Canada is an organization that seeks to set standards for Phase I Assessments across Canada. AESAC has developed a code of ethics that is followed by all members.

AESAC, in addition to training, conducts peer reviews of their members' reports on a regular basis, although that has lately been placed on hold due to the Pandemic.

Mr. Polson has completed many Phase I Site Assessments in urban and rural areas throughout Saskatchewan as well as in Alberta and more limited numbers in Manitoba.

Site Assessments conducted by Mr. Polson follow the recommended procedures developed by AESAC (now CSA Standard Z768-01 - 2016) which are recognized as the Canadian Standards for Site Assessment in Canada. Mr. Polson was involved in updating CSA Standard Z768-01 in 2012 while working with Pinter & Associates of Saskatoon.

Eileen Barlow. B.A., Site Assessor In-Training

Ms. Barlow became involved with environmental consulting after meeting Mr.John Polson through wildlife work. She completed the AESAC Phase I Site Assessment Certification training course in the spring of 2022 and began work with Polson Environmental in July of 2022. She is currently working towards her B.Sc in Environmental Biology at the University of Saskatchewan and hopes to become a Registered AESAC Site Assessor in the near future.

Since joining Polson Environmental as a Site Assessor In-Training, Ms. Barlow has assisted with the Phase I Study of over 30 commercial properties.

ASSOCIATED ENVIRONMENTAL SITE ASSESSORS OF CANADA

CODE OF ETHICS

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AESAC Members shall:

Be working or training in the field of environmental site assessments and working towards certification.

1. ***Conduct themselves in a professional manner at all times.***
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3. ***Perform site assessments in accordance with the current CSA Standards for Environmental Site Assessments or equivalent standard applicable outside Canada.***
4. ***Undertake only such work as competent to perform by virtue of training and experience***
5. ***.Strive to maintain and improve professional standards in the field of environmental site assessments***
6. ***.Recognize the responsibilities he or she has to the public, the profession, their employer and all parties having an interest in environmental site assessments.***
7. ***Give independent objective opinions in any reports or information supplied to them in the course of an Environmental Site Assessment regardless of the source.***
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ERRORS & OMISSIONS

DECEMBER 1, 2023 - DECEMBER 1, 2024
Combined Insurance - $3 million

CERTIFICATE OF LIABILITY INSURANCE

ISSUE DATE YYYY/MM/DD
2023/11/30

BROKER

HUB

Hub International Insurance Brokers (TOS)
400-4350 Still Creek Drive
Burnaby, BC V5C 0G5
PHONE: 604-269-1000

This certificate is issued as a matter of information only and confers no rights upon the certificate holder and imposes no liability on the insurer. This certificate does not amend, extend or alter the coverage afforded by the policies below.

Company A	Aviva Ins. Company as arranged by Victor Canada
Company B	Lloyd's on behalf of Beazley Canada Limited
Company C	
Company D	
Company E	

INSURED'S FULL NAME AND MAILING ADDRESS
John Polson o/a Polson Environmental
2001 St Henry Ave
Saskatoon, SK S7M 0P4

COVERAGES

This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated notwithstanding any requirements, terms or conditions of any contract or other document with respect to which this certificate may be issued or may pertain. The insurance afforded by the policies described herein is subject to all terms, exclusions and conditions of such policies.

LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS

TYPE OF INSURANCE	CO LTR	POLICY NUMBER	EFFECTIVE DATE YYYY/MM/DD	EXPIRY DATE YYYY/MM/DD	LIMITS OF LIABILITY (Canadian dollars unless indicated otherwise)		
COMMERCIAL GENERAL LIABILITY	A	SGL628463	2023/12/01	2024/12/01	EACH OCCURRENCE	$	2,000,000
☐ CLAIMS MADE					GENERAL AGGREGATE	$	
☒ OCCURRENCE					PRODUCTS - COMP/OP AGGREGATE	$	2,000,000
☒ PRODUCTS AND/OR COMPLETED OPERATIONS					PERSONAL INJURY	$	2,000,000
☒ PERSONAL INJURY					EMPLOYER'S LIABILITY	$	
☐ EMPLOYER'S LIABILITY					TENANT'S LEGAL LIABILITY	$	500,000
☒ TENANT'S LEGAL LIABILITY					NON-OWNED AUTOMOBILE	$	1,000,000
☒ NON-OWNED AUTOMOBILE					HIRED AUTOMOBILE	$	
☐ HIRED AUTOMOBILE							
AUTOMOBILE LIABILITY					BODILY INJURY PROPERTY DAMAGE COMBINED	$	
☐ DESCRIBED AUTOMOBILES					BODILY INJURY (Per person)	$	
☐ ALL OWNED AUTOMOBILES					BODILY INJURY (Per accident)	$	
☐ LEASED AUTOMOBILES **					PROPERTY DAMAGE	$	
☐ GARAGE LIABILITY							
☐							
** ALL AUTOMOBILES LEASED IN EXCESS OF 30 DAYS WHERE THE INSURED IS REQUIRED TO PROVIDE INSURANCE							
EXCESS LIABILITY	B	18601665	2023/12/01	2024/12/01	EACH OCCURRENCE	$	1,000,000
☒ UMBRELLA FORM					AGGREGATE	$	1,000,000
☐ OTHER THAN UMBRELLA FORM							
OTHER (SPECIFY)	A	SRD628463	2023/12/01	2024/12/01	per LOSS	$	2,000,000
Errors and Omissions- Claims Made					per policy period	$	2,000,000
						$	
						$	
						$	

DESCRIPTION OF OPERATIONS/LOCATIONS/AUTOMOBILES/SPECIAL ITEMS TO WHICH THIS CERTIFICATE APPLIES (but only with respect to the operations of the Named Insured)

Re: For confirmation of existing coverages only.

CERTIFICATE HOLDER

To whom it may concern

CANCELLATION

Should any of the above described policies be cancelled before the expiration date thereof, the issuing company will endeavor to mail 0 days written notice to the certificate holder named to the left, but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives.

AUTHORIZED REPRESENTATIVE

Per:_____

Page 1 of 1

MRXWXVSP

ERRORS & OMISSIONS

DECEMBER 1, 2022 - DECEMBER 1, 2023
Combined Insurance - $3 million

Victor Canada
500-1400 Blair Towers Place
Ottawa, Ontario K1J 9B8
Telephone 613-786-2000
Facsimile 613-786-2001
Toll Free 800-267-6684
www.victorinsurance.ca

Policy

Errors and Omissions Insurance for Environmental Consultants

POLICY NUMBER: SRD606871 REPLACING POLICY: New

CLIENT NUMBER: 127808 BROKER: HUB INTERNATIONAL INS BROKERS

DECLARATIONS

1. Named INSURED: POLSON ENVIRONMENTAL

2. INSURED'S Address: 2001 ST HENRY AVE
SASKATOON SK S7M 0P4

3. Policy Period: from 01 December 2022 to 01 December 2023
at 00:01 local time at the INSURED'S
address shown above without tacit renewal

4. Limits of Liability: $ 2,000,000 per LOSS
$ 2,000,000 per policy period

5. Deductible: $ 0 per LOSS

6. Premium: $ 3,500

Policy Fee: $ 150 payable immediately (fully earned)

** All amounts shown in CDN dollars*

7. Retroactive Date: 15 September 2012

8. These Declarations provide the INSURED with coverage under the policy wording (EC35E-SRD-16-CAN/QUE) which is attached hereto.

9. Endorsements forming part of this policy at issuance: 1 to 4

10. INSURERS:

Aviva Insurance Company of Canada	25.00%
Temple Insurance Company	20.00%
Everest Insurance Company of Canada	20.00%
Arch Insurance Canada Ltd.	17.50%
XL Reinsurance America Inc.	17.50%

It is agreed that the above INSURERS are binding themselves, severally and not jointly, each in its layer of coverage only, and each only for that amount determined by multiplying its percentage proportion of coverage by the amount of the LOSS.

For purposes of the Insurance Companies Act (Canada), this document was issued in the course of the subscribing INSURERS' insurance business in Canada.

INSURANCE MANAGER: Victor Insurance Managers Inc.
500-1400 Blair Towers Place
Ottawa, Ontario K1J 9B8

The INSURERS have duly authorized Victor Insurance Managers Inc. to execute and sign this policy of insurance.



Dated: 25 November 2022

David G. Cook, President
Authorized Representative

Victor Canada
500-1400 Blair Towers Place
Ottawa, Ontario K1J 9B8
Telephone 613-786-2000
Facsimile 613-786-2001
Toll Free 800-267-6684
www.victorinsurance.ca

Policy

Errors and Omissions Insurance for Environmental Consultants

This is a claims-made and reported policy. Please read the entire policy carefully.

Terms in capital letters have special meaning. Please refer to the definitions section of this policy (Part I).

Part I – Definitions

As used in this policy, the following words or expressions shall mean:

1. **Bodily Injury**

   Bodily injury, physical injury, sickness, disease, mental anguish, mental suffering or shock, including death resulting from any of these at any time.

2. **Claim**

   Any written or oral allegations received by the INSURED resulting from an error, omission or negligent act in the rendering of INSURED SERVICES.

3. **Damages**

   Compensatory DAMAGES, including all pre-judgment and post-judgment interest.

4. **Fissionable Substance**

   Any prescribed substance that is, or from which can be obtained, a substance capable of releasing atomic energy by nuclear fission.

5. **Insurance Manager**

   The insurance administrator under this policy, who is duly authorized to issue this policy as well as to issue and receive notices under this policy for and on behalf of the INSURERS, and whose name and address appear in the Declarations. The INSURANCE MANAGER is not a party to this contract of insurance.

6. **Insured**

   The Named INSURED mentioned in the Declarations, as well as persons described hereafter, but solely for CLAIMS resulting from an error, omission, or negligent act in the rendering of INSURED SERVICES, while acting within the scope of their duties for the Named INSURED:

   (a) any present or former partner, director, officer or employee of the Named INSURED;

   (b) any independent contractor retained by the Named INSURED;

   (c) employees of others on loan to and while working for and under the guidance of the Named INSURED.

7. **Insured Services**

   Those services rendered by the INSURED, while acting within the scope of the INSURED'S duties as an environmental consultant and customary to the practice of environmental consulting.

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8. **Insurers**

The insurance companies whose names appear in the Declarations. It is agreed that such INSURERS are binding themselves severally and not jointly, each in its own layer of coverage only, and each only for that amount determined by multiplying its percentage proportion of coverage by the amount of the LOSS.

9. **Loss**

One or more CLAIMS resulting from the same or related error, omission or negligent act in the rendering of INSURED SERVICES, regardless of the number of suits, claimants or INSUREDS. Such CLAIMS will be considered first reported within the policy period in which the earliest CLAIM was reported and subject to that single limit of liability.

10. **Nuclear Energy Hazard**

The radioactive, toxic, explosive or other hazardous properties of RADIOACTIVE MATERIAL.

11. **Nuclear Facility**

(a) Any apparatus designed or used to sustain nuclear fission in a self-supporting chain reaction or to contain a critical mass of plutonium, thorium, uranium, or any one or more of them;

(b) any equipment or device designed or used for:

(i) separating the isotopes of plutonium, thorium, uranium, or any one or more of them;

(ii) processing or utilizing spent fuel; or

(iii) handling, processing or packaging waste;

(c) any equipment or device used for the processing, fabricating or alloying of plutonium, thorium or uranium enriched in the isotope uranium 233 or in the isotope uranium 235, or any one or more of them, if at any time the total amount of such material in the custody of the INSURED at the premises where such equipment or device is located consists of or contains more than 25 grams of plutonium or uranium 233 or any combination thereof, or more than 250 grams of uranium 235;

(d) any structure, basin, excavation, premises or place prepared or used for the storage or disposal of waste RADIOACTIVE MATERIAL.

The above includes the site on which any of the foregoing is located, together with all operations conducted thereon and all premises used for such operations.

12. **Pollution**

Emission, release, discharge, dispersal, escape or disposal of smoke, gases, vapours, soot, fumes, acids, alkalis, toxic substances, waste materials, irritants, contaminants or pollutants into or upon land or any water of any description no matter where located or how contained, or into any drainage or sewage system, or into the atmosphere.

13. **Radioactive Material**

Uranium, thorium, plutonium, neptunium, their respective derivatives and other compounds, radioactive isotopes of other elements and any other substances that the Canadian Nuclear Safety Commission may, by regulation, designate as being prescribed substances capable of releasing atomic energy, or as being requisite for the production, use or application of atomic energy.

Part II – Insuring Agreements

1. **General Agreements**

In consideration of the premium indicated in the Declarations, and in reliance upon the attachments to and the statements made in the application form, and subject to the terms, conditions and limitations contained in this policy, the INSURERS agree to pay on behalf of the INSURED all sums which the INSURED shall become legally obligated to pay as DAMAGES because of a CLAIM first made and reported to the INSURANCE MANAGER during the policy period resulting from an error, omission or negligent act in the rendering of INSURED SERVICES by the INSURED:

(a) during the policy period; or

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(b) before the effective date of the initial policy issued and renewed without interruption by the INSURANCE MANAGER, but after the retroactive date (if one is shown in the Declarations), provided that on the effective date of this policy the INSURED did not know of the CLAIM or of the circumstance that could reasonably have given rise to the CLAIM.

This policy of insurance, subject to its terms, conditions and limitations, applies to CLAIMS first made against the INSURED and reported to the INSURANCE MANAGER during the policy period.

2. **Defence and Other Payments**

With respect to the insurance afforded by the General Agreements of Part II of this policy, the INSURERS further agree:

(a) that they shall have the right and duty to defend the INSURED in any suit first brought against the INSURED before a court of civil jurisdiction in Canada or the United States of America;

(b) to pay any premium payable under guarantee bonds required to release attachments and any premium payable on appeal bonds but without any obligation to apply for or furnish any such bonds;

(c) to pay the reasonable and necessary legal, adjusting, investigating or expert expenses incurred for the defence of CLAIMS for which coverage is provided by this policy;

(d) to pay costs taxed against the INSURED following a judgment by a court of civil jurisdiction;

(e) to reimburse INSUREDS for the reasonable expenses incurred by the INSURED to assist in the investigation and defence of the CLAIM at the request of the INSURANCE MANAGER. Such expenses shall include the amount paid in salaries up to a total of three hundred dollars ($300) per day per INSURED, subject to a maximum of ten thousand dollars ($10,000) for all INSUREDS who, in lieu of work, attend at discoveries, mediation, trial, coroner's inquest or human rights tribunal as part of the defence of a CLAIM;

(f) the INSURERS shall have no duty to defend a CLAIM which arises from demands or proceedings first brought against the INSURED outside Canada or the United States of America.

Where it is the duty of the INSURED to defend, the INSURED shall not select defence counsel without the INSURANCE MANAGER'S written consent, which shall not be unreasonably withheld. The INSURERS shall have the right and shall be given the opportunity to effectively associate with the INSURED in the investigation, defence and settlement of any CLAIM for which coverage is provided under this policy. The payment of sums provided for in Item 2 of Part II shall be on a current basis.

3. The payment of the sums provided for in Item 2 of Part II is to be considered an integral part of the applicable limit of liability of the INSURERS as it erodes the limit of liability.

4. The INSURERS' obligation to defend any CLAIM ends once the available limit of liability is exhausted.

5. **Territory**

This policy applies to CLAIMS which give rise to demands or proceedings against the INSURED anywhere in the world.

Part III – Exclusions

The coverage afforded under this policy does not apply to:

1. **Asbestos Liability Bodily Injury**

CLAIMS for DAMAGES for BODILY INJURY which is actually or allegedly, in whole or in part, directly or indirectly, caused by, based upon or in any way involving asbestos or any material derived therefrom in whatever form or quantity.

This exclusion applies to such CLAIMS regardless of any other cause or event (whether insured or not) contributing concurrently or in any sequence to the occasioning of the BODILY INJURY.

2. **Bankruptcy/Insolvency**

CLAIMS resulting from the bankruptcy or insolvency of the INSURED.

3. **Care, Custody and Control**

CLAIMS resulting from damage caused to property in the care, custody or control of the INSURED or property over which the INSURED is for any purpose exercising control.

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4. **Deliberate, Dishonest or Fraudulent Acts**

CLAIMS resulting from deliberate, dishonest, criminal or fraudulent acts committed by the INSURED, unless it was done in order to protect persons or property, but this exclusion does not apply to any INSURED who is neither the author of nor an accomplice to the act.

5. **Design-build**

CLAIMS resulting from services rendered by the INSURED where:

(a) actual construction, erection, fabrication, installation, assembly, manufacture thereof, or;

(b) decommissioning, remediation, clean-up, removal, containment, detoxification or neutralization of any property, pollutants or contaminants;

is also performed by or on behalf of the INSURED or by or on behalf of an associated business enterprise in which the INSURED either directly or indirectly has an interest, or that directly or indirectly has an interest in the INSURED.

6. **Economic Return**

CLAIMS resulting from representations, forecasts or estimates of profit, return on capital or economic return.

7. **Fines, Penalties**

CLAIMS resulting from any fines, penalties, punitive or exemplary damages.

8. **Insured vs. Insured**

CLAIMS initiated by one or more INSUREDS against any other INSURED.

9. **Joint Venture**

CLAIMS resulting from the Named INSURED'S participation in a joint venture, partnership, associateship or any other entity which has not been endorsed on this policy as an additional Named INSURED unless this policy was specifically issued for this purpose.

10. **Liability of Others**

CLAIMS resulting from the liability of others assumed by the INSURED under a contract; however, this exclusion shall not apply to the INSURED'S legal liability for subconsultants contractually bound to the INSURED or for the INSURED'S liability for errors, omissions or negligent acts of the INSURED'S own employees.

11. **Libel and Slander**

CLAIMS resulting from DAMAGES resulting from:

(a) oral or written publication of material, declaration or interview by the media that slanders or libels a person or organization or disparages a person's or organization's goods, products or services; or

(b) oral or written publication of material that violates a person's right of privacy.

12. **Nuclear Energy**

CLAIMS:

(a) resulting from any liability imposed by or arising under the Nuclear Liability Act; or

(b) with respect to which an INSURED under this policy is also insured under a contract of nuclear energy liability insurance (whether the INSURED is named in such contract or not and whether or not it is legally enforceable by the INSURED) issued by the Nuclear Insurance Association of Canada or any other group or pool of insurers, or would be an INSURED under any such policy but for its termination upon exhaustion of its limit of liability; or

(c) resulting directly or indirectly from the NUCLEAR ENERGY HAZARD arising from:

(i) the ownership, maintenance, operation or use of a NUCLEAR FACILITY by or on behalf of an INSURED;

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(ii) the furnishing by an INSURED of services, materials, parts or equipment in connection with the planning, construction, maintenance, operation or use of any NUCLEAR FACILITY; and

(iii) the possession, consumption, use handling, disposal or transportation of FISSIONABLE SUBSTANCES, or of other RADIOACTIVE MATERIAL;

but this exclusion shall not be construed to apply in any commercial or medical radioactive isotopes.

13. **Other Activities**

CLAIMS resulting from the legal liability of the INSURED arising from the operation of any business enterprise, other than INSURED SERVICES.

14. **Other Insurance**

CLAIMS covered under another valid and collectible insurance policy. Any coverage provided by this policy shall be specifically excess of and shall not act in contribution with such other insurance policy.

15. **Pollution**

CLAIMS arising out of or attributable to POLLUTION.

16. **Prior Knowledge**

CLAIMS or circumstances, reported or not in the application, known to the INSURED before the effective date of the initial policy issued and renewed without interruption by the INSURANCE MANAGER to the INSURED.

17. **Related Entities**

CLAIMS made against the INSURED, when such CLAIMS are made by another business:

(a) owned totally or partially by an INSURED;

(b) controlled or managed totally or partially by an INSURED;

(c) which is directly or indirectly involved in any way in the ownership or management of an INSURED'S business; or

(d) of which an INSURED is a partner, director, officer or employee.

This exclusion shall not apply where the interest held by such an entity in the INSURED, or interest held by the INSURED in such an entity, whether held as equity, ownership or voting rights, is less than or equal to ten per cent (10%).

18. **War Risk**

CLAIMS resulting from DAMAGES caused directly or indirectly by war, invasion, acts of foreign enemies, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection.

Part IV – Computation of Amounts Payable by the Insurers

Limit of Liability of the Insurers

Subject, when applicable, to the deductible as stated in the Declarations, the liability of the INSURERS under Part II – Insuring Agreements of this policy is limited, for each LOSS and per policy period, to the amounts as stated in the Declarations. It is agreed that the INSURERS and the INSURED shall contribute equally towards DAMAGES until the INSURED has paid the deductible referred to in the Declarations.

Part V – Conditions

1. **Action Against the Insurers**

No action or legal proceedings may be initiated against the INSURERS unless the INSURED has fully complied with the requirements of this policy.

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2. **Amendments**

The terms of this policy may only be waived or changed by the INSURANCE MANAGER and then, only by written endorsement signed by the INSURANCE MANAGER. Such endorsement shall form a part of this policy.

3. **Assignment**

Assignment of interest under this policy shall not bind the INSURERS until their consent is endorsed hereon; if, however, the Named INSURED should be adjudged bankrupt, insolvent or incompetent or die within the policy period, this policy shall cover the Named INSURED'S legal representative as Named INSURED. The INSURED agrees that any notice of any kind the INSURANCE MANAGER mails to the Named INSURED at the address shown in the Declarations shall constitute notice to the INSURED'S legal representatives.

4. **Cancellation of Policy**

(a) The Named INSURED may cancel this policy by giving written notice to the INSURANCE MANAGER to this effect, indicating when thereafter the cancellation shall be effective. The INSURANCE MANAGER will reimburse the excess of premium paid by the INSURED over and above the premium earned for the time on risk, the calculation being made in accordance with the customary short rate table and procedure.

(b) The INSURANCE MANAGER may cancel this policy by giving to the Named INSURED written notice to this effect, either by registered mail or by delivering it by hand and the termination takes effect thirty (30) days after the date of the notice; in the event of non-payment of premium, the termination takes effect fifteen (15) days after the date of the notice. The INSURANCE MANAGER shall reimburse this excess premium paid by the INSURED over the earned premium for the time on risk, such calculation to be made on a pro rata basis.

5. **Conformity to Statute**

The terms of this policy that are in conflict with the terms of any applicable laws construing this policy, including the Quebec Civil Code, are hereby amended to conform to such laws.

6. **Continuity**

In the event this policy replaces, without interruption, a prior policy issued by the INSURANCE MANAGER, any CLAIMS or circumstances that could reasonably give rise to a CLAIM of which the INSURED is aware and which the INSURED reports to the INSURANCE MANAGER shall be deemed to have been reported on the date the INSURED first became aware of such CLAIM or circumstances and will be insured subject to the terms, conditions and limits of liability of the policy in force on such date.

7. **Co-operation of the Insured**

The INSURED must co-operate with the INSURANCE MANAGER and, at the request of the INSURANCE MANAGER, assist to effect settlement, forward proceedings, attend hearings and trials, assist in securing and giving evidence and in obtaining the attendance of witnesses.

The INSURED shall not, without the INSURANCE MANAGER'S approval and except at the INSURED'S own cost, voluntarily make any payment, assume any obligation or incur any expense.

8. **Named Insured Represents All Insureds**

The Named INSURED, INSURED, INSURERS and INSURANCE MANAGER agree that the Named INSURED represents all INSUREDS under this policy.

9. **Notice of Claim**

This is a claims-made and reported policy. The INSURED shall, as soon as practicable after being made aware of a CLAIM for which coverage would be afforded by this policy, provide written notice with the full particulars thereof to the INSURANCE MANAGER, Victor Insurance Managers Inc., at the address indicated in the Declarations.

If during the policy period the INSURED becomes aware of a circumstance which could reasonably give rise to a CLAIM, the INSURED shall give written notice thereof to the INSURANCE MANAGER as soon as practicable and prior to the date of the termination of the policy. Any such CLAIM received by the INSURED resulting from such circumstances shall be treated as a CLAIM made during the policy period in which such notice was given.

If the effective date of termination of the policy is a Saturday, Sunday or Statutory Holiday, any CLAIM presented to the INSURANCE MANAGER on the business day immediately following the termination date will be deemed to have been reported within the policy period.

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Notwithstanding the aforementioned, any late notice or absence of notice is cause of forfeiture of the rights of the INSURED, if the INSURERS sustain injury therefrom.

10. **Right to Audit**

The INSURANCE MANAGER may, at any time, inspect the premises of the INSURED. In relation to the object of this policy, the INSURANCE MANAGER may also examine the financial records and files of the INSURED during the policy period and during the two (2) years which follow its expiry or cancellation provided that prior notice of forty-eight (48) hours is given to the INSURED.

11. **Settlement and Contestation of Claims**

In the event of a CLAIM, the INSURANCE MANAGER will not settle the LOSS without first obtaining the written consent of the INSURED.

However, if a settlement is rendered impossible by the sole refusal of the INSURED, the latter must continue the defence at the Named INSURED'S own expense and the liability of the INSURERS will then be limited to the amount for which the CLAIM could have been so settled together with expenses incurred under the present policy at the date of such refusal.

12. **Severability of Interests**

In the event that a CLAIM is made against more than one INSURED, it is agreed that the obligation of the INSURERS under this policy is the same as if separate policies had been issued to each. Notwithstanding the number of INSUREDS involved, the total amount payable hereunder on behalf of all INSUREDS shall not exceed the INSURERS' limit of liability stated in the Declarations.

13. **Subrogation**

In the event of any payment under this policy, the INSURERS shall be subrogated to all the INSURED'S rights of recovery therefore against any person or organization and the INSURED shall execute and deliver instruments and papers and do whatever else is necessary to secure such rights. The INSURED shall do nothing to prejudice such rights.

14. **Suspension of Permit or Provisional Administration**

If the Named INSURED has its permit or licence to practice suspended by virtue of the laws governing its practice, or if a provisional administration is imposed by governmental authority, notice must be given to the INSURANCE MANAGER within a period of not more than thirty (30) days from such suspension or provisional administration.

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Victor Canada
500-1400 Blair Towers Place
Ottawa, Ontario K1J 9B8
Telephone 613-786-2000
Facsimile 613-786-2001
Toll Free 800-267-6684
www.victorinsurance.ca

Endorsement

Endorsement No.: 0001
Standard Form: M-3EO
Attached to and forming part
of Policy Number: SRD606871

Fungi Exclusion

It is agreed that this policy is amended as follows:

1. Part I – Definitions is amended to include the following:

    14. Fungi

        Any form of fungus, including but not limited to yeast, mould, mildew, rust, smut or mushroom.

2. Part III – Exclusions is amended to include the following:

    19. CLAIMS based upon or arising out of, in whole or in part,:

        (a) the actual, alleged or threatened inhalation of, ingestion of, contact with, exposure to, existence of, growth or presence of;

        (b) any costs or expense incurred to prevent, respond to, test for, monitor, abate, mitigate, remove, cleanup, contain, remediate, treat, detoxify, neutralize, assess or otherwise deal with or dispose of;

        (c) the actual or alleged failure to detect, report, test for, monitor, cleanup, remove, contain, dispose of, treat, detoxify, neutralize, or in any way respond to, assess the effects of or advise of the existence of or the conditions for the potential growth of;

        any FUNGI or any spores, mycotoxins, odours, or any other substances, products or by-products produced by, released by, or arising out of the current or past presence of FUNGI.

        Such CLAIMS are excluded regardless of any cause or event contributing concurrently or in any other sequence to the LOSS.

Except as otherwise provided by this endorsement, all terms, provisions and conditions of this policy shall have full force and effect.

Victor Canada
500-1400 Blair Towers Place
Ottawa, Ontario K1J 9B8
Telephone 613-786-2000
Facsimile 613-786-2001
Toll Free 800-267-6684
www.victorinsurance.ca

Endorsement

Endorsement No.: 0002
Standard Form: P-4EO
Attached to and forming part
of Policy Number: SRD606871

Pollution Coverage

It is agreed that Item 15 of Part III – Exclusions of this policy is deleted in its entirety.

Except as otherwise provided by this endorsement, all terms, provisions and conditions of this policy shall have full force and effect.

Victor Canada
500-1400 Blair Towers Place
Ottawa, Ontario K1J 9B8
Telephone 613-786-2000
Facsimile 613-786-2001
Toll Free 800-267-6684
www.victorinsurance.ca

Endorsement

Endorsement No.: 0003
Standard Form: T-6EO
Attached to and forming part
of Policy Number: SRD606871

Terrorism Exclusion

It is agreed that this policy does not apply to CLAIMS directly or indirectly, in whole or in part, attributable to or arising out of TERRORISM.

TERRORISM means an ideologically motivated unlawful act or acts, including but not limited to the use of violence or force or threat of violence or force, committed by or on behalf of any group(s), organization(s) or government(s) for the purpose of influencing any government and/or instilling fear in the public or a section of the public.

Except as otherwise provided by this endorsement, all terms, provisions and conditions of this policy shall have full force and effect.

Victor Canada
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Ottawa, Ontario K1J 9B8
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Facsimile 613-786-2001
Toll Free 800-267-6684
www.victorinsurance.ca

Endorsement

Endorsement No.: 0004
Standard Form: W-1EO
Attached to and forming part
of Policy Number: SRD606871

Warranties/Guarantees Exclusion

It is agreed that the following is added to Part III – Exclusions of this policy:

20. Warranties/Guarantees

CLAIMS resulting from the express warranties, guarantees or penalty clauses the INSURED has given for the benefit of others unless the INSURED's liability would have already existed at law in the absence thereof.

Except as otherwise provided by this endorsement, all terms, provisions and conditions of this policy shall have full force and effect.

EXCESS LIABILITY INSURANCE
Effected with Certain Underwriters at Lloyd's (hereinafter called the "Insurer") through Lloyd's Approved Coverholder ("the Coverholder")
BEAZLEY CANADA LIMITED
100 King Street West, Suite 4530, Toronto, ON M5X 1E1

THIS IS A CLAIMS MADE POLICY. PLEASE READ IT CAREFULLY.

The Insured is requested to read this policy, and if incorect, return it immediately for alteration. In the event of an occurrence likely to result in a claim under this Insurance, immediate notice should be given to the office designated above.

THIS POLICY CONTAINS A CLAUSE WHICH MAY LIMIT THE AMOUNT PAYABLE.

POLICY DECLARATIONS

POLICY NUMBER: 18601665

1.	Named Insured: Address:	John Polson - Polson Environmental 2001 St Henry Ave Saskatoon SK Canada S7M 0P4
2.	Policy Period:	From: 01 Dec 2022 To: 01 Dec 2023 (both days at 12:01am local standard time at the Address of the Insured)
3.	Limit of Liability:	$ 1,000,000 Per Claim In the aggregate for the policy period
4.	Insurer: Broker:	As per attached list of subscribing companies Hub International Canada West ULC
5.	Retroactive Date:	15 Sep 2012
6.	Premium:	$ 1,500
7.	Followed Policy:	$ 2,000,000 Victor Policy # SRD606871
8.	Schedule of Underlying Insurance:	A) Primary $ 2,000,000 Victor Policy # SRD606871 B) Other Underlying Insurance N/A
9.	The insurance contract consists of this Declarations page as well as coverage wording 300513 and endorsements 1 through 2.	

IDENTIFICATION OF INSURER/ACTION AGAINST INSURER

FOR THE PURPOSES OF THE *INSURANCE COMPANIES ACT* (CANADA), THIS DOCUMENT WAS ISSUED IN THE COURSE OF LLOYD'S UNDERWRITERS' INSURANCE BUSINESS IN CANADA.

This insurance has been effected in accordance with the authorization granted to the Coverholder by the Underwriting Members of the Syndicate Agreement No. B6012BEAZCAN22 (hereinafter referred to as « the Underwriters »).

In any action to enforce the obligations of the Underwriters they can be designated or named as "Certain Underwriters at Lloyd's " and such designation shall be binding on the Underwriters as if they had each been individually named as defendant. Service of such proceedings may validly be made upon the Attorney In Fact in Canada for Certain Underwriters at Lloyd's , whose address for such service is 200 Bay Street, Suite 2930, P.O. Box 51, Toronto, ON M5J 2J2

NOTICE
Any notice to the Underwriters may be validly given to the Coverholder.
In witness whereof this policy has been signed, as authorized by the Underwriters, by Beazley Canada Limited

Per:

Issue date: 29/11/2022

EXCESS LIABILITY INSURANCE POLICY

IN CONSIDERATION OF THE PAYMENT OF THE PREMIUM, AND IN RELIANCE UPON THE STATEMENTS MADE TO THE INSURER OR ANY UNDERLYING INSURER, INCLUDING STATEMENTS MADE BY APPLICATION AND ANY AND ALL SUPPLEMENTARY INFORMATION PROVIDED THEREWITH, WHICH SHALL BE DEEMED TO BE INCORPORATED HEREIN, AND SUBJECT TO ALL THE TERMS AND CONDITIONS OF THIS POLICY, THE INSURER AGREES AS FOLLOWS:

SECTION I - INSURING AGREEMENT

The **Insurer** shall provide coverage to the **Insureds** in excess of the **Underlying Limits of Liability**, subject to and in accordance with the applicable insuring agreements, definitions, terms, conditions, exclusions and other provisions of the **Followed Policy**, except as otherwise provided herein.

The **Insurer** shall not be obligated to pay any further claim(s), nor shall it have any other obligation whatsoever under this Policy, upon exhaustion of the Limit of Liability as shown under Item 3 of the Declarations.

SECTION II - CONFORMANCE WITH FOLLOWED POLICY

This Policy is subject to the same insuring agreements, definitions, terms, conditions, exclusions and other provisions, as set forth in the **Followed Policy**, except as regards:

1) the premium;

2) the obligation to investigate and defend;

3) the amount and limits of liability;

4) the Policy Period;

5) any renewal agreement;

6) the subject matter of Sections III, IV, V, and VII and any endorsements attached hereto; and

7) any terms or conditions that may otherwise be provided herein.

The Policy also applies in conformance and subject to any other limitations, restrictions or exclusions in any **Underlying insurance**. In no event shall this Policy grant broader coverage than would be provided by the most restrictive **Underlying Insurance**.

SECTION III - DEFINITIONS

The following terms whenever used in this Policy shall have the meanings indicated.

A) **Insured** means the individuals and organizations for whom coverage is afforded under the **Primary Policy**.

B) **Insurer** means the Insurer identified in Item 4 of the Declarations.

C) **Followed Policy** means the policy as described in the materials submitted to the **Insurer** in connection with the Application for this Policy and identified in Item 7 of the Declarations.

D) **Primary Policy** means the policy identified in Item 8(A) of the Declarations.

E) **Sublimit** means any limit of liability of any **Underlying Insurance** which:

(i) applies only to a particular type of coverage under such **Underlying Insurance**; and
(ii) is part of, and not in addition to, the applicable aggregate or other limits of liability of such **Underlying Insurance**.

F) **Underlying Insurance** or **Underlying Insurer** means, respectively, all policies and insurers outlined in Item 8 of the Declarations, including the **Followed Policy**.

G) **Underlying Limits of Liability** means the combined limits of liability of the **Underlying Insurance** as set forth in Item 8 of the Declarations, plus any applicable retention or deductible under the **Primary Policy**.

SECTION IV - MAINTENANCE OF UNDERLYING INSURANCE

This Policy provides excess coverage only. It is a condition precedent to the coverage afforded under this Policy that those insured hereunder maintain the **Underlying Insurance** as set forth in Item 8 of the Declarations in full force and effect and without alteration of any limit of liability, retention amount, insuring agreement, warranty, definition, term, condition, exclusion or any other provision (subject to reduction or exhaustion as a result of loss payments).

This Policy does not provide coverage for any claim or loss not covered by the **Underlying Insurance** except and to the extent that loss is not paid under the **Underlying Insurance** solely by reason of the reduction or exhaustion of the **Underlying Limits of Liability** through payments of covered loss thereunder as provided under Section V. C) of this Policy.

SECTION V - LIMIT OF LIABILITY

A) The **Insurer** shall only be liable to pay covered loss under this Policy which is in excess of the **Underlying Limits of Liability** after:

(i) the **Underlying Insurers** have paid or have been held liable to pay; or
(ii) the **Insureds** have paid: (a) pursuant to an agreement with the **Underlying Insurers**; or (b) because of the financial impairment or insolvency of the **Underlying Insurers**,

the total amount of all **Underlying Limits of Liability** as covered loss thereunder. Any payments by the **Insureds** shall be subject to the same terms and conditions for any such payment of the **Underlying Insurers**. Any such payments by the **Insureds** in any claim shall not be recognized as reducing or exhausting the **Underlying Limits of Liability** for any other claim.

B) Any claim, loss or coverage that is subject to any **Sublimit** shall not be considered covered loss under this Policy, but shall, for purposes of this Policy, reduce or exhaust the **Underlying Limits of Liability** to the extent such payment reduces or exhausts the aggregate limit(s) of liability of such **Underlying Insurance**.

C) In the event of the reduction or exhaustion of the **Underlying Limits of Liability** by reason of payment of covered loss, this Policy shall:

1) in the event of reduction, pay covered loss excess of the reduced limits; and
2) in the event of exhaustion, continue in force as primary insurance; provided, however that in the case of exhaustion, this Policy shall only pay covered loss excess of the retention or deductible applicable under the **Primary Policy**, which shall be applied to any loss in the same manner as specified in the **Primary Policy**.

D) Notwithstanding any of the terms of this Policy which might be construed otherwise, this Policy shall drop down only in the event of reduction or exhaustion of the **Underlying Insurance** as described in Section V.C), and for no other reason, including uncollectability or non-payment, in whole or in part, of any **Underlying Limits of Liability**. The risk of uncollectability of the **Underlying Limits of Liability**, in whole or in part, whether because of financial impairment or insolvency of any **Underlying Insurer** or for any other reason, is expressly retained by the **Insured** and is not in any way, or under any circumstances, insured or assumed by the **Insurer**.

The amount shown in Item 3 of the Declarations shall be the maximum aggregate Limit of Liability of the Insurer for all covered loss resulting from all claims made against any insured during the Policy Period, or any discovery period or extended reporting period properly elected under this Policy, if applicable.

SECTION VI – CLAIM PARTICIPATION

The **Insurer** shall have the right and be given the opportunity to associate with the **Insured** and any **Underlying Insurer** in the control and defence of any claim even if the **Underlying Insurance** has not been exhausted.

SECTION VII - NOTIFICATION

A) Where notice is permitted or required by the **Underlying Insurance**, the **Insureds** have the same rights and obligations to notify the **Insurer** under this Policy, except that such notice shall be given to the **Insurer** at the address set forth in paragraph B) below. Notice to any other insurer shall not constitute notice to the **Insurer** unless also given to the **Insurer** as provided above.

Notice given to any **Underlying Insurer** shall not constitute notice under this Policy.

B) Notice to the **Insurer** provided for in this Section VII. shall be given to:

Beazley Canada Limited
First Canadian Place
100 King Street West, Suite 4530, P.O. Box 328
Toronto, Ontario M5X 1E1
Facsimile: + 1 416-861-1617



Authorized Insurer's Representative
Beazley Canada Limited

Attached to and forming part of Policy No. 18601665

Endorsement # 1

Sanctions and Limitation Exclusion (AEM1056)

Named Insured: **John Polson - Polson Environmental**
Effective Date: 01 Dec 2022

No (re)insurer shall be deemed to provide cover and no (re)insurer shall be liable to pay any **Claim** or provide any benefit hereunder to the extent that the provision of such cover, payment of such **Claim** or provision of such benefit would expose that (re)insurer to any sanction, prohibition or restriction under United Nations resolutions or the trade or economic sanctions, laws or regulations of Canada, the European Union, United Kingdom or United States of America.

All other terms and conditions remain unchanged.



Authorized Insurer's Representative
Beazley Canada Limited

01 Dec 2022
Date

Attached to and forming part of Policy No. 18601665

Endorsement # 2

Amended Retroactive Date Endorsement (BZEX1091)

Named Insured: **John Polson - Polson Environmental**
Effective Date: 01 Dec 2022

This endorsement modifies insurance provided under the following:

EXCESS INSURANCE POLICY

In consideration of the premium charged for the Policy, it is hereby understood and agreed that the following clause is added to the Policy:

RETROACTIVE DATE
With respect to any "retroactive date", "continuity date" or similar term contained in the **Followed Policy** the following date shall apply for this Policy: 15 Sep 2012

All other terms and conditions remain unchanged.



Authorized Insurer's Representative
Beazley Canada Limited

01 Dec 2022
Date



Ryan Riess, M.Sc., P.Eng.
Senior Remediation Specialist, President
Ph : 306 227 2423
www.rsquaredenviro.com
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Your best fit for remediation and assessment solutions

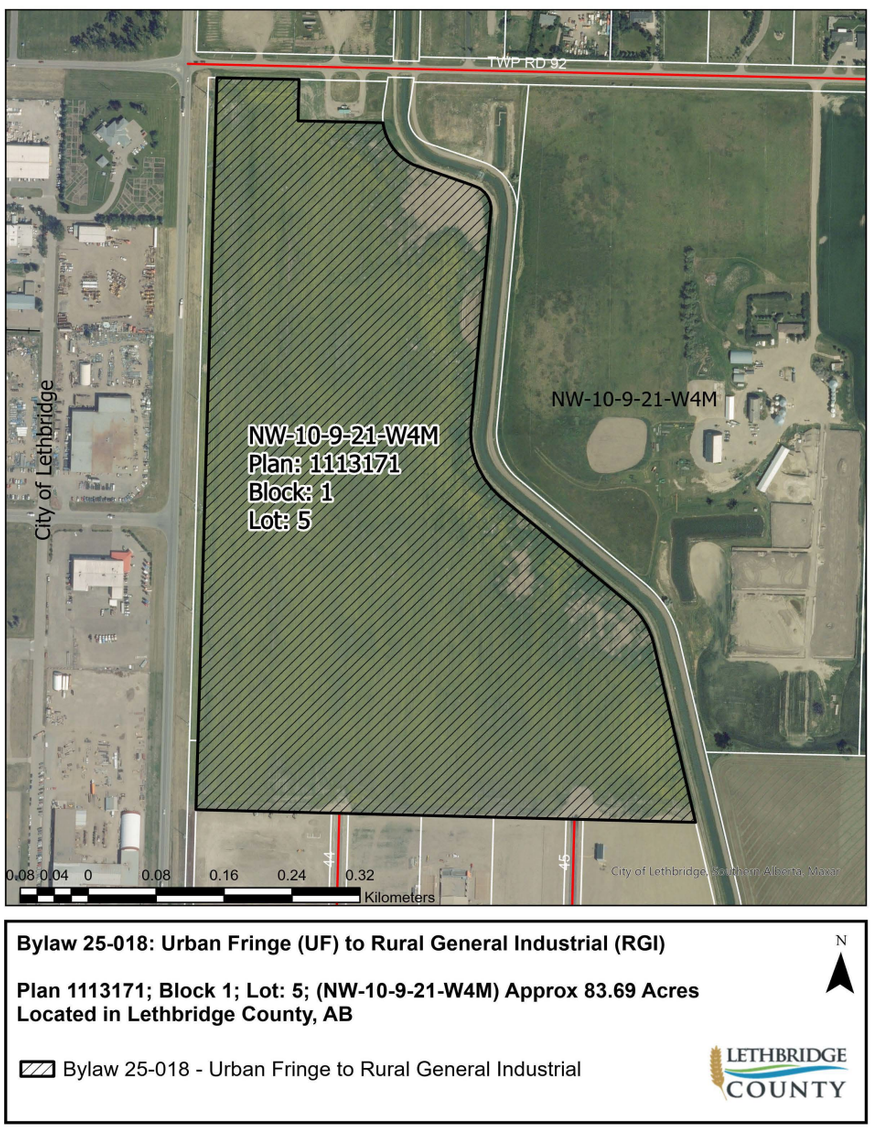
LETHBRIDGE COUNTY

IN THE PROVINCE OF ALBERTA

BYLAW NO. 25-018

Bylaw 25-018 of Lethbridge County being a bylaw for the purpose of amending Land Use Bylaw 24-007, in accordance with Sections 230, 606 and 692 of the Municipal Government Act, R.S.A. 2000, Chapter M-26.

WHEREAS the purpose of Bylaw 25-018 is to re-designate Plan 1113171 Block 1 Lot 5 in the NW 10-9-21-W4 from Urban Fringe to Rural General Industrial as shown below;



Bylaw 25-018: Urban Fringe (UF) to Rural General Industrial (RGI)

N

Plan 1113171; Block 1; Lot: 5; (NW-10-9-21-W4M) Approx 83.69 Acres
Located in Lethbridge County, AB

Bylaw 25-018 - Urban Fringe to Rural General Industrial

LETHBRIDGE COUNTY

AND WHEREAS the re-designation of the lands will allow for uses as allowed in the Rural General Industrial District.

AND WHEREAS the municipality must prepare an amending bylaw and provide for its notification and consideration at a public hearing;

NOW THEREFORE, under the authority of the Municipal Government Act, R.S.A. 2000, C-26, as amended, the Council of Lethbridge County in the Province of Alberta duly assembled does hereby enact the following, with the bylaw only coming into effect upon three successful reading thereof;

GIVEN first reading this 19th day of June 2025.

_____
Reeve

_____
Chief Administrative Officer

GIVEN second reading this _____ day of _____, 20___.

_____
Reeve

_____
Chief Administrative Officer

GIVEN third reading this _____ day of _____, 20_____.

_____
Reeve

_____
Chief Administrative Officer

AGENDA ITEM REPORT

Title: Tax Penalty Waiver Request - Roll #19420400
Meeting: Council Meeting - 19 Jun 2025
Department: Corporate Services
Report Author: Hailey Pinksen

APPROVAL(S):

Candice Robison, Executive Assistant — Approved - 12 Jun 2025

STRATEGIC ALIGNMENT:


Governance ☒


Relationships ☐


Region ☐


Prosperity ☐

EXECUTIVE SUMMARY:

The County has received an appeal of Council's prior decision and another request for a tax penalty waiver related to Roll #19420400.

RECOMMENDATION:

That Council deny the request for a tax penalty waiver as requested for tax roll #19420400.

REASON(S) FOR RECOMMENDATION(S):

Administration has made the recommendation to not waive the tax penalty as penalties have been levied per the Tax Penalty Bylaw #1273. Additionally, a waiver of penalty could set some precedent for future requests of a similar nature

PREVIOUS COUNCIL DIRECTION / POLICY:

Historically County Council has not waived tax penalties, however, the Municipal Government Act states the following with regards to cancellation, reduction, refund or deferral of taxes;
Section 347(1) If a council considers it equitable to do so, it may, generally or with respect to a particular taxable property or business or a class of taxable property or business, do one or more of the following, with or without conditions:
(a)cancel or reduce tax arrears;
(b)cancel or refund all or part of a tax;
(c)defer the collection of a tax.

BACKGROUND INFORMATION:

On June 3, 2025, Lethbridge County received correspondence from the Ringelberg's requesting a waiver of property tax penalties and accrued interest. The request was based on their assertion that they did not receive property tax statements from the County, despite them indicating that the mailing

address on file was accurate. However, the Ringgenberg's indicated that no statements were ever received.

Despite not receiving the statements, no attempts were made by the property owners to contact the County to inquire about their property tax obligations. At the time the letter was received, taxes were three years in arrears and the property had entered the tax notification process.

Given these circumstances, the request for a waiver was reviewed by Council during its meeting on June 5, 2025. As the account had progressed significantly in arrears, no consideration or approval of the waiver was granted at that meeting.

A second letter from the Ringgenberg's was received on June 10, 2025, appealing Council's earlier decision and renewing their request for a waiver of penalties and interest. In their appeal, the Ringgenberg's contended that the County should have reached out via email or telephone to notify them of the outstanding taxes. They maintained that the lack of such contact absolves them of responsibility for the penalties and interest.

As of June 10, 2025, a payment of $11,282.78 was received from the Ringelbergs, which served to remove the property from the tax notification process.

Description	Amount
Previous balance owing	$20,013.65
Payment received (June 10, 2025)	-$11,282.78
Remaining balance	**$8,730.87**
• 2025 Tax Levy	$5,616.64
• Outstanding Penalties/Interest	$3,114.23

ALTERNATIVES / PROS / CONS:

Waive tax penalty in the amount of $3,114.23 as requested:
PRO - Would satisfy the penalty waiver request.
CON - There is a tax penalty bylaw in place, and waiving the penalty would set a precedent for similar future requests.

FINANCIAL IMPACT:

Loss of tax penalty in the amount of $3,114.23.

LEVEL OF PUBLIC PARTICIPATION:

☒ Inform ☐ Consult ☐ Involve ☐ Collaborate ☐ Empower

ATTACHMENTS:

Tax Penalty Waiver Request - Roll #19420400

Please Note

We did pay our outstanding balance today of $11.282.20

June 10, 2025

To the Council of Lethbridge County

We would like to appeal the decision that was made at your previous County Meeting regarding our account.....

We have never received a statement or been contacted via email or phone and been notified of the fact that our account was in arrears

Therefore I think it is completely unfair to be charged a penalty and charge interest on the penalty when I am unaware of the fact that I owe anything

A phone call or email would have been a very simple way to contact and notify us

Therefore I would like to appeal your decision and have you reconsider your decision. I would be happy to present my case in front of council personally and would appreciate the appeal hearing

Thank you for your consideration.

Sincerely [redacted]

FRESH Start
RECOVERY
Providing Solutions To Save Lives

RECEIVED
JUN 12 2025
Lethbridge County

June 5, 2025

Mr. Cole Beck
Chief Administrative Officer
Lethbridge County
#100, 905 4 Avenue South
Lethbridge, AB T1J 4E4

Dear Cole,

On behalf of all the people we serve at Fresh Start Recovery, thank you very much for your generous grant in support of our inaugural Lethbridge Run for Recovery event!

The Run for Recovery is an exciting opportunity to engage the community in a way that celebrates healthy activity, increases awareness of addiction and recovery, and reduces the stigma associated with the disease of addiction.

At Fresh Start, we are guided by three simple but profound principles: Generosity, Gratitude, and Community. Generosity fuels the resources needed to provide treatment and support. Gratitude reminds us of the progress we've made and the remarkable support we've received along the way. Community is the foundation for healing, a space where individuals and families come together to thrive and rebuild.

We are grateful to have the support of Lethbridge County through the Stirling Wind Project. Thank you!

Sincerely,

Bruce Holstead
Executive Director

Rod Garossino
Director of Fund Development

COMMUNITY FOUNDATION
LETHBRIDGE + SOUTHWESTERN ALBERTA

RECEIVED
MAY 29 2025
Lethbridge County

May 22, 2025

Tory

Tory Campbell
Reeve, Lethbridge County
905 4 Avenue South
Lethbridge, AB T1J 4E4

Dear Reeve Campbell,

As you will recall, when the Community Foundation's Committee of Nominators met in December 2024, our Executive Director, Charleen Davidson, shared our plans to bring the *Community Foundation of Lethbridge and Southwestern Alberta Act* (the "Act") forward to the Legislative Assembly of Alberta to update our Act through a handful changes. Among the changes requested was that our Board of Directors have the authority to appoint all incoming Directors to the Board moving forward, a change that would simultaneously dissolve the Committee of Nominators.

This letter is to inform you that we presented our request to repeal and replace our Act to the Standing Committee on Private Bills in Edmonton on April 15, 2025. Mr. Rob Miyashiro, MLA Lethbridge West, served as our sponsor. On May 16, 2025, we received confirmation from Parliamentary Counsel Vani Govindarajan that our Bill passed Second Reading, Committee of the Whole, and Third Reading in the Assembly, and that on May 15, 2025, the Bill received Royal Assent, transforming it into law. A copy of the correspondence is included for your information.

The decision to repeal and replace our Act was made solely to modernize it and ensure that it continues to meet our needs so that we can better serve our community. Although we were incorporated in 1966, very few changes have been made to our Act. For example, we now serve all of Southwestern Alberta, yet the Committee of Nominators as defined in our previous Act, represents only the City of Lethbridge and Lethbridge County.

We thank you for your many years of service on our Committee of Nominators and appreciate your generous support of work. We acknowledge your commitment to and interest in our work, and invite you to contact us if ever you are interested in joining our team; we would be delighted to have you.

Best wishes,

The Honourable Rick Casson P.C.
President, Community Foundation

Unit 50, 1202 – 2 Avenue South, Lethbridge, AB T1J 0E3
P 403.328.5297 E office@cflsa.ca W cflsa.ca

LEGISLATIVE ASSEMBLY

ALBERTA

OFFICE OF PARLIAMENTARY COUNSEL

May 16, 2025

SENT VIA EMAIL

Charleen Davidson
Executive Director
Community Foundation of Lethbridge and Southwestern Alberta
Unit 50, 1202 – 2 Avenue South
Lethbridge, AB T1J 0E3

Dear Ms. Davidson:

Re: **Private Bill – *Community Foundation of Lethbridge and Southwestern Alberta Act***

I am writing to advise you of the progress of the petition for the above-noted private Bill since the hearing of Standing Committee on Private Bills on April 15, 2025.

The Bill passed Second Reading, Committee of the Whole and Third Reading in the Assembly. On May 15, 2025, the Bill received Royal Assent, transforming it into law. Unless otherwise stated, an Act is in effect on the beginning of the day the Bill is assented to.

Once the statute is printed, we will provide you with three certified copies of the Act as it will appear in the annual bound version of the Alberta Statutes. These are typically made available early in the new year and will be mailed to you at that time.

Should you have any questions, please feel free to contact our office.

Sincerely,

Vani Govindarajan
Parliamentary Counsel

cc. Ms. Angela Pitt, Member for Airdrie-East, Chair, Standing Committee on Private Bills
Member Rob Miyashiro, Member for Lethbridge-West
Jody Rempel, Committee Clerk, Standing Committee on Private Bills
Nancy Robert, Clerk of Journals and Committees

3105, 9820 – 107 STREET NW
EDMONTON, ALBERTA, T5K 1E7, CANADA

Phone: 780-422-4837
parliamentary.counsel@assembly.ab.ca

AGENDA ITEM REPORT

Title: Lethbridge County Council Attendance Update - May 2025
Meeting: Council Meeting - 19 Jun 2025
Department: Administration
Report Author: Candice Robison

APPROVAL(S):

Cole Beck, Chief Administrative Officer — Approved - 12 Jun 2025

STRATEGIC ALIGNMENT:


Governance ☒


Relationships ☐


Region ☐


Prosperity ☐

EXECUTIVE SUMMARY:

To remain transparent to its citizens, Lethbridge County Council members report on their activities and events attended throughout the month.

RECOMMENDATION:

No motion required.

REASON(S) FOR RECOMMENDATION(S):

To remain transparent to the citizens of Lethbridge County.

PREVIOUS COUNCIL DIRECTION / POLICY:

A County Council update is provided monthly.

BACKGROUND INFORMATION:

In order to remain transparent to its citizens, Lethbridge County Council members provide a monthly report on their activities and events for the prior month.

ALTERNATIVES / PROS / CONS:

By not reporting activities and events attended by members of Council, citizens are unaware of the events occurring within the region and are unaware of the participation of Council with regards to community events.

FINANCIAL IMPACT:

None at this time.

LEVEL OF PUBLIC PARTICIPATION:

☒ Inform	☐ Consult	☐ Involve	☐ Collaborate	☐ Empower

ATTACHMENTS:

2025 May Lethbridge County Council Attendance

Lethbridge County Council Attendance
May 2025

Division 1

Councillor Lorne Hickey

May 1	Lethbridge County Council Meeting
May 7	Green Acres Board Meeting
May 15	Lethbridge County Council Meeting
May 21	Green Acres Finance Meeting
May 28	Greed Acred Board Meeting

Division 2

Reeve Tory Campbell

May 1	Lethbridge County Council Meeting
May 14	EDL Board Meeting
May 14	Meeting with CPFC/Northleaf Capital
May 15	Lethbridge County Council Meeting
May 15	Luncheon with CPFC/Northleaf Capital, Invest Alberta, SMRID, AIDA
May 20	Meeting with Residents, CAO, Director of Operations
May 24	PBHS Graduation Ceremony
May 28	Shaughnessy Community Association AGM
May 29	LDE Whoop-Up Days Media Launch
May 29	Chinook Arch Library Finance & Personnel Committee Meeting

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Division 3

Councillor Mark Sayers

May 1	Lethbridge County Council Meeting
May 15	Lethbridge County Council Meeting
May 29	LDE Whoop-Up Days Media Launch

Division 4

Deputy Reeve John Kuerbis

May 1	Lethbridge County Council Meeting
May 3-7	Community Futures National Conference
May 12	Teams Meeting with Prairies Can
May 13	Weekly Meeting with Community Futures Executive Director
May 15	Lethbridge County Council Meeting

May 20	Weekly Meeting with Community Futures Executive Director
May 21	Teams Meeting with Prairies Can
May 21	Community Futures Policy Committee Meeting
May 26	Emergency Management Advisory Committee Meeting
May 27	Waste Commission Sub-Committee Meeting
May 28	Community Futures Monthly Board Meeting

Division 5

Councillor Kevin Slomp

May 1	Lethbridge County Council Meeting
May 15	Lethbridge County Council Meeting

Division 7

Councillor Morris Zeinstra

May 1	Lethbridge County Council Meeting
May 15	Lethbridge County Council Meeting

AGENDA ITEM REPORT
CLOSED ITEM

Title:	Request for Participation (Disclosure harmful to intergovernmental relations (FOIP section 21))
Meeting:	Council Meeting - 19 Jun 2025
Department:	Administration
Report Author:	Mattie Watson

APPROVAL(S):

Cole Beck, Chief Administrative Officer — Approved - 12 Jun 2025

STRATEGIC ALIGNMENT:



Governance ☐ | **Relationships** ☒ | **Region** ☐ | **Prosperity** ☐

EXECUTIVE SUMMARY:

Lethbridge County has been invited to participate in the annual Mayor's Whoop Up Days BBQ on Tuesday, August 19 at Lethbridge City Hall.

RECOMMENDATION:

That Council indicate whether or not the County will participate in this event in 2025.

REASON(S) FOR RECOMMENDATION(S):

Participating in this event may be an opportunity to build upon existing relationships with the City and community.

PREVIOUS COUNCIL DIRECTION / POLICY:

Lethbridge County and members of Council have participated in this event since 2022.

BACKGROUND INFORMATION:

The City of Lethbridge has hosted the Mayor's Whoop Up Days BBQ since 2022, and each year the County has been invited to participate by providing a booth and having staff and/or Councillors attend.

The free event is always well-attended and coincides with the end of the Whoop Up Days parade.

The County has typically set up a tent with a table, banners and giveaway items for attendees.

The City has reached out to ask if the County is interested in participating in 2025, and is open to suggestions for our involvement.

In previous years (including 2024), the Lethbridge office is closed for the duration of the parade and a staff and Council-only lunch is served in the parking lot. The County's Employee Engagement Committee plans to host a staff lunch following the parade in 2025.

ALTERNATIVES / PROS / CONS:

- The County could continue participating as in past years, including a tent/table, banners and giveaway items, with both staff and Council attending.
- The County could continue participating as in past years, including a tent/table, banners and giveaway items, with only staff attending.
- The County could decline the invitation to participate.

FINANCIAL IMPACT:

Staff time is the only anticipated expense. We have giveaway items, tents, tables and banners in stock. Should Council decide to participate and would like additional items or food to give away, there would be associated costs.

LEVEL OF PUBLIC PARTICIPATION:

☒ Inform ☐ Consult ☐ Involve ☐ Collaborate ☐ Empower

AGENDA ITEM REPORT

Title:	Proposed Regional Economic Development Initiative (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party, Section 25 - Disclosure Harmful to Economic and Other Interests of a Public Body)
Meeting:	Council Meeting - 19 Jun 2025
Department:	Administration
Report Author:	Mattie Watson

APPROVAL(S):

Cole Beck, Chief Administrative Officer — Approved - 16 Jun 2025

STRATEGIC ALIGNMENT:


Governance


Relationships


Region


Prosperity

EXECUTIVE SUMMARY:

In 2022, Council approved a motion to commit financial resources and enter into a partnership with SouthGrow Regional Initiative for a proposed solar energy project (solar farm) on County-owned land directly southeast of Monarch. SouthGrow intends to use the solar farm as a revenue stream to fund their economic development initiatives.

In 2023, the Government of Alberta imposed a moratorium on renewable facilities and interest rates increased, so this project did not advance.

At the beginning of this year, SouthGrow informed the County they now intend to move forward with this project. As it had been two years since this had been discussed between SouthGrow and Lethbridge County, Administration reviewed the project. Concerns around its feasibility and benefit to the County were identified, including:

- The original area for the project includes flanking the panels on three sides of the lagoon, inhibiting the ability for expansion, therefore possibly limiting the capacity for growth in Monarch.
- A City of Lethbridge waterline runs through the northern portion of SouthGrow's proposed area and would need to be moved, at the expense of SouthGrow.
- An engineering study should be done to determine how much land should be reserved for effluent.

Administration has met with SouthGrow to discuss these concerns. The organization was presented with a map that keeps the panels to the east side of the lagoon with a 20m setback from the waterline. SouthGrow has indicated they prefer a larger area to ensure the project's financial viability, and would be willing to move the waterline (at their expense).

SouthGrow has also informed Administration that they have been invited into a full application with PrairiesCan for $1-3 million in capital, and the Federation of Canadian Municipalities will fund the remainder.

RECOMMENDATION:

That Council determine whether the County should continue supporting the proposed SouthGrow solar project on the County-owned parcel east of Monarch.

REASON(S) FOR RECOMMENDATION(S):

SouthGrow has begun moving forward with the planning phase of the project. Next steps are contingent on approvals from Lethbridge County, including rezoning, permitting and possibly relocating a waterline if the County's proposed area is not acceptable to SouthGrow.

PREVIOUS COUNCIL DIRECTION / POLICY:

2019-2022 Deputy Reeve VanderVeen MOVED that Lethbridge County commits financial resources and pursues entering into a partnership with a third party for a proposed solar energy project.

CARRIED

BACKGROUND INFORMATION:

In 2022, Council was approached by SouthGrow Regional Initiative to partner on a solar project directly southeast of Monarch, on a County-owned parcel. SouthGrow had identified that a solar facility would provide them with a more predictable and sustainable solution to their funding challenges. At that time, the County had agreed to leasing the land to SouthGrow, providing support for applications and assistance in obtaining grants.

The project was well underway in 2023 before the provincial moratorium was implemented. Discussions were being held on next steps with rezoning and lease agreements. The CAO provided letters of support to the Minster of Jobs, Economy and Northern Development and Fortis in 2023. The County had also submitted a Project Concept as a requirement of SouthGrow's funding request to Western Economic Diversification Canada (now called PrairiesCan).

As the moratorium has been lifted, interest rates are more favourable and SouthGrow has potentially secured funding through the Federation of Canadian Municipalities, they are ready to proceed with the project. They are working through the application process with Fortis.

Administration wants to ensure the project will not inhibit the expansion of the lagoon and that there will be enough land remaining for effluent distribution. The population of Monarch has not grown substantially over the past number of years, however there is potential due to the recent indication of a landowner to develop a parcel on the west side of the hamlet. It is not known if, or to what extent the lagoon may need to expand to accommodate this potential growth.

ALTERNATIVES / PROS / CONS:

1) Council could consider continuing to support this project.

PRO:

- SouthGrow would have access to predictable funding.
- Additional tax revenue for the County.
- The County would be supporting an innovative solution to funding local economic development initiatives.

- Grant funding and lower-interest financing has been secured by SouthGrow, eliminating the need for the County to provide financial support.

CON:

- If SouthGrow ceases to exist as an organization, the County should consider how maintenance and remediation of the panels would be done.
- Lagoon expansion would be restricted by the solar panels.
- SouthGrow wishes to expand the project area for the project's economic viability, which may require moving the existing waterline and reducing area for effluent spread.

2) Council could consider withdrawing support for this project.

PRO:

- No restriction on lagoon expansion or area for effluent spread.
- No uncertainty around solar farm maintenance or remediation if SouthGrow ceases to exist.
- No need to move the waterline.

CON:

- Potential damage to relationship with SouthGrow.
- There are few parcels that are financially accessible to SouthGrow (land costs are high and the County lease is an affordable option).
- SouthGrow has committed significant time and effort into this project, as the County pledged support in 2022.
- The County wrote letters of support and submitted project concept documents in support of this project to PrairiesCan for grant funding - this may impact future grant funding or partnership considerations.

FINANCIAL IMPACT:

If this project were to proceed, the County would receive tax revenue.

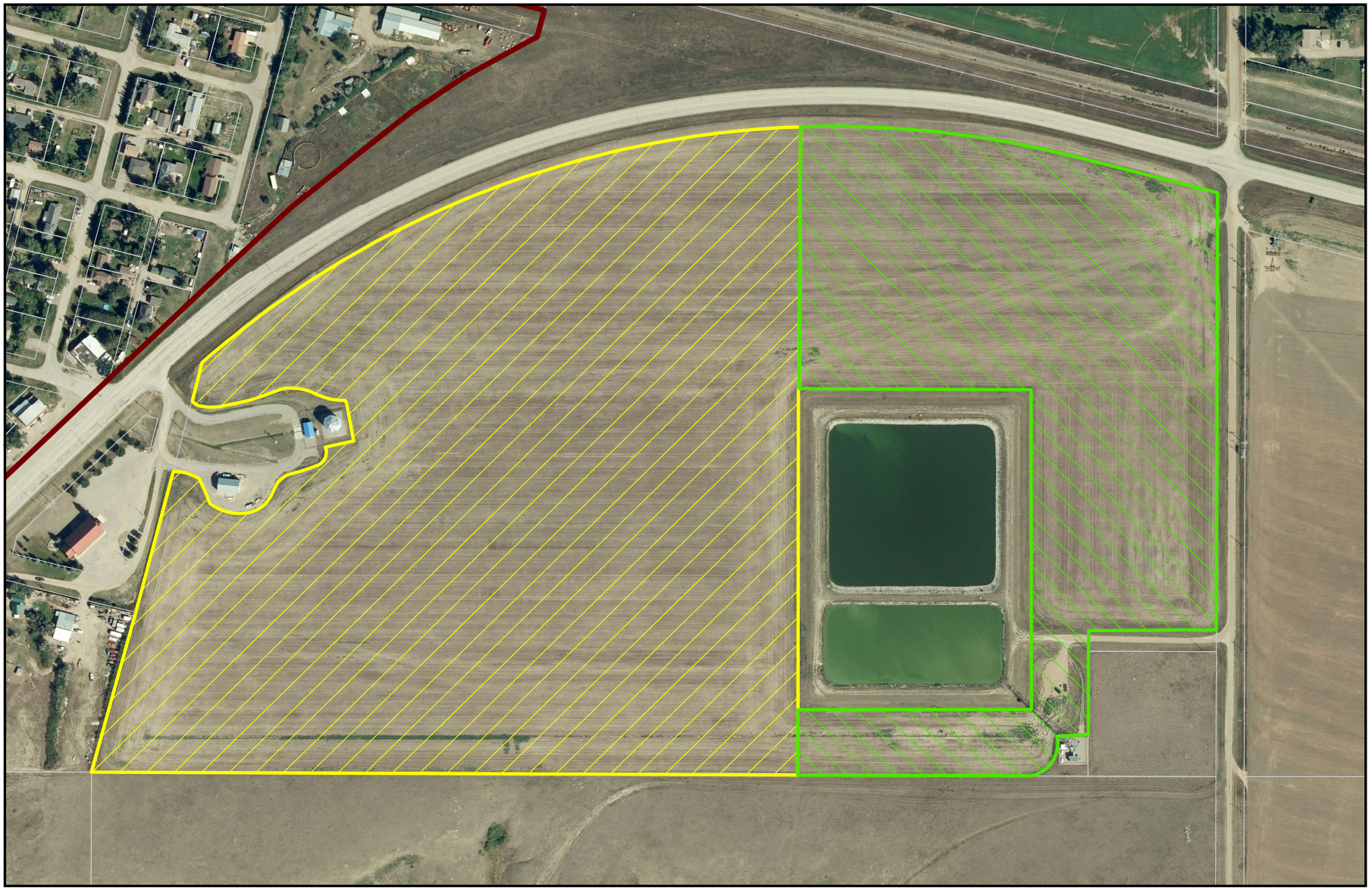
SouthGrow has indicated that they would be interested in exploring a community benefit funding program once the project is complete (similar to the Stirling Wind Project).

LEVEL OF PUBLIC PARTICIPATION:

☒ **Inform** ☐ **Consult** ☐ **Involve** ☐ **Collaborate** ☐ **Empower**

ATTACHMENTS:

Proposed Monarch Solar Project Area_2022
SouthGrow Solar Project Update_January 2025
Agenda Report - August 4 2022
Proposed Monarch Solkar Project Area_2025_County



Monarch Lagoon Area - Proposed Solar Area

General area for proposed solar site

Effluent Release Area

Parcel Boundary

Hamlet Boundaries

0 25 50 100 150 200 250 300 350 400 Meters

N

LETHBRIDGE COUNTY

Lethbridge County 2022
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SouthGrow Regional Economic Development
403.394.0615
P.O. Box 27068
Lethbridge, Alberta
Canada T1K 6Z8

Date: January 21, 2025

RE: Update on SouthGrow Solar Project

Background: Since around 2020, the SouthGrow Regional Initiative has been exploring the possibility of building, owning and operating a small-scale solar production facility with the intent of generating power and producing income to fund our non-profit economic development activities in Southern Alberta. In order to do so, we needed to secure a power connection and a suitable land location, an off-taker for the power, and the requisite financing. All of the above needed to be secured in a way that enabled a viable, low-risk business case.

In 2022, SouthGrow identified a potential piece of land in Lethbridge County that is class3 farmland, located near to the Hamlet of Monarch. This 60-acre parcel of land is used by the County for effluent spreading from the Monarch waste-water treatment pond. We approached the County to request their support and partnership on the project, which council was amenable too. Pledged support was loosely defined but included an agreement to lease a portion of the identified land to host the project, assistance with moving the project properly through the municipal permitting process, political support in applications to the AUC, and potentially help finding a funding mechanism for the project as may be appropriate, needed or feasible.

In the spring of 2023, the project was forming up nicely when the moratorium on new renewable projects put a halt to progress. Simultaneously, interest rates spiked and at the tail end of the moratorium, government policy pushed the price of power to plummet and the business case for the project was broken.

Since then, we have retooled small parts of the project, advanced potential capital funding avenues with multiple funders, and have watched carefully for the regulatory and economic environment to stabilize.

We have now reached that point and have a viable economic model and are ready to move forward again.

Current Situation:

SouthGrow has successfully advanced potential funding for our project with the Federation of Canadian Municipalities at interest rates which work for our business model. We have also been in talks with a broker to sell the power at a price that will work for our model too. Finally, we have engaged a professional consultant to project manage the next steps and are also advancing potential funding to de-risk the capital costs with Prairies Canada.

We are actively moving through the first stages of the application process with Fortis Alberta.

SouthGrow Regional Economic Development
403.394.0615
P.O. Box 27068
Lethbridge, Alberta
Canada T1K 6Z8

Next Steps and Requests:

Since it's been a while since we've discussed the project, we wanted to touch base with Lethbridge County and ensure that:

a.) You are still willing to lease the land in question to us
b.) Request next steps for municipal permitting and guidelines for any public consultation requirements that you might have.
c.) Request a short update meeting to review the project parameters again.
d.) Discuss environmental considerations and a potential waiver from the County which we can present to the AUC
e.) Update lease costing from the County and
f.) Discuss dates for implementation and construction (given that you lease out the land for haying).

Bona Fides:

The following business interests are now involved in professionalizing the project with us.

D-Com Electrical Solutions Ltd.
https://d-com.ca/
Role: Project builder

MPE Engineering Ltd: A Division of Englobe
https://www.mpe.ca/
Role: Engineering approvals

Ignite Energy Solutions
Role: Project Management

Edwards Land
https://edwardsland.ca/
Role: Land representation (will work with you on lease)

F**ortisAlberta**
https://www.fortisalberta.com/
Role: Project Sponsor and Electrical Distributor

Thank you again for your support of this project. I look forward to reigniting the conversation.

AGENDA ITEM REPORT
CLOSED ITEM

Title:	Solar Project Proposal Follow-up Report
Meeting:	Council Meeting - 04 Aug 2022
Department:	Administration
Report Author:	Jennifer Place, Larry Randle

APPROVAL(S):

Ann Mitchell, Chief Administrative Officer, Approved - 20 Jul 2022

STRATEGIC ALIGNMENT:

Governance	Relationships	Region	Prosperity
☐	☒	☒	☒

EXECUTIVE SUMMARY:

At the July 14, 2022 closed meeting of council a presentation was made by SouthGrow Regional Economic Development regarding a proposed solar facility on county-owned land near Monarch (see attached map). Council directed administration to present a report at the August 4th Council meeting on this regional economic development initiative.

RECOMMENDATION:

Resolved, That Lethbridge County moves forward with a land use bylaw amendment application for a solar energy project lead by SouthGrow on county-owned property and directs County Administration to draft the Direct Control Bylaw and to proceed with the public process;

That Lethbridge County agrees to serve as lead applicant on SouthGrow grant applications to Prairies Canada, Alberta Innovates, and any other potential funders, that may help to offset the costs of the proposed solar project, and that administration be directed to appoint a staff member to work in concert with SouthGrow staff towards these ends;

ThatLethbridge County agrees to help SouthGrow secure low-interest financing to fund the remaining project costs after grants have been applied for up to a maximum of $XXXX and directs administration to work with SouthGrow to finalize project details to make efficient use of this amount; and

ThatLethbridge County agrees to purchase power generated on Lethbridge County land at rates that will be negotiated by administration in conversation with SouthGrow with the goal of providing mutual benefit.

REASON(S) FOR RECOMMENDATION(S):

This project represents an opportunity for the county to enhance regional and local economic development and prosperity while also delivering on its promise to be innovative.

PREVIOUS COUNCIL DIRECTION / POLICY:

As per the county's Municipal Development Plan and Land Use Bylaw, commercial solar projects fall under the authority and jurisdiction of County Council through the Direct Control land use bylaw amendment process.

BACKGROUND INFORMATION:

In order to accommodate the solar facility, the lands in question are required to be re-designated to Direct Control as per the County Municipal Development Plan (Section 13). County Council would determine the suitability of the site for the proposed use based on the policies of the Municipal Development Plan and consider any input from affected landowners. If the site is deemed suitable and there are no unacceptable negative impacts to adjacent landowners, County Council could approve the Direct Control Bylaw.

If the Direct Control zoning amendment bylaw were adopted by council to permit a commercial solar farm on county-owned property, the applicant would then have to apply for and meet the terms and conditions of a county development permit. The County's Land Use Bylaw regulates this application process.

In addition for the need to rezone the county lands to accommodate the initiative, Southgrow also brought forward the following proposals for County consideration. Administration has highlighted the key points from each of the proposal items for Council.

- SouthGrow will request preferential lease-rates from the three host municipalities to streamline our annual costs.
- SouthGrow will sell the power produced at each site to the nearest host community at preferential rates that will realize substantial long-term cost savings for those municipalities and allow them to have predictable energy prices for the term of the agreement.
- SouthGrow will offset the costs of the projects by pursuing matching funding from Prairies Canada ($1 million) with the active support of Linda Erickson. SouthGrow will offset the costs of the projects by pursuing matching funding from Alberta Innovates ($1 million) to pilot the space-saving peg mount system as a demonstration project for the Province. SouthGrow will see the balance of the funding by securing a low interest loan, first by approaching our member municipalities for financing, and second by approaching other low-cost lenders for innovative energy projects.

The attached funding options for Councils review are based upon the numbers included in Southgrow's proposal.

ALTERNATIVES / PROS / CONS:

Option 1. Direct administration to prepare a land use bylaw amendment and to take other appropriate steps working with SouthGrow to pursue financing sources to move the proposed solar energy project on county-owned land near Monarch, forward to potential completion.

PROS:

- Presents a development opportunity using new, less intrusive solar array technology for a development that does not require water or wastewater services.
- Supported by the relationships, region and prosperity pillars of the county's strategic plan.
- Fits with the county's vision statement: "Lethbridge County is Canada's most innovative rural community."
- May provide the county with substantial energy cost savings over time.

- Will increase lease and property tax revenue for the county.

CONS:

- Any finance backing for the project the county provides has some inherent risk.

Option 2. Do not pursue the proposed SouthGrow solar energy project on county-owned land.

PROS:

- Eliminates direct financial risk to the county.

CONS:

- Without identifying legitimate reasons for not exploring the project further, would be contradictory to the strategic plan.

FINANCIAL IMPACT:

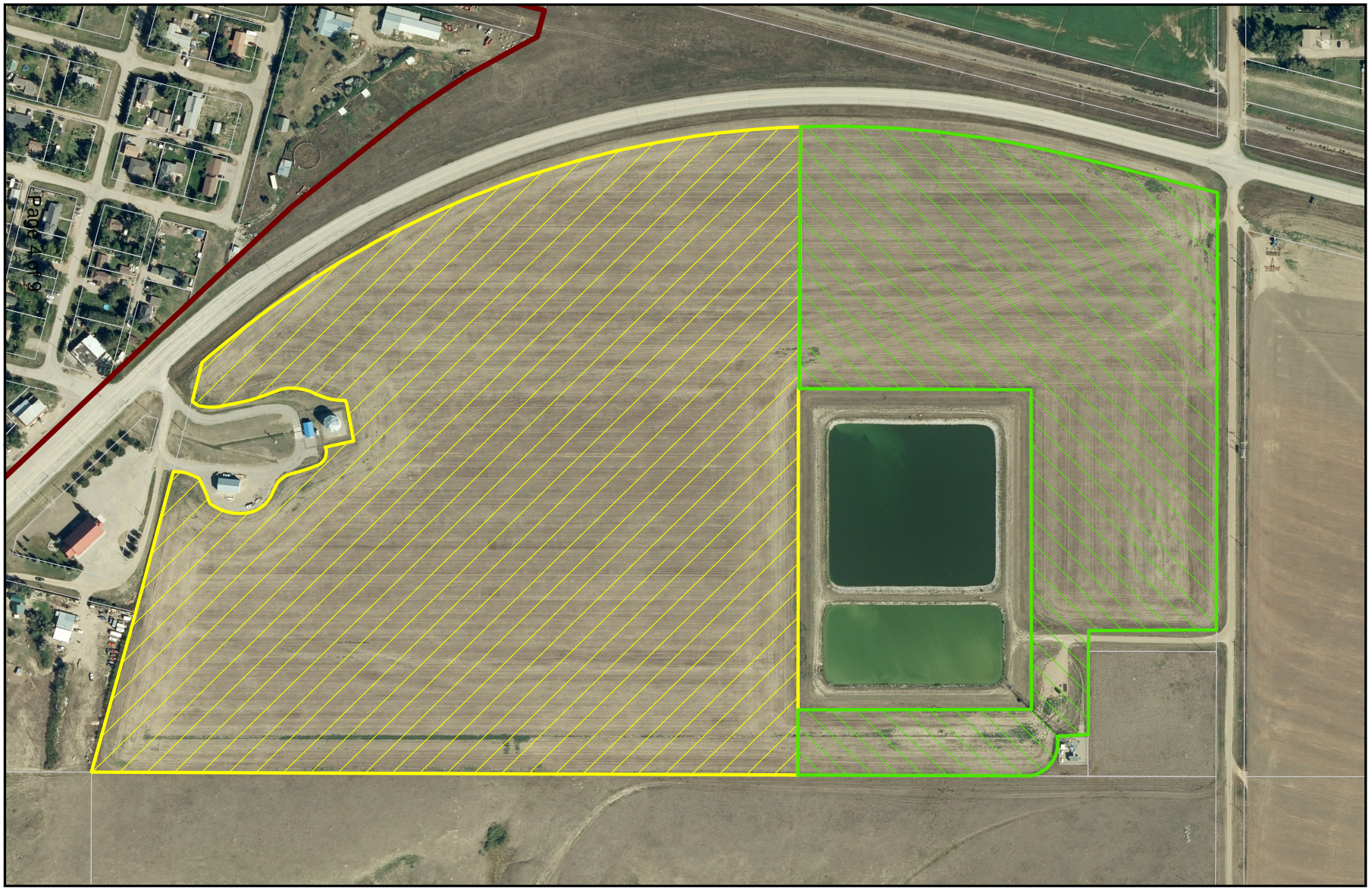
The amount and type of financial support Council is willing to provide would have an impact to the County by either reducing the amount of debt service available and/or reserve balances available until paid back in full.

LEVEL OF PUBLIC PARTICIPATION:

☐ Inform ☒ Consult ☐ Involve ☐ Collaborate ☐ Empower

ATTACHMENTS:

Monarch Solar Project Area
ACFA Rates - July 14-22
2023 Debtenture
2021 YE Reserve Balances



Monarch Lagoon Area - Proposed Solar Area

General area for proposed solar site

Effluent Release Area

Parcel Boundary

Hamlet Boundaries

0 25 50 100 150 200 250 300 350 400 Meters

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LETHBRIDGE COUNTY

Lethbridge County 2022
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Loans to Local Authorities - Loan Calculator

Please read the instructions accessed via the button below, fill in the appropriate information, and click "Calculate Loan".

Alter the current LTLA rates by entering new values in the fields below:

1 year rate	%	3 year rate	4.17 %
5 year rate	4.24 %	10 year rate	4.53 %
15 year rate	4.76 %	20 year rate	4.91 %
25 year rate	5 %	30 year rate	5.04 %
40 year rate	%	50 year rate	%

Loan calculation performed upon entry of a new value in the field below:

Loan value:	$ 0.00	Calculation as at:	7/14/2022, 11:51:39 AM

© Government of Alberta

As of July 14, 2022 Canada's Prime Rate was 4.70%.

SCHEDULE OF OUTSTANDING CURRENT DEBT 2023 - 2025 BUDGET										
LOAN	PROJECT NAME	PRINCIPAL	START	END	RATE	BALANCE @ DEC. 31, 2022	Planned 2023 Payment	Planned 2024 Payment	Planned 2025 Payment	Planned 2025 Payment
1	McCains Waterline Project	4,000,000	1999	2024	6.500%	597,031	327,926	327,926	-	-
2	North County Waterline Project	1,555,000	2002	2027	5.875%	508,059	120,202	120,202	120,202	120,202
3	Monarch Wastewater Project	626,000	2004	2024	5.175%	95,002	50,613	50,613	-	-
4	Diamond City Wastewater Project	817,896	2005	2025	4.364%	144,698	61,723	61,723	61,723	-
5	Turin Wastewater Project	957,106	2010	2030	4.124%	494,194	73,153	73,153	73,153	73,153
6	Mountain Meadows Pipeline Project	303,000	2011	2031	3.452%	159,806	20,526	20,526	20,526	20,526
7	Stewart Siding	200,000	2014	2034	3.748%	130,324	13,664	13,664	13,664	13,664
8	Base Stabilization - Draw #1	3,250,000	2017	2047	3.300%	2,903,883	171,488	171,488	171,488	171,488
9	Base Stabilization - Draw #2	2,060,000	2017	2047	3.164%	1,836,226	106,839	106,839	106,839	106,839
10	Base Stabilization - Draw #3	4,200,000	2019	2048	3.204%	3,842,982	218,938	218,938	218,938	218,938
11	Base Stabilization - Draw #4	3,490,000	2019	2048	3.367%	3,200,554	185,712	185,712	185,712	185,712
12	Base Stabilization - Draw #5	454,000	2019	2049	2.726%	412,555	22,252	22,252	22,252	22,252
	TOTAL OUTSTANDING DEBT					$ 14,325,313	$ 1,373,036	$ 1,373,036	$ 994,497	$ 932,774

Section 276(2) of the Municipal Government Act requires that debt and debt limits as defined by the Alberta Regulation 255/00 for Lethbridge County be disclosed in the County's Financial Statements. Below is a calculation as of December 31, 2013

	2013	2012
Total debt limit	$ 36,944,393	$ 32,716,880
Total debt	5,789,475	6,105,573
Unused debt limit	**$ 31,154,919**	**$ 26,611,308**
Debt servicing limit	$ 6,157,399	$ 5,452,813
Debt servicing	654,142	988,151
Unused debt servicing limit	**$ 5,503,257**	**$ 4,464,662**

The debt limit is calculated at 1.5 times revenue of the County (as defined in Alberta Regulation 255/00) and the debt service limit is calculated at 0.25 times such revenue. Incurring debt beyond these limitations requires approval by the Minister of Municipal Affairs. These thresholds are guidelines used by Alberta Municipal Affairs to identify municipalities which could be at financial risk if further debt is acquired. The calculation taken alone does not represent the fiancial stability of the County, rather that the finanical statements be interpreted as a whole for that determination.

Alberta Capital Finance Authority

20 Year Debentures @ 4.91% (rate as of July 14, 2022)

PRINCIPAL BORROWED	TOTAL INTERST OWED	DEBENTURE TOTAL	ANNUAL PAYMENT AMOUNT
$ 6,000,000	$ 3,488,382	$ 9,488,382	$ 474,419
$ 4,000,000	$ 2,325,588	$ 6,325,588	$ 316,279
$ 3,000,000	$ 1,744,191	$ 4,744,191	$ 237,213
$ 2,000,000	$ 1,162,794	$ 3,162,794	$ 158,140

$4 Million Debt Payment Funding Example using ACFA Debt

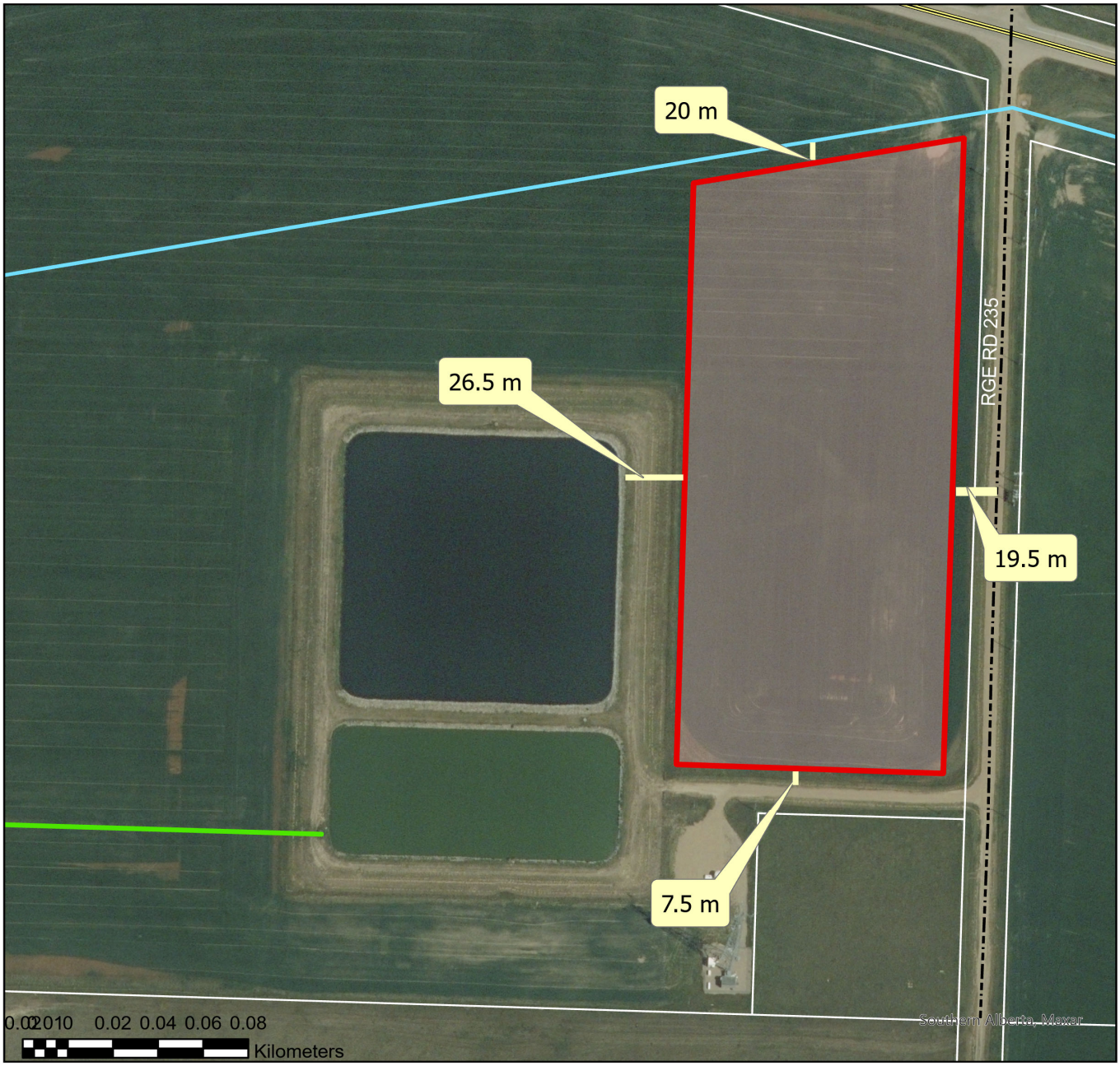
Annual Payment	Taxes Earned	Annual Lease	Debenture Payment SG	Balance Forward
$ 316,279	$ (58,500)	$ (12,800)	$ (244,979)	$ -

$4 Million Debt Payment Funding Example using Southgow Debt Example

Annual Payment	Taxes Earned	Annual Lease	Debt Payment per SG	SG Revenue Retained
$ 316,279	$ (58,500)	$ (12,800)	$ (279,162)	$ 34,183

Lethbridge County
RESERVES
31-Dec-21

DESCRIPTION	2021
RESERVES	
ADMINISTRATION RESERVE	665,396.96
ASB FUTURE PROJECTS RESERVE	261,890.73
IT CAPITAL RESERVE	211,259.52
COUNCIL DISCRETIONARY RESERVE	157,337.29
DONATION RESERVE	23,015.00
DRAINAGE RESERVE	410,014.30
COMMUNITY GRANT RESERVE	34,588.42
UTILITIES CAPITAL RESERVE	4,415,497.68
FLEET SERVICES	5,639,050.41
GRAVEL PIT RECLAMATION RESERVE	55,196.29
COMMERCIAL/INDUSTRIAL LAND	4,511,682.84
LANDFILL (KEDON) RESERVE	584,922.00
TAX EQUALIZATION RESERVE	4,956,133.29
EMERGENCY SERVICES PROJECTS RESERVE	220,323.92
EMERGENCY SERVICES EARS PROGRAM RESERVE	1,117,490.64
EMERGENCY SERVICES CONTINGENCY RESERVE	614,982.63
PROVINCIAL POLICING FUNDS RESERVE	354,355.00
PW CAPITAL PROJECTS RESERVE	3,610,067.73
RECREATION RESERVE	165,775.00
SAFETY PROGRAM RESERVE	107,223.74
SNOW REMOVAL	874,841.70
MARKET ACCESS NETWORK - BASE STABILIZATION	1,764,735.13
MARKET ACCESS NETWORK - BRIDGES/H.T. ROADS	5,874,332.17
TAX RECOVERY - HENSCHEL	16,999.49
TOTAL OPERATING & CAPITAL RESERVES	**36,647,111.89**
DESIGNATED RESERVES	
DIAMOND CITY PREPAID FRONTAGE	348,594.82
MONARCH LIT RESERVE	250,525.20
MOUNTAIN MEADOWS LIT RESERVE	200,092.40
TURIN LIT RESERVE	886,287.82
SUNSET ACRES LIT RESERVE	95,606.04
RIVERBRINK LIT RESERVE	15,761.72
TOTAL DESIGNATED RESERVES	**1,796,868.00**
TOTAL DUE TO OTHER FUNDS - RESERVES	**38,443,979.89**



Acceptable Area For Solar Production Facility

N

Distance from County water line: 20 meters (65.6 ft)
Distance from RGE RD 253: 19.5 m (63.9 ft)
Distance from Lagoon: 26.5 m (87 ft)
Distance from Internal Road 7.5 m (24.6 ft)

Total acres: ~8.11

Sanitary System (Linear) Water System Linear Landownership(Parcels)

LETHBRIDGE COUNTY