December 15, 2015

Rocky View County
911 32 Avenue NE
Calgary, AB T2E 6X6

Attention: Johnson Kwan
Planner, Rocky View County

Operations Plan – GFL Waste Transfer Station Facility

Dear Mr. Johnson Kwan:

GFL Environmental Inc. (GFL) has purchased a parcel of land located along Frontier Crescent, on the northern side of Township Road 240, approximately 1.6 km east of Route 201 in Rocky View County (See Figure 1, attached). GFL is proposing to develop the site into a Solid Waste Transfer Facility (SWTF).

GFL has met with Rocky View County's Agricultural & Environmental Services group to discuss the GFL Waste Transfer Facility development plans. It is our understanding, through our discussions, that the proposed GFL facility is consistent with and supports Rocky View County's 20 Year Solid Waste Master Plan. The new GFL SWTF will include a state of the art transfer facility that will complement the existing Rocky View transfer station network.

In addition to receiving and transferring nonhazardous solid waste that GFL collects mainly from their commercial and industrial customers in the area, the proposed site will also have: a collection vehicle maintenance shop and truck and container washbays to serve GFL's fleet, and office space for GFL administrative personnel. A preliminary site location plan of the proposed development is attached to this letter (see Figure 2). The site will include two separate buildings, and employee and truck parking.

Depending on future market conditions, GFL may consider expanding their operations at the site to include a recycling centre for the processing of recycling material. The recycling centre will provide innovative and sustainable processing options for rural municipalities that are not able to support their own recycling facilities. It would also provide additional jobs at the facility.

The nonhazardous solid waste that will be brought to the site (commonly referred to as MSW or IC&I waste) is comprised primarily of discarded packaging including rigid plastic containers, soft plastic wrap, laminated paper and wax coated paper, cardboard, styro-

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foam, and other packaging materials. It also includes a high proportion of discarded textiles (clothing, tarping, etc.). This type of solid waste does contain a small proportion (usually less than 10%) of organic food waste as might be found in the average office lunch room trash pail. Solid waste **does not** include hazardous materials, liquids, chemically caustic or acidic materials, medical waste, etc., and GFL has specific operating procedures in place to keep this type of waste out of the SWTF.

A typical nonhazardous solid waste transfer facility is presented below.

Plate 1: Typical Waste Transfer Facility

Details related to the facility operations are provided within the attached Design & Operations Report. Some other highlights of the SWTF include:

- **CNG Waste Collection Fleet and Fueling Station -** The facility will be designed to meet or exceed Rocky View County's environmental initiatives through a commitment to developing a fully integrated Compressed Natural Gas (CNG) facility and fleet. Studies have indicated that CNG waste collection fleets are not only cleaner than their diesel equivalents but they also have lower carbon footprint. GFL's CNG waste collection fleet will be one of the only in Alberta and it will be based in Rocky View County.
- **Multiple Benefits to Local Rocky View County Stakeholders -** GFL believes the proposed facility will be a benefit to multiple stakeholders within Rocky View County. With the addition of this waste transfer facility the increased local

competition will result in lower solid waste collection and ultimately disposal pricing for Rocky View County and its property owners. GFL was recently awarded the solid waste disposal contract for the Town of Cochrane and during the award, the town reiterated its support of GFL and the significant cost savings it would realize through the new contract with GFL. The development of this site as proposed will also be a significant employer in the County, with over a 100 people working at the facility.

- **Enhanced Stormwater Management** - Through the design process, GFL is committed to 'meet or exceed' the general requirements for Stormwater Management in accordance with the County's Servicing Standards and the specific requirements of the Frontier Park Business Lot Owner's Association. GFL will also complete the specific design and layout of the proposed development consistent with the County's Commercial/Industrial Design Guidelines.
- **Design Considerations to Minimize the Potential for Odour and Noise Impacts -** The waste transfer building will be located at the back of the property, away from Frontier Crescent and the existing neighbours. The building has been designed with all doors on the south side, facing away from Frontier Crescent and the prevailing winds. All waste unloading, storage and transfer activities at the site will occur within this enclosed building. There will be no outside handling, storage or stockpiling of waste materials. These measures will minimize the potential for odour and noise impacts.
- **No Significant Impacts to the Traffic Operations of the Road Network -** Comments received as part of the County's planning process had indicated that traffic from this site is a concern to neighboring property owners. As such, a detailed traffic impact assessment for this site was completed. The objectives for this study were to:
    - Compare trip generation for the GFL Solid Waste Transfer Facility versus other approved land uses in Frontier Industrial Park; and
    - Evaluate impacts of vehicular traffic generated by the GFL Solid Waste Transfer Facility on the adjacent roadway system as compared to the current land uses.

  The results of the traffic impact assessment concluded that the development will not have a significant impact to the traffic operations of the road network. Specifically:
    - The anticipated traffic volumes generated by the GFL Solid Waste Transfer Facility are less than those that were anticipated for the approved land use for the site. The operating hours of the facility are offset from the peak hours of operation for the road network.
    - The sensitivity analysis indicates that there is residual capacity in the transportation network. There is sufficient residual capacity that even an increase in traffic generated by the GFL Solid Waste Transfer Facility would not significantly impact the local transportation system.

Summary of Operations at Site

On a daily basis, the general operations at the site are summarized below:

Collection vehicles will be started and visually inspected commencing at 3:00 AM and continuing until 5:00 AM dependant up driver and route start times. Once a collection vehicle has been visually inspected, it will leave the site to complete its assigned collections. Vehicles will begin leaving the site shortly after 3:00 AM.

After the vehicle has completed its collection route, it will return to the GFL Waste Transfer Facility via Frontier Crescent. Collection vehicles will begin returning to the site around 5:00 AM where they will be weighed upon their arrival. The site has been planned such that there is sufficient space to allow truck queuing on site without backing up onto Frontier Crescent. The Waste Transfer facility has been designed with doors only on the south side, opposite to the prevailing winds and to prevent cross breeze through the facility. In addition, the location of the building at the back of the site will mitigate any odour and noise impacts.

As the collection vehicles back up to the south doors, the doors will open automatically to allow the truck to enter the building. Once fully inside the building, the doors will close. Collection vehicles will unload the waste onto the tipping floor for a visual inspection. Should any of the unloaded material be observed to be unauthorized waste, the material will be reloaded and removed from site. Following unloading, a door will be opened and the collection vehicle will leave the building. The door will subsequently close. Vehicles will stop at the weigh scale to weigh out prior to leaving for their next collection route. The collection vehicles will finish their routes between the hours of 1:00 – 4:00 PM and the facility will cease receiving waste at 5:00 PM.

Waste left on the tipping floor will be collected by front end loader and placed into a compactor. The compactor will compress the waste into an enclosed transfer trailer until the trailer reaches capacity. The transfer trailer will then leave the site, stopping at the scales to be weighed before heading to a solid waste disposal facility for delivery. This is a continuous through-put operation. Waste will not be allowed to accumulate at the site and generally only the material received at the end of the day, too late to be transported off-site, will remain overnight. There is no outside handling, storage or stockpiling of waste material. Any odours associated with the waste will be contained within the building. An odour management plan is included in the attached Design & Operations report.

It should be noted that much of the activity at the site will be related to office administration and vehicle maintenance functions, as GFL intends to relocate their

administrative office to the site. These types of activities are common throughout the business park and will form a large part of the activity at the GFL site.

We trust this overview of the GFL Waste Transfer Facility provides a complete understanding of the proposed operations. A Design and Operations Report and the Traffic Impact Assessment for the GFL Waste Transfer Facility in Rocky View County are attached.

Should you have any questions or concerns, please contact Keith Barnes at (403)215-8885, ext. 4310 or by email at kbarnes@dillon.ca.

Sincerely,
Dillon Consulting Limited

Keith Barnes, P.Eng.
Project Manager

Attachments: Figure 1, Location Plan
Figure 2, Proposed Site Plan
Design and Operations Report
Traffic Impact Assessment

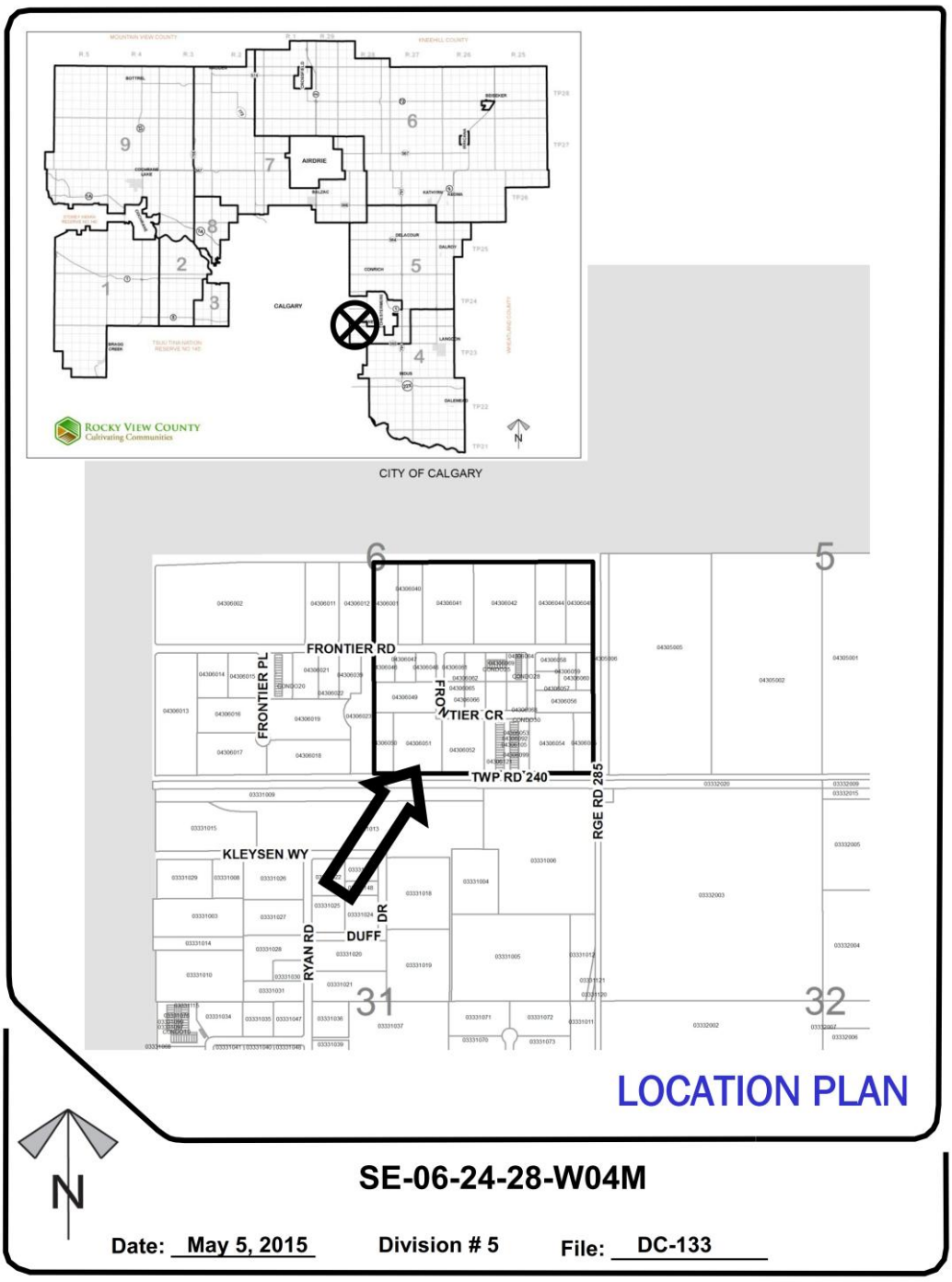

Figure 1: Location Plan

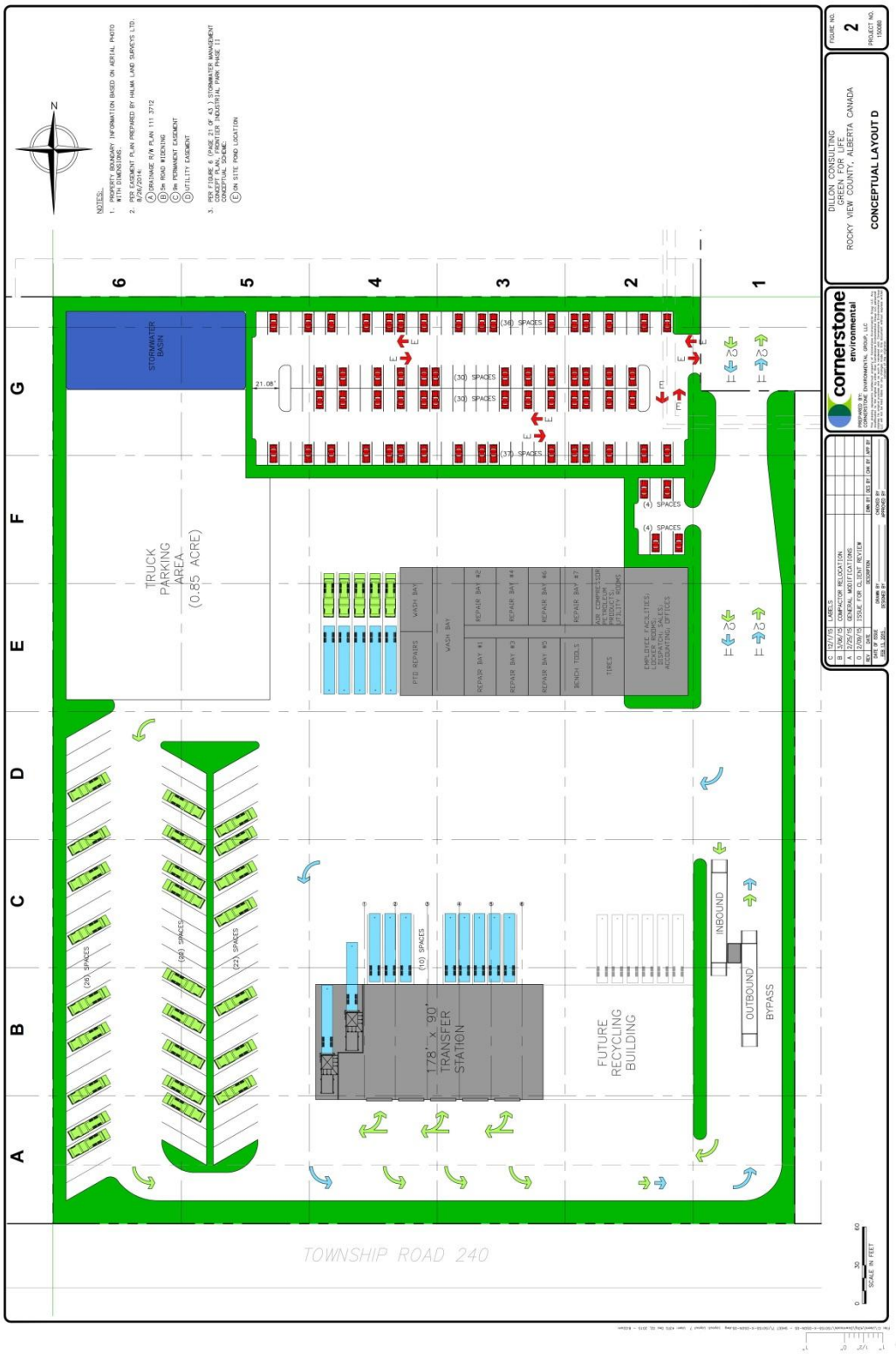

Figure 2: Proposed Site Plan

Design and Operations Report
GFL - Rocky View County
Waste Transfer Facility

GFL Environmental Inc.
Frontier Crescent, Rocky View, Alberta, T1X 0W3

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APPENDICES

Revision 2: December 15, 2015

Revision Table

Date of Revision	Revision
2015-12-15	Client reviewed

DEFINITIONS

a) “AEP” means Alberta Environment and Parks.

b) “AR 276/2003 Section 4” Activities Designation Regulation specifies activities that require approvals, registration and notifications. Transfer stations fall under the definition for waste storage facilities in Section 4.

c) “Company” means GFL Environmental Inc.

d) “Director” at Alberta Environment and Parks.

e) “EPEA” means the Environmental Protection and Enhancement Act.

f) “EPP” means Emergency Preparedness Plan.

g) “Recyclable(s)” means materials having a re-use or recycling end market.

h) “Site” means the waste transfer facility located at on the northern side of Township Road 240, approximately 1.6 kilometers east of Route 201.

1 INTRODUCTION

1.1 Site Location

GFL Environmental Inc. (GFL) proposes to construct and operate a waste transfer facility at a parcel of land located along Frontier Crescent, on the northern side of Township Road 240, approximately 1.6 km east of Route 201 in Rocky View County (the Site). Figure 1, **Location Plan** shows the locations of the property relative to its surroundings. The Site has an area of approximately 9.5 acres.

The Site is currently vacant and is surrounded to the north and northeast by commercial/light industrial buildings and trucking operations; to the east by a vacant land; to the west by a water body; and to the south by Township Road 240, CP railroad tracks and a large industrial property.

1.2 Function of the Site

The function of the facility is to receive and transfer nonhazardous solid waste. The processing of recyclable materials may be contemplated if demand exists.

In general, trucks will enter the facility through an access road and proceed to the scale for weighing and inspection prior to approaching the waste transfer building. The waste will then be unloaded onto the tipping floor inside the building. A loader operator will then reposition the waste from the floor to compaction trailers for shipment offsite.

This Design and Operations (D&O) Report has been prepared to include the following operations:

- The receipt and shipment of nonhazardous solid waste;
- The receipt of approximately 250 tonnes per day of waste; and
- Proposed hours of operation are Monday to Saturday from 5 am to 5 pm.

2 FACILITY DESIGN

2.1 Building Layout and Site Plan

The preliminary site and building **Conceptual Layout** is provided in Figure 2. Two buildings will be located on site; Waste Transfer Building and a Maintenance Shop and Operations Building. A description of each building is presented below.

2.1.1 Waste Transfer Building

The Waste Transfer Building will be designed as a fully enclosed pre-engineered metal building. Three tipping floor access bays and two bays for two stationary compactors will be provided. The proposed footprint of the waste transfer facility will be about 16,000 square feet.

The waste unloading, storage and loading areas are located within a large enclosed open space. The waste unloading and storage area has a high ceiling that measures 10.5 metres. The building is designed with an expandable end wall to allow for building expansion for the addition of recycling operations.

The tipping floor doors which are approximately 8 m wide by 8 m high will be electrically operated steel roll-up doors, with exterior weather hood enclosures. Personnel doors will be provided to meet the building code and operational requirements. The roofing will be constructed of steel panels with protective coating.

Concrete and steel push walls will be at least 4.5 m high and the lower 1 m of the wall will be constructed with an embedded steel plate which allows for waste to be loaded up against the wall without risking structural damage. The concrete floors will have a mix design of high cement content, hard aggregate, sacrificial thickness and steel fiber reinforcement. Rubber edges on the wheel loader buckets will be used to minimize floor wear.

In order to minimize impacts from the Site operations, the Waste Transfer Building has been located in the back corner of the property, furthest from Frontier Crescent and existing neighbours. In addition, all doors of the Waste Transfer Building will be located on the south side of the building, facing away from Frontier Crescent and the prevailing winds. There is sufficient space on the Site such that truck queuing on Frontier Crescent will not be necessary. In addition, since all waste unloading, storage and transfer operations are conducted inside the enclosed building, odour and noise impacts are not anticipated.

2.1.2 Maintenance and Operations Building

The Maintenance and Operations Building will be designed as a pre-engineered metal building. The Maintenance and Operations Building has been located at the front of the site close to the employee parking area to reduce pedestrian traffic crossing access roads. The Operations Center will be a two storey structure with a combined floor area of approximately 7,500 square feet. The Operations Center

will include offices, a meeting/break room, dispatching, accounting, and customer service representative areas. The maintenance shop area will be joined with the Operations Center. These floor areas will be further developed as part of the concept plan development work scope.

2.2 Hours and Days of Operation

Receiving and shipping of waste and/or recyclable materials will take place from Monday to Saturday between 5 am to 5 pm.

2.3 Vehicle Traffic

As shown on Figure 1, **Location Plan**, all vehicles entering or leaving the facility travel on Frontier Crescent, Frontier Road, 100 Street SE or 84 Street SE, and Peigan Trail SE or Glenmore Trail after exiting Route 201. Sufficient queuing capacity is available onsite for trucks waiting to cross the scale. A traffic management plan for handling both inbound and outbound truck traffic during peak periods is provided in Appendix A.

2.4 Waste Accepted at the Site

The Site will only receive and transfer nonhazardous solid waste. The processing of recyclable materials may be contemplated in the future if demand exists. It is anticipated that the site will receive approximately 250 tonnes of waste materials per day.

2.5 Site Storage

Waste will be stored in accordance with the requirements set out in the Fire Code for indoor storage of combustibles.

2.5 Fencing and Security

A chain link fence surrounding the property, including a lockable access gate along Frontier Crescent is proposed. All doors to the waste transfer building and the access road gate will be locked when the facility is closed. There will be 24 hour surveillance at the site, thus eliminating the potential for illegal dumping.

2.6 Utility Services

Potable water will be trucked into the Site. A fire water loop within the Site will provide water to the building and to the onsite fire hydrants. The number of fire hydrants will be determined in consultation with the local Fire Department. A water storage tank dedicated to fire protection may also be required. The fire hydrants must be inspected, tested and maintained on an annual basis.

Hydro services will be provided through underground conductors and pad mounted transformers.

Due to lack of access to a sanitary sewer system, all wastewater generated at the Site (domestic and that associated with the Site operations), will be directed to a wastewater holding tank. The tank will be pumped as required and hauled to a licensed disposal and treatment facility.

2.7 Stormwater Management

The waste material brought to the Site will not be in contact with stormwater on the Site as the material will be handled inside an enclosed building. There is no outside storage of waste materials.

Stormwater will be directed through a system of catch basins, drainage pipes, and onsite stormwater management controls as per the requirements for the development of the Site.

3 FACILITY OPERATIONS

Waste and/or recyclables will be brought to the facility in waste collection vehicles. All vehicles will be required to use Frontier Crescent to access the Site. Once on the property, they will be weighed using the facility's scales. Records will be kept of the load weights (refer to Section 3.10 Record Keeping). From the scale, the driver will be directed to the transfer building. The facility is equipped with a radioactive monitoring system to monitor vehicles entering the Site.

Vehicles will back into the unloading area and unload onto the tipping floor. As the vehicle is unloading, it will be inspected for any suspicious or prohibited waste. If suspect waste is encountered, a *Noncompliant Waste Refusal Form* will be completed and kept as part of Site records. The waste will be reloaded into the collection vehicle and the driver will be advised on removal of the material.

After fully unloading acceptable material, the collection truck will exit the building and be weighed out. All received waste collected at the Site will be loaded into fully enclosed compactions trailers and hauled to licensed disposal facilities.

3.1 Material Balance

Based on the design of the Site, it is possible to load two compactors at a time. The maximum trailer load weighs 32 tonnes and a trailer takes approximately 30-45 minutes to load. Therefore, up to four trailers can be loaded per hour. The regular receiving and shipping hours for the facility are 5 am to 5 pm.

3.2 Waste Receiving Sites

As above, all waste accepted at the Site will be loaded into enclosed compaction trailers and hauled to approved disposal facilities.

3.3 Facility Equipment and Maintenance

It is expected that the following equipment will be used at the transfer facility:

- Two (2) Stationary Transfer Compactors;
- Yard Jockey Truck;
- Wheel Loader;
- 10 Transfer Trailers;
- 6 Truck Tractors;
- Skid Steer Loader/Integrated Tool Carrier (sweeper/broom, bucket, forks); and
- Mechanical Broom/Street Sweeper with integral dust control.

Tipping and storage area floors will be washed and sanitized on an as required basis. Floor maintenance will be done to ensure safe operating conditions and to prevent odours from being generated.

3.4 Staff Training

All staff will receive appropriate training. Trained personnel will supervise all receiving, unloading and transfer of waste at the facility. All employees directly involved with activities relating to the facility will be trained in the following:

- Relevant waste management legislation, regulations and guidelines;
- Major environmental concerns pertaining to the waste to be handled;
- Occupational health and safety concerns pertaining to the processes and wastes to be handled;
- Environmental emergency and contingency procedures for the processes and wastes to be handled (e.g., the Environmental Preparedness Plan, Odour Management Plan, etc.);
- Use and operation of the equipment to be used by the operator;
- Procedures for the refusal of noncompliant loads;
- Site specific written procedures for the control of nuisance conditions;
- Record keeping procedures; and
- The requirements of AEP.

3.5 Waste Screening Procedure

All incoming vehicles must have their loads visually checked by on-site operators who then direct the trucks for off-loading. The facility will be equipped with a radioactive monitoring system to monitor vehicles entering the Site. Should a vehicle alert the radioactive monitoring system, it will be turned away from the facility prior to unloading. Facility staff at the tipping areas supervise unloading and inspect the incoming waste to ensure that the load does not contain any noncompliant materials, such as liquids or hazardous wastes. Loads that do contain noncompliant materials will be rejected and will be reloaded onto the vehicle delivering the waste. Appendix B provides details on specific waste handling procedures.

3.6 Emergency Preparedness Plan

An Emergency Preparedness Plan (EPP) will be prepared and updated as needed. The EPP will be readily accessible to all staff at all times and will deal with the prevention of, preparedness for, response to, and recovery from an emergency, including environmental emergencies.

The EPP will identify Facility Emergency Response Coordinators and it will contain the notifications protocol with names and telephone numbers of persons to be contacted, including persons responsible for the Site, the Alberta Environment Spills Hotline (1-800-222-6514), the Alberta Occupational Health & Safety (1-866-415-8690), the local Municipal Fire Department and the Police Department.

The EPP will also provide an organized set of procedures for responding to unexpected but possible emergencies at the facility, including but not limited to: medical emergencies, spills, fire, and other emergency issues as may be appropriate. The EPP will be reviewed annually and revised when needed to reflect any changes to design or operating procedures and to ensure that the contact names and telephone numbers are accurate.

3.6.1 Spills

With the operation of a Waste Transfer Facility, the potential exists for a spill of vehicle fluids. In the event of a spill, a procedure as outlined in Appendix C will be followed.

3.6.2 Fire

The Site is located within an industrial area with fire hydrants. A detailed *Fire Emergency Procedure* is provided in Appendix D.

3.7 Site Inspections and Nuisance Conditions

At the start of each day a visual inspection by the Site operator will be conducted. The purpose of the inspection will be to ensure Site security and cleanliness. The inspections will include the following areas:

a) Receiving areas;
b) Unloading/Storage/Compaction areas;
c) Truck Parking areas;
d) Security fence and property line; and
e) Adjacent properties.

Notes from each inspection will be recorded and within *Daily Visual Inspection* forms. Completed and extra forms will be kept at the facility.

Beyond the daily inspections, a regular inspection and maintenance monitoring program will be developed for the Site to ensure that it is kept clean and maintained in good condition. This type of a program is important in order to maintain the long-term integrity of the Site. To this end, issues identified within the program will be addressed as they are discovered.

Inspection		Maintenance
Frequency	**Items**	
Weekly/Daily	Presence of litter or debris	Pick up litter from transfer station and access roads weekly and place in appropriate bins for disposal.
	Suitable access to all required areas	Grade as required, snow removal as required.
	Lockable areas	Repair/replace as required to control Site access.
	General site cleanliness	Maintain neat and tidy operation.
Quarterly	Site fencing and signage	Repair as needed. Maintain site signs in clear readable condition. Ensure information is current and correct.

3.8 Nuisance Conditions

3.8.1 Dust Control

Since all waste unloading, storage and transfer operations will occur inside the building, dust emissions resulting from the operations will be minimal. All access roads are paved, minimizing dust generation and a road sweeper contractor will be retained to clean the onsite roadways during summer hours.

3.8.2 Odour Prevention and Control

To prevent the generation of odours, the following practices will be followed:

- All waste unloading, storage and transfer will occur inside the building.
- The tipping floor will be kept clean and absorbents will be used to remove any liquid that may be left from time to time.
- Waste will be removed from the facility normally within 24 hours of receipt, though storage for 72 hours may be necessary in the event of equipment failure, inclement weather and statutory holidays.

The Site will be inspected on a daily basis to ensure that odours are not an issue. If odours are detected, the following steps will be put in place progressively until the odour is mitigated:

- Employees in the waste receiving area will use a portable sprayer to dispense a non-toxic odour neutralizer on any loads of odorous waste that are received.
- The waste can also be covered with wood chips or similar material (for example, dry garbage) to neutralize or suppress the odour.
- The doors to the facility at the south side of the property will be closed other than when trucks are entering or exiting the building.
- A detailed *Odour Management Plan* is provided in Appendix E.

3.8.3 Litter Prevention and Control

All waste will be unloaded, stored (temporarily) and transferred inside the building, thereby minimizing the potential for creating litter. In addition, facility staff will undertake daily visual inspections and clean up any litter resulting from Site operations. The Site is also surrounded by fencing to prevent any litter from blowing offsite.

3.8.4 Pest Control

The company retains the services of a licensed pest control contractor to design and implement a pest control plan for the Site.

3.9 Complaint Procedure/Occurrence Reporting

The company will maintain an *Environmental Complaints and Issues Report* that will document at minimum:

a) Complainant name, address and phone number (if provided);
b) Weather conditions such as the wind direction;
c) Detailed description of complaint (date, time, nature);
d) Company activities at the time of the complaint; and
e) Description of immediate response.

A copy of the report will be kept on file at a central location. Signage at the gate includes a telephone number to allow a complainant to contact the company at any time.

3.10 Record Keeping

Records (either electronic or hard copy) are kept of all received and shipped waste material at the Site, including:

a) Itemized record of any rejected waste;
b) Type, date, time of arrival, source, and quantity of waste received;
c) Company name of hauler delivering the waste (for commercial waste);
d) Daily Visual Inspection forms and Complaint Reports; and
e) Type, date, time, destination, and quantity of material shipped.

3.11 Regulatory Reporting

Any contravention of EPEA or regulations under the Act will be immediately reported to the Director. This may include such incidents as:

- Spills that result in an offsite release;
- Drainage of a contaminant to a watercourse;

- Accidental fires; and
- Other incidents that result in a release of a substance.

The Site Supervisor should contact the Director by telephone at (780) 422-4505. A written report is then required to be submitted to the Director within 7-days that provides:

- A description of the contravention;
- Date of the contravention;
- Explanation on why the contravention occurred ;
- Name of the owner of the property where the contravention occurred;
- Preventative actions that were taken prior to the contravention;
- Summary of actions taken to mitigate the contravention;
- Summary of measures that will be taken to address any remaining effects of the contravention; and
- Any other information requested by the Director.

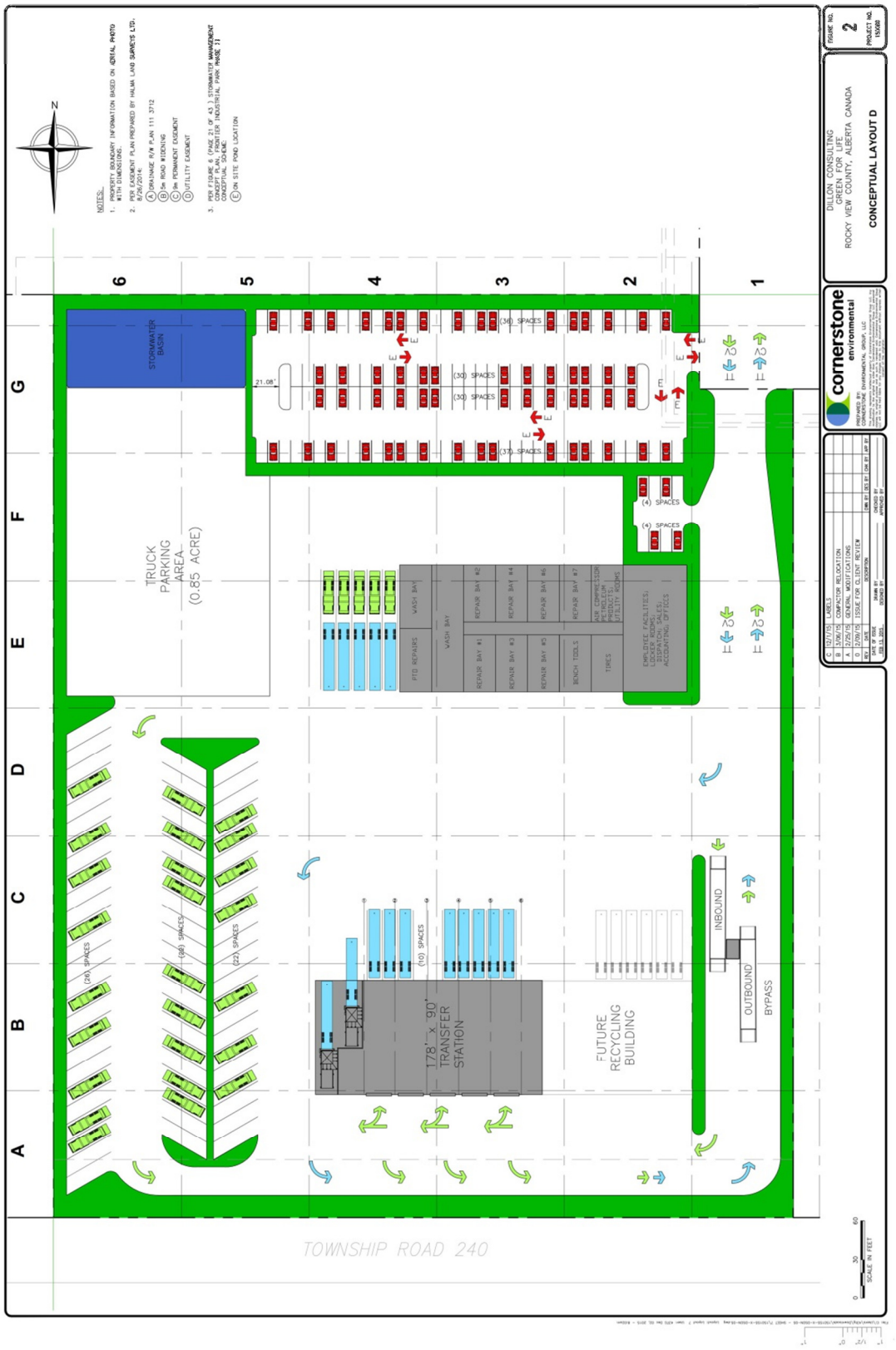
3.12 Disruption of Shipment

If a shipment disruption were to occur, such that the maximum storage time of 72 hours would be exceeded, other waste transportation service companies would be contacted to remove the waste from the Site. Additionally, incoming waste material would be redirected to other existing waste disposal or transfer facilities.

FIGURES

Figure 1 Location Plan

Figure 2 Conceptual Layout



APPENDIX A

Traffic Management Plan

Appendix A
Traffic Management Plan

Traffic Control

Traffic control assists in maintaining human and vehicle safety and helps prevent the disruption to the flow of vehicle traffic on site or on municipal roads. The Traffic Impact Assessment conducted for the site (Dillon, November 2015) concluded that the volume of vehicle traffic at the GFL Waste Transfer Facility in Rocky View County during normal operating times does not result in significant traffic impacts, such as blocked travel on municipal roads. The Site has sufficient queuing areas and unloading space onsite to allow for vehicles to wait before going to the scale or before leaving the property.

Access to the Site is from Frontier Crescent (Rocky View), with other business operating on this road way.

Site Rules

During heavy or peak traffic conditions, designated GFL Staff will be assigned to control traffic coming to the Site. When an excessive number of trucks are onsite at any one time, unloading staff will direct incoming trucks to a designated queuing area on GFL property. Staff will direct drivers where to park and wait, and when to proceed onto the scales.

GFL staff will operate the peak traffic process considering:

- Prevention of on-road parking;
- Safety to non-waste traffic; and
- Vehicle safety for trucks leaving and entering the Site including safe access and egress.

APPENDIX B

Noncompliant Waste Handling Procedure

Appendix B
Non-Compliant Waste Handling Procedure

Introduction

The facility is permitted to receive waste for temporary storage and transfer, of nonhazardous solid waste. All prospective new clients will be notified of GFL's receipt prohibitions. Receipt of noncompliant waste will not be accepted by GFL.

Upon arrival, all vehicles will be required to stop at the weigh-scales. If there is any concern that the material may be noncompliant, the scale operator will reject the vehicle at this time. The scale operator will visually inspect suspect loads, to the extent possible, observing liquid drippage, odours or indication of hazardous materials. The facility is equipped with a radioactive monitoring system to monitor vehicles entering the Site. Should a vehicle alert the radioactive monitoring system, it will be turned away from the facility prior to unloading.

If the shipment appears to be compliant at the scales, it will be directed onsite to the designated tipping area. Vehicles preparing for off-loading will be observed by a GFL spotter. If necessary, the vehicle contents will be pre-examined by the spotter. If it is determined by the spotter that the load may contain noncompliant material, it will be rejected at this time. If there are no apparent concerns regarding the material to be off-loaded, the spotter will direct the discharge and observe the process to identify any noncompliant contents while the vehicle is onsite.

If noncompliant material is observed by the spotter upon discharge, the driver will be immediately notified. At this time the noncompliant material will be reloaded to the delivery vehicle. If noncompliant material is observed after the delivery vehicle has departed the Site, the spotter will make a record of the truck identity.

Noncompliant material inadvertently received by GFL will be treated as follows:

- Odorous material will be treated with disinfectant and transferred immediately to the shipping trailer for prompt removal.
- Subject waste will be segregated to a secure containment vessel for approved disposal offsite.

In all cases above, the responsible generator will be notified, if possible, and added handling and disposal costs will be charged to them. Violations will be referred to Alberta Environment and Parks.

APPENDIX C

Spill Response Procedure

Appendix C
Spill Response Procedure

Spills and/or leaks are not expected to occur at the Site. GFL vehicles are regularly maintained and liquid wastes are not to be accepted at the Site. The most likely spill/leak scenario would be from a rupture of a fuel or hydraulic system on a vehicle at the Site, which is common to most industrial/commercial operations. In the event that a spill/leak occurs, the following procedures are to be followed.

Small Spills/Leaks

Spills or leaks less than 20L are considered to be a small spill. (A 5 gallon pail is approximately 20L). For a small spill, the following procedure is to be followed:

1. Contain the spill by using the Floor Dry, absorbent pads and brooms.
2. Ensure activity in the area is restricted to guarantee the safety of the personnel cleaning up the spill.
3. Shovel the spilled material and clean-up debris into a drum, bin, or bag. If the spill is very aqueous, place it in a drum.
4. Label the container(s) as “Spill Material” along with the date. Place in a safe storage area.
5. Complete a Spill Report Form detailing the following:
    a. Amount of product spilled.
    b. Name of material spilled if it is known. If the material is unknown, indicate that in the log.
    c. Person who noted the spill.
    d. Date and time of the spill.
    e. Estimated volume of spill clean-up material used.
    f. Any other relevant details.
6. Forward the incident report/memo to the Site Supervisor for review.

Large Spills/Leaks

Spills or leaks greater than 20L are considered a large spill. For a large spill, the following procedure is to be followed:

1. Clear all personnel out of the area.
2. Contact the Site Supervisor or Designate to assist in evaluating the situation.
3. Use appropriate Personal Protective Equipment for proper handling of material.
4. If there is a danger due to exposure, fire, explosion, or if public safety is an issue, the Site Supervisor should suspend operation. All personnel should evacuate to the Emergency Muster Area. If the Emergency Muster Area is an unsafe area due to conditions, personnel should proceed to alternate Emergency Muster Area.
5. Site Supervisor should take attendance from preprinted list and contact the Alberta Environment Spills Hotline (1-800-222-6514).

Appendix C
Spill Response Procedure

6. If the chemical spill is too dangerous or toxic to handle with equipment onsite, or if it appears to be dangerous, reactive, or unknown, GFL will contact the appropriate emergency response authority for assistance.
7. Contain the spill with Floor Dry, brooms, and absorbent pads. If necessary, create a ditch around the area of the spill or leak, or build a berm to minimize the movement of the spilled product.
8. Shut off all valves to utilities in the area if they pose a potential risk to the spill clean-up personnel.
9. Block any sewers or drains in the area that may be threatened by the spill.
10. Place the spill clean-up material into an open top drum or lugger bin, including disposable PPE used in the clean-up.
11. Log the spill.
12. Site Supervisor will make arrangements for proper disposal of spill and spill clean-up material.

APPENDIX D

Fire Emergency Procedure

Appendix D
Fire Emergency Procedure

The potential for a fire at the facility is very low. Materials brought to the Site are not reactive and generally have accumulated in waste bins over a period of time before being picked up for transfer to the Site. However, if a fire were to occur, the following procedures are to be followed.

For Loader Operators & Floor Spotters:

Upon recognition of Fire or Smoke from a load on the floor, evaluate the situation quickly to determine one of two options:

1. The fire can be safely removed from building (by pushing load out with the loader) or extinguished quickly. (Option A)
2. The fire is too large, it must be handled by the Fire Department. (Option B)

Option A

1. Quickly and safely push entire contents of load out of building to a safe distance away from the building.
2. Contact the Scale Operator to advise that the 'Fire/Smoke' load was removed from the building. Return to the building, and ensure that there are no hot spots left in the building.
3. Use a fire hose or fire extinguisher(s) to confirm there are no hot spots.
4. If the building is secure, evaluate the Fire/Smoking Load to determine if the fire department is required or if the load can be handled without the aid of the fire department.
5. Once the load is extinguished, spread out the pile to confirm nothing is still hot and search for any possible sources of the fire.
6. Once the pile is confirmed to be safe by the Site Supervisor (or Designate), load the pile into a steel roll-off bin for outdoor observation and a 24 hour monitoring period. Do NOT return the load to inside the building for at least 24 hours. Once the Site is deemed safe by the Site Supervisor (or Designate), notify the scale operator of clearance and complete an incident log as soon as possible.

Option B

1. If the load cannot be removed safely from the building, immediately pull fire alarm and advise the scale operator that there is a fire in the building.
2. Use the fire hose, fire extinguishers and/or loader, if possible, to contain the fire by moving the load away from other sources of ignition.
3. Remain a safe distance and be mindful of explosive material such as fuel tanks in loading equipment.
4. Do not leave the fire unattended until the Fire Department's arrival.

5. Assist the Fire Department through the use of the loader or other means. Once extinguished, confirm with the Fire Department whether further action is needed. Contact the scale operator and complete an incident log as soon as possible.

Fire Procedure for Scale Operators

The scale operator's main job is to act as the command post and be responsible for communications.

1. Once notified of the fire, initiate a lock-down of the facility. If instructed by the loader operator or floor staff, call 9-1-1. Be prepared with the address, your name, and the details of the fire. Have someone who is close to the front entrance gate remain at the gate.
2. Evacuate all customers.
3. Contact the Site Supervisor or Designate and advise of the situation.
4. Contact the alarm company and notify them of the situation. For example: "There is a fire in the building/or on the property, the fire department has been dispatched."
5. Remain in the scale house near the phones and/or the 2-way radios.
6. Stay in contact with floor staff and loader operators in regards to progress and any aid needed. Delegate requirements as necessary and available.
7. Do not allow site to re-open until cleared by Fire Department and the Site Supervisor.
8. Complete a **Workplace Incident Investigation** form as soon as possible.

APPENDIX E

Odour Management Plan

Appendix E
Odour Management Plan

Introduction

The potential for odour generation is influenced by a number of factors, such as the type of wastes received, volumes of waste, length of time waste it is stored, physical conditions, weather conditions, distance to generators, and housekeeping practices (i.e. floor cleaning).

GFL considers the prevention of odours as a priority to ensure a good long term relationship with facility neighbours and regulators.

The proper way to deal with odour prevention is by planning for odour, managing the transfer process and facility to eliminate and minimize odour generation, and to contain and capture odours.

The preparation of the Odour Management Plan to be used at the GFL Waste Transfer Facility in Rocky View County is based on approved plans prepared for other GFL transfer facilities in Ontario.

Facility Site Characteristics

A number of factors that relate to the physical characteristics of a site can influence both the generation and intensity of offsite odours. For the GFL Waste Transfer Facility in Rocky View County, existing conditions are described below:

Neighbouring Community

Within 500 metres of the Site, the land use surrounding the facility includes:

- North – commercial and light industrial buildings and trucking operations;
- East – vacant land;
- South – Township Road 240, CP rail tracks and large industrial property; and
- West – Pond and several industrial buildings and trucking operations.

Refer to Figure 1, Location Plan for a satellite image of the facility and its surrounding environment.

Transfer Facility

All activities, from the unloading of collection trucks, to the loading of waste into transport trailers will be done in an enclosed metal building. One of the key concerns for odour control is the location and number of openings. At the Rocky View Site, there are three access doors on the south side.

Mechanical Ventilation

The GFL Waste Transfer facility is designed to have a minimum of six air changes per hour provided by mechanical ventilators.

Appendix E
Odour Management Plan

Odour Intensity Scale

Staff at the facility will be trained in the use of a model Odour Intensity Scale. This will aid staff with odour prevention and control activities.

Category	Meaning	Description
0	No Odour	No detectable odour, or odour so weak as to be difficult to characterize or describe.
1	Slight Odour	Identifiable, slight odour.
2	Moderate Odour	Identifiable odour of moderate intensity.
3	Strong Odour	Identifiable, strong odour.
4	Extreme Odour	Odour so intense that you feel compelled to leave the area.

Odour Monitoring Procedure

The generation of offsite odours is not anticipated; however, monitoring will be a daily occurrence with the implementation of an "Odour Monitoring Procedure" outlined below.

a. Daily facility checks conducted by Site Supervisor or Designate include recording any onsite odour issues.
b. During the facility checks the wind direction will be observed.
c. In the event odours are within a category 3 (Strong Odour) and the wind direction is from north to south, a GFL staff person will travel offsite in the downwind direction to determine if odours are migrating. If required, contact will be attempted with the facilities/residence to the south to discuss concerns and identify remediation reassurances.
d. The results of the facility checks are documented on the Daily Visual Inspection form.

Odour Management Procedure

A number of operational measures can be used regularly or as required to prevent and control odours from having an offsite impact.

Transfer Cleaning

a. The transfer station floor is cleared multiple times per day using a loader to maintain a clean and clear tipping floor.
b. The transfer station floor and equipment will be power washed on an as required basis.
c. Trucks are cleaned regularly in the wash bay located at the site.

Mobile Deodorizer/Operation

a. If a load is received that has an excessive odour, it is immediately sprayed with deodorizer.
b. This load is then transferred into the waste pile with more inert waste for immediate loading into a transport trailer (i.e., within 2 hours)
c. The garbage tipping floor area is sprayed with deodorizer on a regular basis during the summer months. The frequency will be determined by staff on an as required basis.
d. Prevention of odours is best managed by unloading and removing waste within as short a time as possible. The longer wet wastes stay in a pile, the greater the opportunity for anaerobic conditions to occur.

Exhaust Fans/Misting Systems

a. The system will be maintained in an operating condition.
b. The system will be operated as specified by the manufacturer, and used in manual mode as required.

Complaint Response Procedure

Facility staff will be trained on a procedure for receiving and acting on odour complaints.

Recording Information

Upon receiving a phone call/complaint or site visit, the following information will be recorded and detailed on an Environmental Complaints and Issues Report:

a. Complainant name, address and phone number (if provided);
b. Weather conditions such as the wind direction;
c. Detailed description of complaint (date, time, nature);
d. Company activities at the time of the complaint; and
e. Description of immediate response.

Investigating Complaint

The GFL staff receiving the complaint will provide the Environmental Complaints and Issues Report to their Manager who will begin an investigation with assistance from the Environmental Compliance Department. The report will be completed including the following:

a. Visit to the complainant location to verify the nature of the complaint and identify the source of the odour;
b. Description of preventative actions taken to address the complaint (including operational changes); and
c. Follow Up.

The report will be provided to the complainant, a copy will be maintained as part of Site records and another copy will be will be filed Corporately.

December 15, 2015

Rocky View County
911 32 Avenue NE
Calgary, AB
T2E 6X6

Attention: Angela Yurkowski, P.Eng.
Municipal Engineer, Rocky View County

Traffic Impact Assessment – GFL Solid Waste Transfer Facility

Dillon Consulting Limited (Dillon) has been retained by GFL Environmental (GFL) to undertake an initial assessment of traffic impacts related to their proposed solid waste transfer facility in the Frontier Industrial Park (Phase 2). The site location is shown in Figure 1. The original Traffic Impact Assessment (TIA) for the Frontier Industrial Park was undertaken by Stantec Consulting Ltd. (Stantec) in 2007 and updated in 2011. Since the proposed development is within the Frontier Industrial Park, this TIA builds upon the previous work completed by Stantec.

1.0 Objectives

The objectives for this study as outlined by Rocky View County are to:

- Compare trip generation for the GFL Solid Waste Transfer Facility versus other approved land uses in Frontier Industrial Park; and
- Evaluate impacts of vehicular traffic generated by the GFL Solid Waste Transfer Facility on the adjacent roadway system as compared to the current land uses.

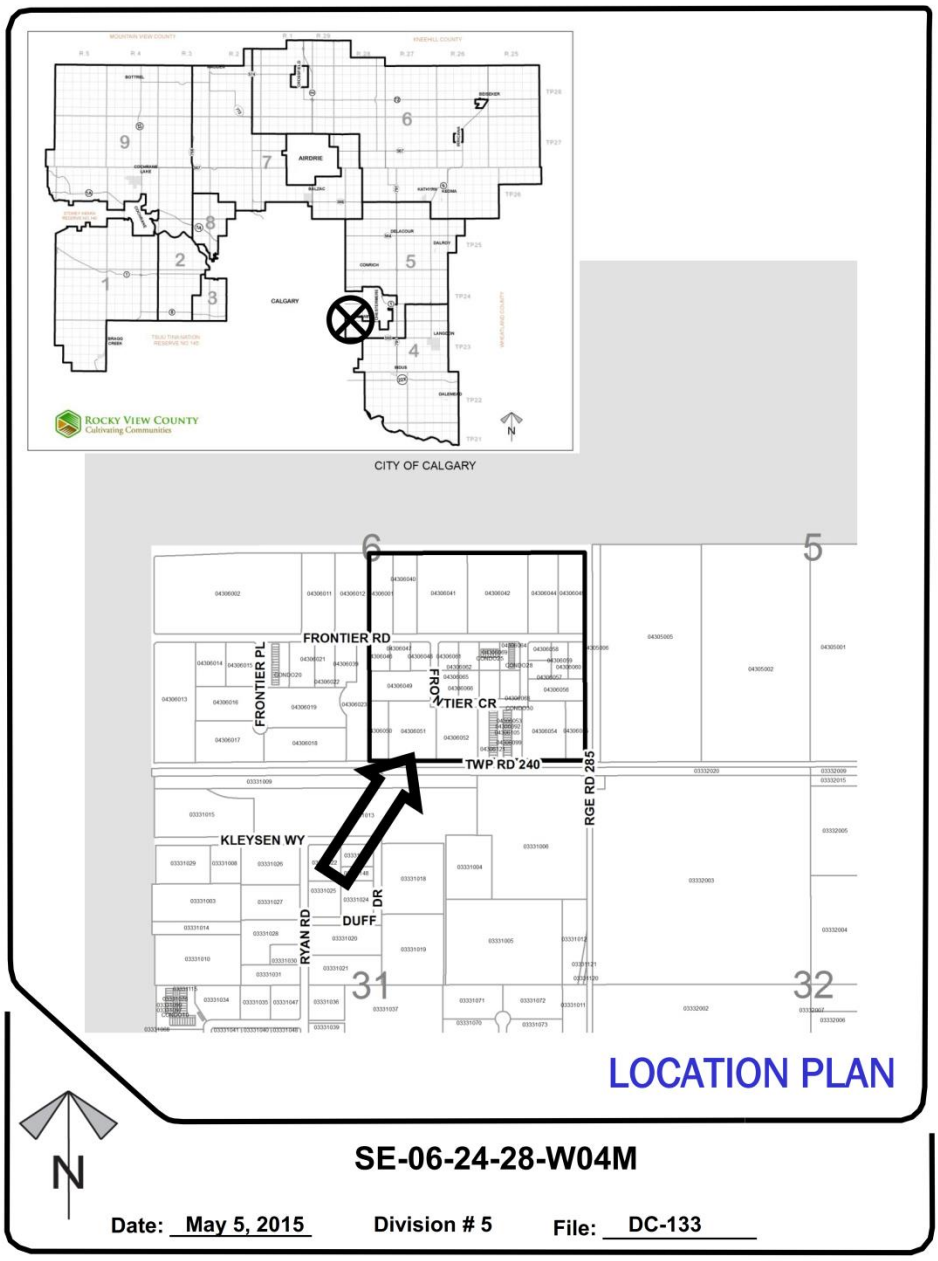
Our correspondence with Rocky View County regarding the scope of this study is documented in Appendix A. A location plan is provided in Figure 1.

DILLON CONSULTING

Suite 200
334 – 11 Ave S.E.
Calgary
Alberta
Canada
T2G 0Y2
Telephone
(403) 215-8880
Fax
(403) 215-8889

Dillon Consulting Limited

Figure 1: Location Plan



2.0 Analysis Periods

The AM and PM peak periods were included in the traffic analysis.

The Opening Day horizon year was used for the traffic analysis. We have assumed that the majority of trips generated by this site will be fully realized as soon as the facility opens.

3.0 Study Area

The Study Area is the same as the Frontier Industrial Park TIA and is shown in Figure 2 and is bounded by:

- 84 Street SE from Peigan Trail to Township Road 240 on the west;
- Peigan Trail SE from 84 Street SE to 100 Street SE on the north;
- 100 Street SE between Peigan Trail SE and Township Road 240 (50 Avenue SE) on the east; and
- Township Road 240 from 84 Street SE to 100 Street SE on the south.

The Study Area also includes 84 Street SE between Township Road 240 and 61 Avenue.

The following intersections were considered in the analysis:

- Peigan Trail / 84 Street SE;
- Peigan Trail / 100 Street SE (Range Road 285);
- 84 Street SE / Frontier Road;
- 84 Street SE / Township Road 240 (50 Avenue SE);
- 84 Street SE / Kleysen Way;
- 84 Street SE / 61 Avenue SE;
- 100 Street SE (Range Road 285) / Frontier Road; and
- 100 Street SE (Range Road 285) / Township Road 240 (50 Avenue SE).

Some of the key assumptions regarding the area road network for the 2015 horizon include the following:

- Peigan Trail terminates east of 100 Street SE (Range Road 285);
- Township Road 240 (50 Avenue SE) terminates west of 84 Street SE;
- 84 Street SE terminates north of Highway 560 (Glenmore Trail); and
- 61 Avenue Flyover at Stoney Trail SE is constructed and open to traffic.

Figure 2: Study Area Map

4.0 Study Assumptions

The GFL Solid Waste Transfer Facility is a part of the Frontier Industrial Park. As such, the Stantec TIA study was used as the basis for this assessment. The Frontier Industrial Park forecasted traffic to 2015. The original TIA also undertook a sensitivity analysis for two network scenarios: with and without the 61 Avenue Flyover. The flyover is currently under construction and is expected to be open within the next year. As such, the 2015 post-development scenario with the 61 Avenue Flyover was chosen as the basis for this study. The 61 Avenue Flyover was included in **all** scenarios considered for the TIA.

The following describes the background development traffic and site generated traffic included in the Frontier Industrial Park TIA.

4.1 Background Developments

The Frontier Industrial Park TIA accounted for the following developments in the vicinity of the Frontier Industrial Park:

- Wesgroup Lands, located on the northwest corner of Range Road 285 (Garden Road) and Highway 560 (Glenmore Trail); and
- Patton Lands, located on the southeast corner of Range Road 285 (Garden Road) and Township Road 240 (50 Avenue SE).

The forecasted traffic volumes for these developments were included in this analysis even though they are not yet fully developed.

4.2 Frontier Industrial Park

As outlined by Stantec in their TIA, the entire Frontier Industrial Park (Phases 1 and 2) is anticipated to generate approximately 1,010 vehicles per hour (vph) in the AM peak hour, 1,030 vph in the PM peak hour and 8,350 vehicles per day (vpd).

4.3 Road Network

Our analysis included the following revisions to the road network:

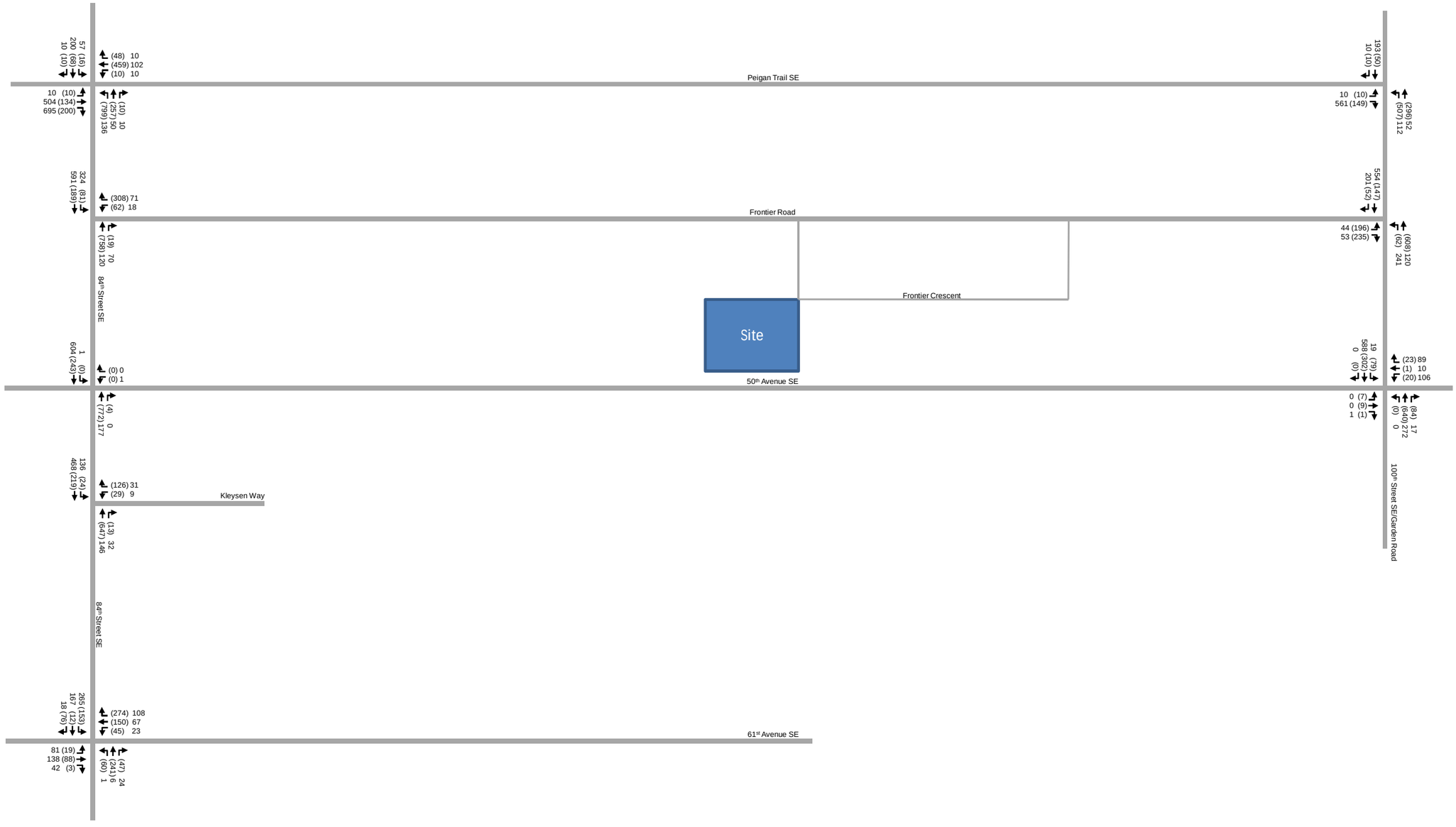
- Intersection of Frontier Road and 100 Street SE is signalized since this was included in the Frontier Industrial Park TIA;
- 61 Avenue Flyover is constructed and open to traffic. The redistributed traffic included in the Phase 2 Frontier Industrial Park TIA update was used; and
- Traffic signal timing assumptions used in the Frontier Industrial Park TIA were maintained.

5.0 2015 Conditions

The 2015 time horizon was assessed by using the Frontier Industrial Park 2015 post-development scenario with 61 Avenue Flyover, as discussed in Section 4.0.

5.1 2015 Traffic Volumes

The 2015 traffic volumes are shown in Figure 3.



Legend:

(123) 123
(123) 123
(123) 123
} (PM) AM peak hour turning movement volumes

NOT TO SCALE

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Rocky View County Waste Transfer Station
November 2015

FIGURE 3:
2015 Frontier Industrial Park Turning Volumes (with 61st Avenue Flyover)

5.2 2015 Traffic Operations

Operations at signalized and unsignalized intersections were analyzed based on the *Highway Capacity Manual* (HCM 2000) methodology, using the Synchro 6 software package.

For signalized intersections, the overall intersection and individual movements' level of service (LOS[1]), average vehicle delay, volume-to-capacity ratio (v/c), and 95th percentile queues are provided in Table 1.

For the unsignalized intersections, the LOS, delay, v/c, and 95th percentile queues are provided in Table 2.

Critical movements, defined as those having a v/c ratio above 0.9 or a LOS below D are identified in red.
All signalized and unsignalized intersections are operating with an overall LOS of D or better. The northbound left turn movement at Peigan Trail and 84 Street SE is operating with a v/c of 0.91 in the PM peak hour. The Frontier Road and 100 Street SE northbound through-left movement is operating with a v/c of 0.96 in the AM peak hour. The 50 Avenue SE and 100 Street SE intersection has a LOS of E for the westbound turning movement in the AM peak hour and eastbound turning movement in the PM peak hour.

Synchro output for the 2015 Traffic Operations is included in Appendix C.

[1] Level of Service (LOS), applied to an intersection, is a measure qualifying the amount of delay experienced by motorists, expressed either for specific turning movements or for the intersection as a whole. A more detailed explanation of LOS is provided in Appendix B.

Table 1: 2015 Frontier Industrial Park with 61 Flyover Signalized Intersection Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	v/c	Delay (s/veh)	Queue (m)	LOS	v/c	Delay (s/veh)	Queue (m)
Peigan Trail &	EBTL	B	0.36	13.7	45.9	B	0.13	19.7	17.6
84 Street SE	EBR	A	0.73	7.0	42.4	A	0.31	4.5	14.6
	WBTLR	B	0.09	10.9	11.2	C	0.44	22.7	59.6
	NBL	D	0.49	43.5	21.1	D	0.91	46.7	#109.1
	NBTR	C	0.18	24.0	16.0	C	0.42	21.2	56.5
	SBL	D	0.29	39.2	21.6	D	0.18	48.1	9.8
	SBTR	D	0.66	40.4	52.7	D	0.37	40.1	26.7
	Intersection	*B*		*17.5*		*C*		*30.8*	
Frontier Road &	WBLR	A	0.24	7.7	10.2	B	0.65	15.8	43.5
84 Street SE	NBT	A	0.12	3.9	8.9	C	0.83	20.6	#136.6
	NBR	A	0.08	1.5	3.1	A	0.03	3.3	2.3
	SBL	A	0.41	6.3	29.5	D	0.63	36.3	#27.6
	SBT	A	0.48	6.3	50.9	A	0.24	7.3	20.1
	Intersection	*A*		*5.9*		*B*		*18.3*	
Kleysen Way &	WBLR	B	0.16	10.6	7.2	B	0.39	10.9	20.3
84 Street SE	NBT	A	0.17	8.7	20.8	B	0.62	12.2	106.9
	NBR	A	0.05	4.7	4.0	A	0.02	3.7	2.2
	SBL	A	0.17	3.3	10.1	A	0.08	5.0	2.9
	SBT	A	0.34	3.9	37.5	A	0.22	4.7	18.0
	Intersection	*A*		*5.0*		*B*		*10.2*	
61 Avenue &	EBL	B	0.31	15.6	14.4	B	0.10	11.3	4.7
84 Street SE	EBTR	B	0.43	13.8	24.0	B	0.17	10.9	13.3
	WBL	B	0.09	12.3	5.4	B	0.12	11.0	8.1
	WBTR	A	0.39	7.9	15.8	B	0.71	14.2	45.5
	NBTL	A	0.01	6.4	1.8	B	0.47	13.4	43.9
	NBR	A	0.03	3.4	2.8	A	0.08	4.0	4.7
	SBL	A	0.41	9.8	34.1	B	0.45	16.2	28.1
	SBTR	A	0.21	6.9	19.2	A	0.14	4.2	7.4
	Intersection	*B*		*10.0*		*B*		*12.7*	
Frontier Road &	EBLR	C	0.43	22.5	20.8	C	0.85	32.6	#82.3
100 Street SE	NBTL	D	0.96	50.5	#60.8	C	0.85	23.5	#122.6
	SBTR	A	0.65	7.3	92.7	A	0.25	5.9	16.3
	Intersection	*C*		*21.4*		*C*		*23.8*	

95th percentile volume exceeds capacity, queue may be longer.

Table 2: 2015 Frontier Industrial Park with 61 Flyover Unsignalized Intersection Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	v/c	Total Delay (s/veh)	95 % Queue (m)	LOS	v/c	Total Delay (s/veh)	95 % Queue (m)
50 Avenue SE & 84 Street SE	EBLTR	A	-	-	0.0	A	-	-	0.0
	WBLTR	C	-	18.5	0.0	A	-	-	0.0
	NBLTR	-	-	0.0	0.0	-	0.00	0.0	0.0
	SBLTR	A	-	0.0	0.0	-	0.00	0.0	0.0
	Intersection	*A*		*0.0*		*A*		*0.0*	
Peigan Trail & 100 Street SE	EBLR	D	0.81	27.1	65.9	C	0.39	18.6	13.8
	NBLT	A	0.10	5.9	2.4	A	0.38	7.3	13.5
	SBTR	A	0.13	0.0	0.0	A	0.04	0.0	0.0
	Intersection	*C*		*17.5*		*C*		*8.6*	
50 Avenue SE & 100 Street SE	EBLTR	B	0.00	13.2	0.1	E	0.13	35.6	3.4
	WBTLR	E	0.73	44.0	40.5	D	0.24	29.4	6.9
	NBLTR	A	0.00	0.0	0.0	A	0.00	0.0	0.0
	SBLTR	A	0.02	0.5	0.4	A	0.11	3.2	2.8
	Intersection	*D*		*8.5*		*D*		2.7	

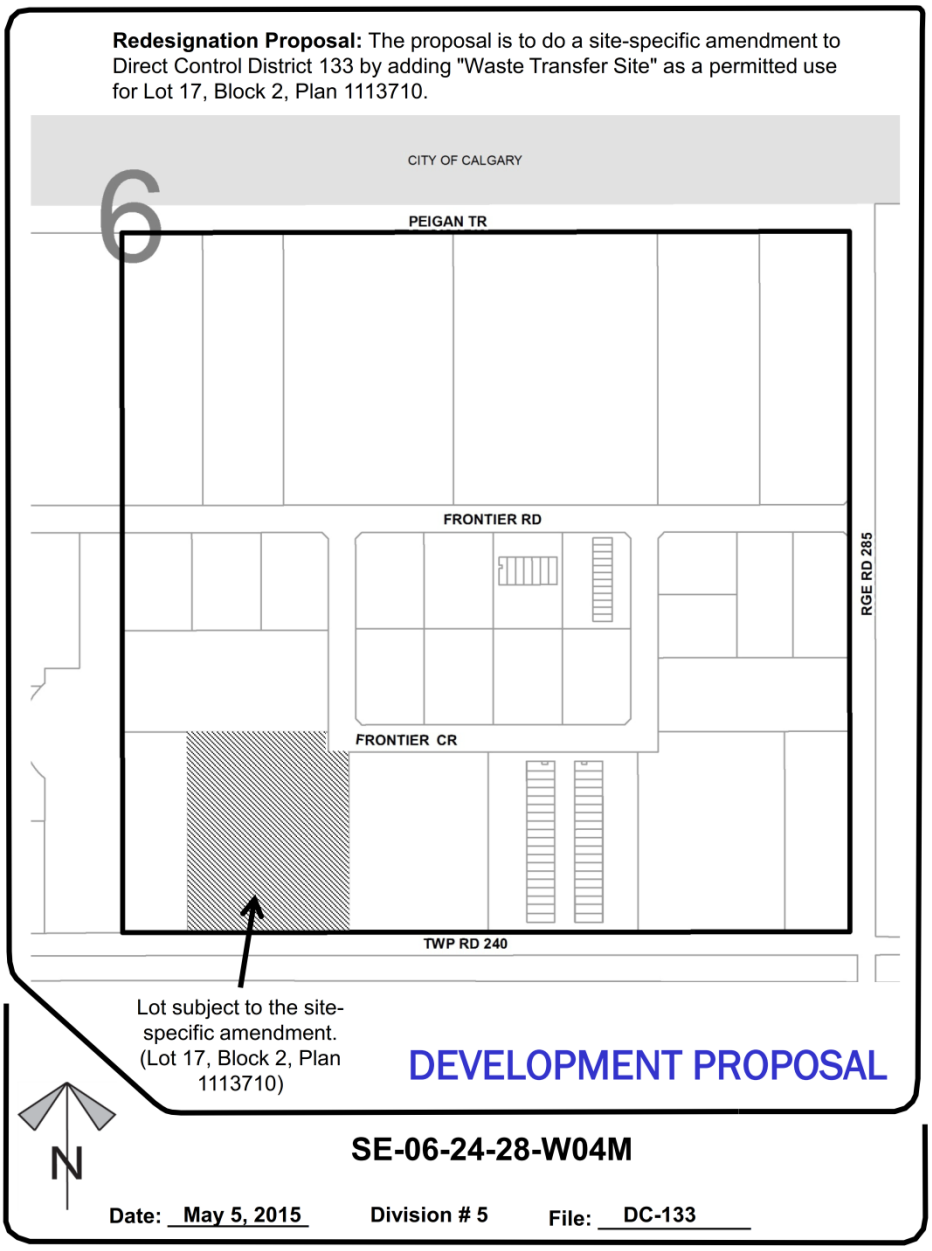
6.0 Proposed Development

The proposed GFL Solid Waste Transfer Facility will be located on Lot 17 of Phase 2 of the Frontier Industrial Park, shown in Figure 4.

The waste transfer facility will operate between 5:00am and 5:00pm. The operations centre will operate from 8:00am to 5:00pm. The collection vehicles will operate from 3:00am to 5:00pm.

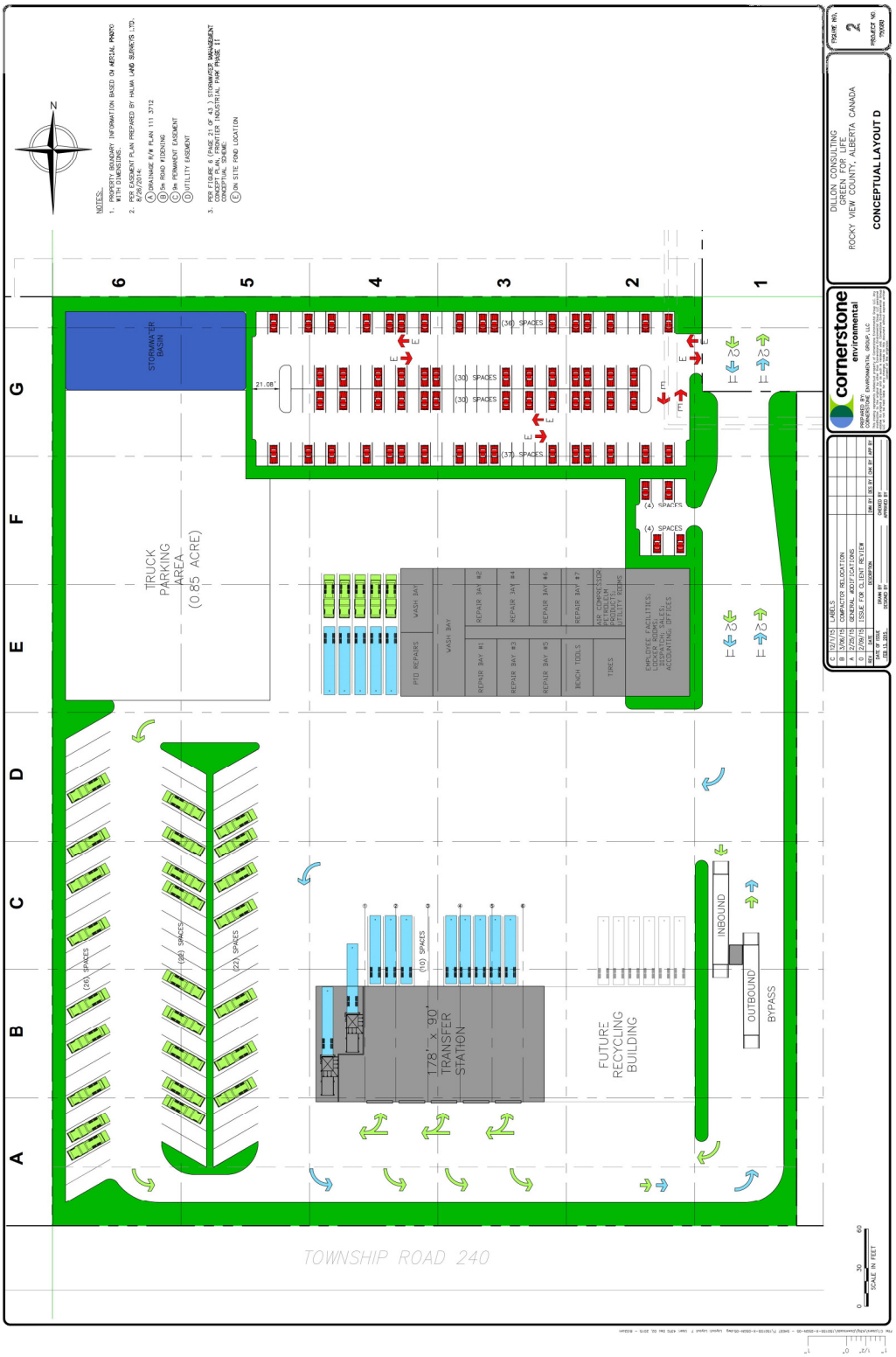
The facility can accommodate a fleet of up to 75 collection vehicles and six truck tractors. Up to 130 people will be employed at the site (50 operations staff and 80 drivers).

Figure 4: Frontier Industrial Park Layout (Phase 1 and 2)



The conceptual site plan for the site is shown in Figure 5. Access to the site will be via Frontier Crescent.

Figure 5: Waste Transfer Facility Site Plan



7.0 Trip Generation

7.1 GFL Solid Waste Transfer Facility Trip Generation

GFL has estimated the loads and tonnage that they could deliver to the waste transfer facility based on the loads and tonnage that they currently deliver to similar facilities. They removed the loads that are hauled to other processing facilities, (i.e., paper, metal, drywall recycling etc.), since these volumes would continue to go to third party processors.

The anticipated opening day site traffic volumes are shown in Figure 6.

7.1.1 Truck Trips

Based upon GFL's existing operations, they have experienced a three month average of 92 loads per day. If we assume that the trips are distributed evenly over a 12 hour day (3:00am to 3:00pm), this site would generate 16 truck trips in the AM peak hour (8 in and 8 out). We have assumed that all six truck tractor vehicles will be returning to the facility in the PM peak hour.

7.1.2 Car Trips

Based on the operating hours, all truck operators will be onsite before the AM peak hour. We have assumed that all operations employees (50 trips) will enter the site during the AM peak hour and leave the site during the PM peak hour.

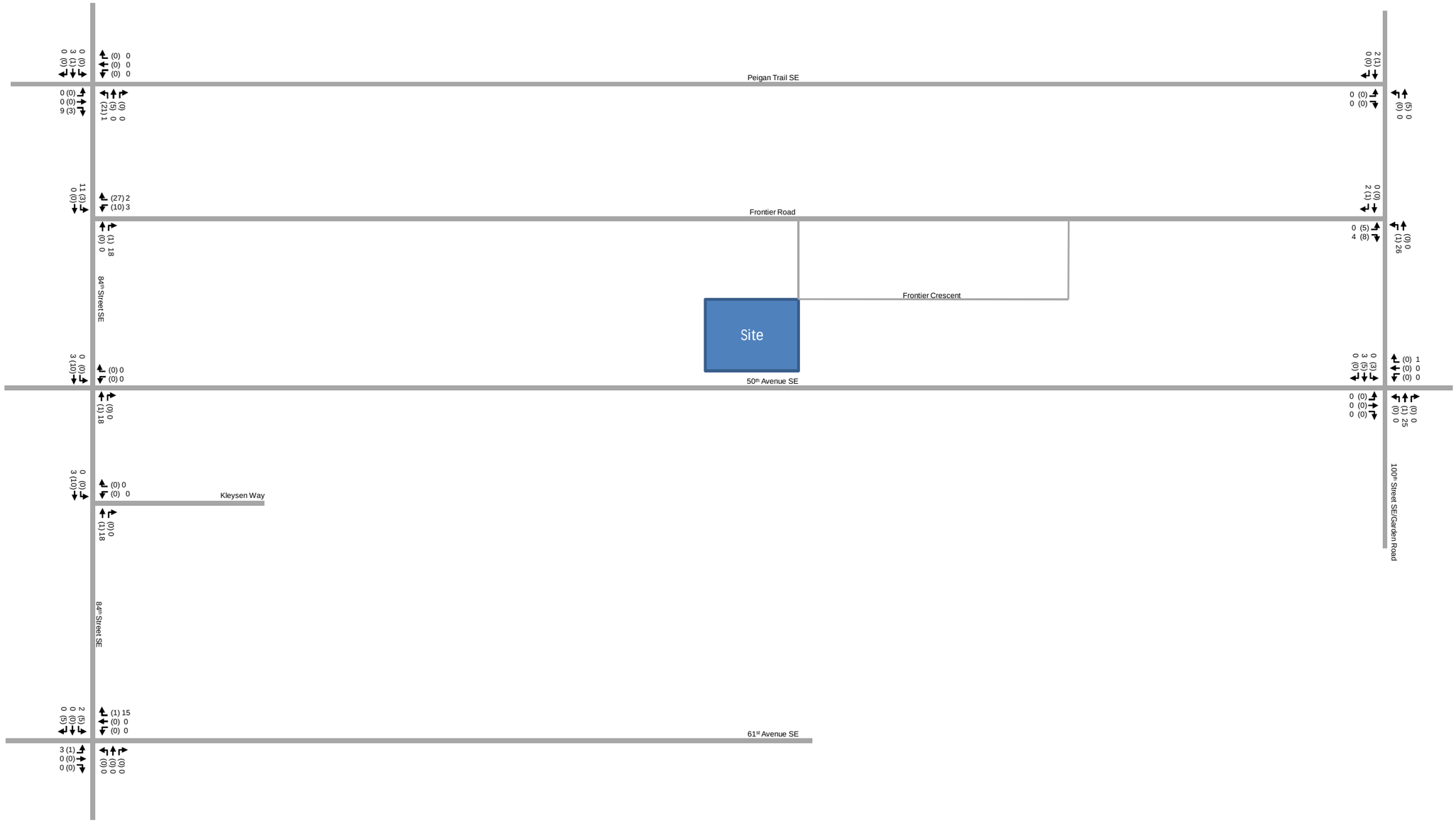
7.2 Frontier Industrial Park Trip Generation

Table 3 outlines the trip generation rate and distribution used in the Frontier Industrial Park TIA.

Table 3: Frontier Industrial Park Trip Generation

AM Peak Hour			PM Peak Hour		
Rate	**In**	**Out**	**Rate**	**In**	**Out**
0.84 vph/1000 ft^2	82%	18%	0.86 vph/1000 ft^2	21%	79%

The proposed GFL Solid Waste Transfer Facility is on a 9.5 acre lot which would generate 80 trips in the AM peak hour and 82 trips in the PM peak hour if calculated with the above trip generation methodology.



Legend:

(123) 123
(123) 123
(123) 123

(PM) AM peak hour turning movement volumes

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Rocky View County Waste Transfer Station
November 2015

FIGURE 6:
Opening Day Site Traffic Volumes (with 61st Avenue Flyover)

7.3 Trip Generation Comparison

As discussed in Section 6.0 and Section 7.1, the majority of site trips will avoid the morning peak hour because of their early operating hours. Approximately eight collection trucks will be coming into and out of the facility during the morning peak. In the afternoon peak, the facility operations will be coming to a close for the day. Approximately six collection trucks will come into the facility and an estimated 50 vehicles will exit the site.

Table 4: Trip Generation Comparison

	AM Peak Hour Trips	PM Peak Hour Trips
Stantec TIA	80 (66 trips in, 14 trips out)	82 (17 trips in, 65 trips out)
Proposed GFL Solid Waste Transfer Facility	66 (58 trips in, 8 trips out)	56 (6 trips in, 50 trips out)
Difference	-14	-26

As shown in Table 4, the Waste Transfer Facility generates 14 less trips than the approved land uses would generate in the AM peak hour and generates 26 less trips than the approved land uses would generate in the PM peak hour.

8.0 Total Traffic

8.1 Total Traffic Volumes

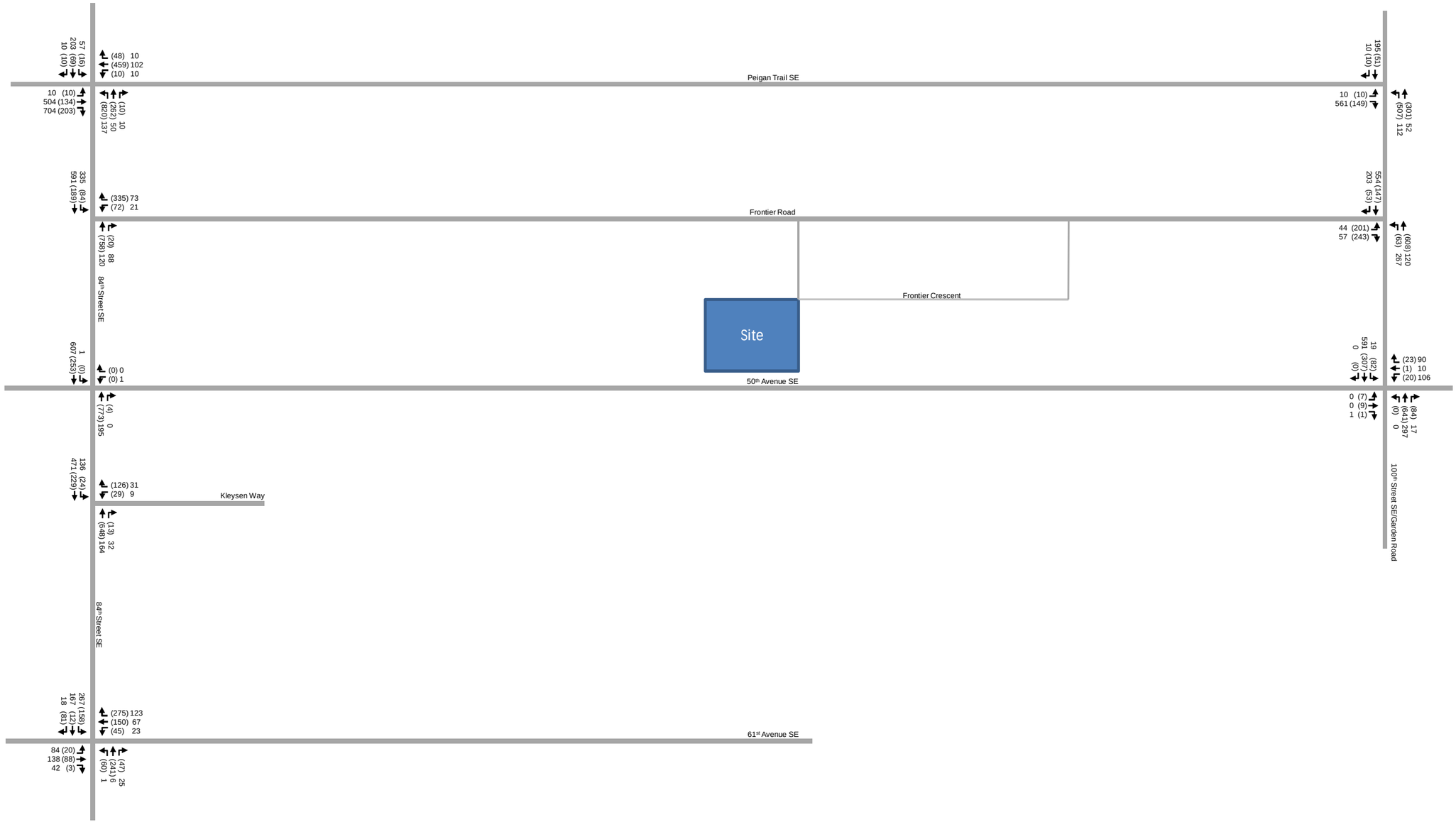
The total traffic volumes were generated by adding the opening day site traffic volumes (Figure 6) to the 2015 Frontier Industrial Park traffic volumes (Figure 3). The total traffic volumes are shown in Figure 7.

8.2 Total Traffic Operations

For signalized intersections, the overall intersection as well as the individual movements' level of service (LOS), average vehicle delay, volume-to-capacity ratio (v/c), and 95th percentile queues were noted in Table 5.

For the unsignalized intersections, the LOS, delay, v/c, and 95th percentile queues were noted in Table 6.

Critical movements, defined as those having a v/c ratio above 0.9 or a LOS below D have been identified in red.



Legend:

(123) 123
(123) 123
(123) 123

(PM) AM peak hour turning movement volumes

NOT TO SCALE

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Rocky View County Waste Transfer Station
November 2015

FIGURE 7:
2015 Total Traffic Volumes (with 61st Avenue Flyover)

Table 5: Total Traffic Signalized Intersection Operations with 61 Flyover

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	v/c	Delay (s/veh)	Queue (m)	LOS	v/c	Delay (s/veh)	Queue (m)
Peigan Trail &	EBTL	B	0.36	13.9	46.1	B	0.13	19.9	17.6
84 Street SE	EBR	A	0.74	7.7	48.9	A	0.32	4.5	14.6
	WBTLR	B	0.09	11.0	11.3	C	0.45	23.0	59.6
	NBL	D	0.49	43.5	21.3	D	0.92	47.9	#114.1
	NBTR	C	0.17	23.9	15.9	C	0.42	21.1	57.7
	SBL	D	0.29	39.2	21.6	D	0.18	48.1	9.8
	SBTR	D	0.66	40.3	53.3	D	0.38	40.1	26.9
	Intersection	*B*		*17.8*		*C*		*31.5*	
Frontier Road &	WBLR	A	0.24	7.8	10.7	B	0.70	17.8	50.9
84 Street SE	NBT	A	0.13	4.3	8.9	C	0.84	21.6	#136.6
	NBR	A	0.11	1.4	3.5	A	0.03	3.4	2.4
	SBL	A	0.46	7.5	31.1	D	0.66	39.5	#28.8
	SBT	A	0.53	7.5	50.9	A	0.24	7.6	20.1
	Intersection	*A*		*6.8*		*B*		*19.5*	
Kleysen Way &	WBLR	B	0.18	11.0	7.3	B	0.39	10.9	20.3
84 Street SE	NBT	A	0.20	8.8	23.2	B	0.62	12.2	107.2
	NBR	A	0.05	4.7	4.0	A	0.02	3.7	2.2
	SBL	A	0.17	3.3	10.1	A	0.08	5.0	2.9
	SBT	A	0.35	3.9	37.9	A	0.23	4.7	18.8
	Intersection	*A*		*5.1*		*B*		*10.2*	
61 Avenue &	EBL	B	0.32	16.0	15.0	B	0.10	11.5	4.8
84 Street SE	EBTR	B	0.42	13.7	24.0	B	0.17	10.9	13.3
	WBL	B	0.09	12.3	5.4	B	0.12	11.0	8.1
	WBTR	A	0.41	7.8	16.3	B	0.71	14.2	45.3
	NBTL	A	0.01	6.4	1.8	B	0.47	13.4	43.9
	NBR	A	0.03	3.4	2.8	-	0.08	4.0	4.7
	SBL	A	0.41	9.9	34.6	-	0.47	16.6	29.0
	SBTR	A	0.21	6.9	19.2	B	0.15	4.2	7.6
	Intersection	*B*		*10.0*		*B*		*12.7*	
Frontier Road &	EBLR	C	0.47	26.8	24.3	D	0.87	35.2	#86.6
100 Street SE	NBTL	E	0.99	56.3	#69.8	C	0.85	23.8	#123.1
	SBTR	A	0.64	6.9	94.9	A	0.25	5.9	16.3
	Intersection	*C*		*23.9*		*C*		*24.9*	

95th percentile volume exceeds capacity, queue may be longer.

Table 6: Total Traffic Unsignalized Intersection Operations with 61 Flyover

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	v/c	Total Delay (s/veh)	95 % Queue (m)	LOS	v/c	Total Delay (s/veh)	95 % Queue (m)
50 Avenue SE & 84 Street SE	EBLTR	A	0.00	0.0	0.0	A	0.00	0.0	0.0
	WBLTR	C	0.00	19.0	0.1	A	0.00	0.0	0.0
	NBLTR	-	0.00	0.0	0.0	-	0.00	0.0	0.0
	SBLTR	A	0.00	0.0	0.0	-	0.00	0.0	0.0
	Intersection	*A*		*0.0*		*A*		*0.0*	
Peigan Trail & 100 Street SE	EBLR	D	0.81	27.3	66.4	C	0.39	18.8	14.0
	NBLT	A	0.10	5.9	2.4	A	0.38	7.3	13.6
	SBTR		0.13	0.0	0.0	-	0.04	0.0	0.0
	Intersection	*C*		*17.6*		*C*		*8.6*	
50 Avenue SE & 100 Street SE	EBLTR	B	0.00	13.2	0.1	E	0.13	35.3	3.3
	WBTLR	E	0.77	49.4	44.2	D	0.24	28.9	6.7
	NBLTR		0.00	0.0	0.0	-	0.00	0.0	0.0
	SBLTR	A	0.02	0.5	0.4	A	0.11	3.3	2.8
	Intersection	*D*		*9.3*		*D*		2.7	

All signalized and unsignalized intersections are operating with an overall LOS of D or better. The northbound left turn movement at Peigan Trail and 84 Street SE is operating with a v/c of 0.92 in the PM peak hour. The Frontier Road and 100 Street SE northbound through-left movement is operating with a v/c of 0.99 and LOS E in the AM peak hour. The 50 Avenue SE and 100 Street SE intersection has a LOS of E for the westbound turning movement in the AM peak hour and eastbound turning movement in the PM peak hour.

Synchro output for the Total Traffic Operations is included in Appendix D.

9.0 Sensitivity Analysis

A sensitivity analysis was undertaken to assess whether the network could accommodate any additional operations at the GFL Solid Waste Transfer Facility.

9.1 Projected Traffic Volumes

Through an iterative process, we determined that the network could accommodate up to 50 cars in, 100 trucks in and 100 trucks out during the AM peak hour.

In the PM peak hour, we identified that the network could accommodate up to 100 trucks in, 50 trucks out and 100 cars out. These numbers accommodate more vehicles

than currently proposed for the GFL Solid Waste Transfer Facility. These traffic volumes are shown in Figure 8.

9.2 Total Projected Traffic Volumes

The total traffic volumes were generated by adding the projected site traffic volumes (Figure 8) and the 2015 Frontier Industrial Park traffic volumes (Figure 3). The total traffic volumes are shown in Figure 9.

9.3 Total Projected Traffic Operations

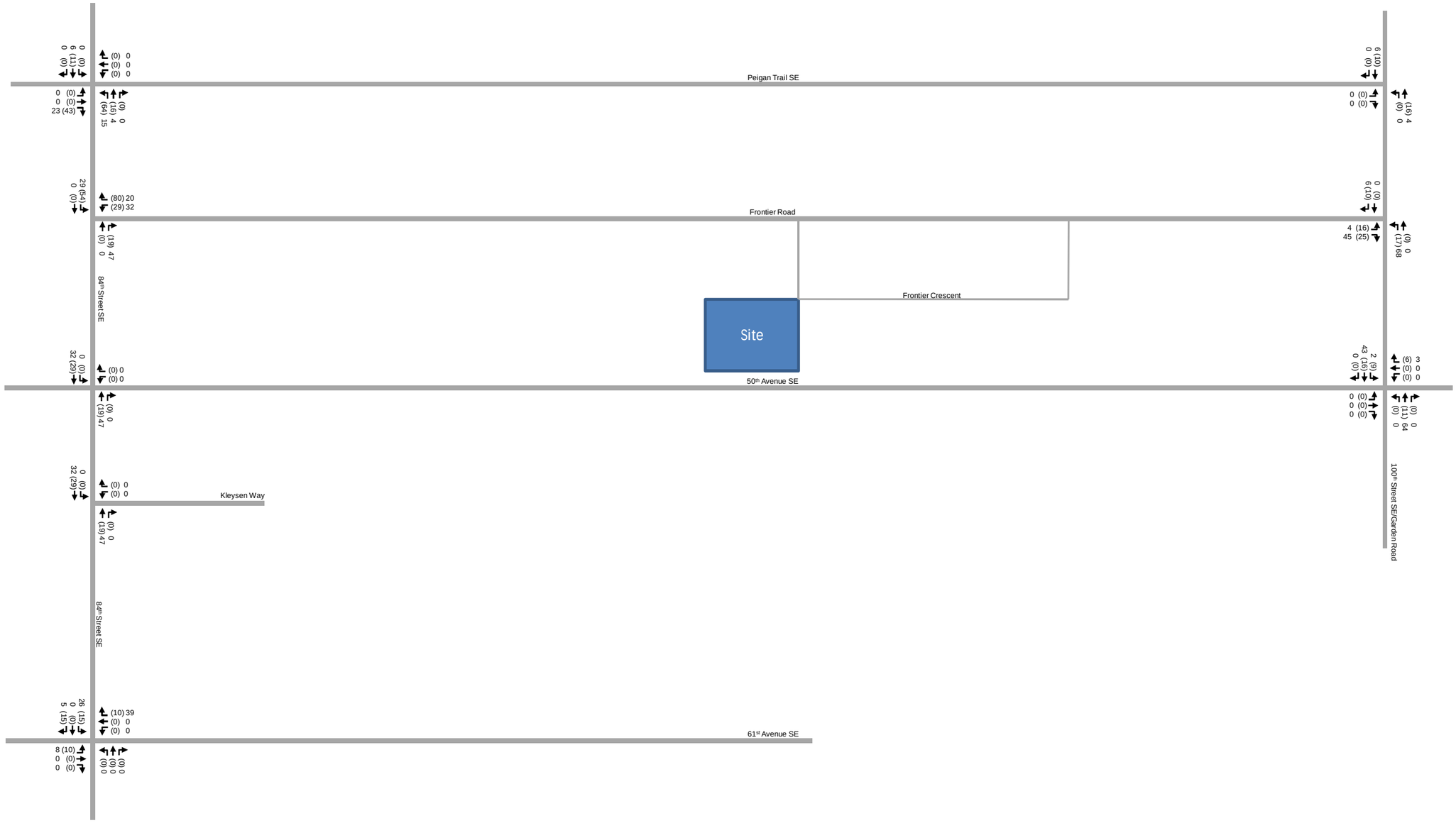
For signalized intersections, the overall intersection as well as the individual movements' level of service (LOS), average vehicle delay, volume-to-capacity ratio (v/c), and 95th percentile queues were noted in Table 7.

For the unsignalized intersections, the LOS, delay, v/c, and 95th percentile queues were noted in Table 8.

Critical movements, defined as those having a v/c ratio above 0.9 or a LOS below D have been identified in red.

All signalized and unsignalized intersections are operating with an overall LOS of D or better. The northbound left turn movement at Peigan Trail and 84 Street SE is operating with a v/c of 1.01 and LOS E in the PM peak hour. The Frontier Road and 100 Street SE northbound through-left movement is operating with a v/c of 1.01 and LOS E in the AM peak hour. The Frontier Road and 100 Street SE eastbound left-right movement operates with LOS E in the AM peak hour and v/c of 0.91 in the PM peak hour. The 50 Avenue SE and 100 Street SE intersection operates with LOS F for the westbound turning movement in the AM peak hour and LOS E for the eastbound turning movement in the PM peak hour.

Synchro output for the Sensitivity Analysis is included in Appendix E.



Legend:

(123) 123
(123) 123
(123) 123

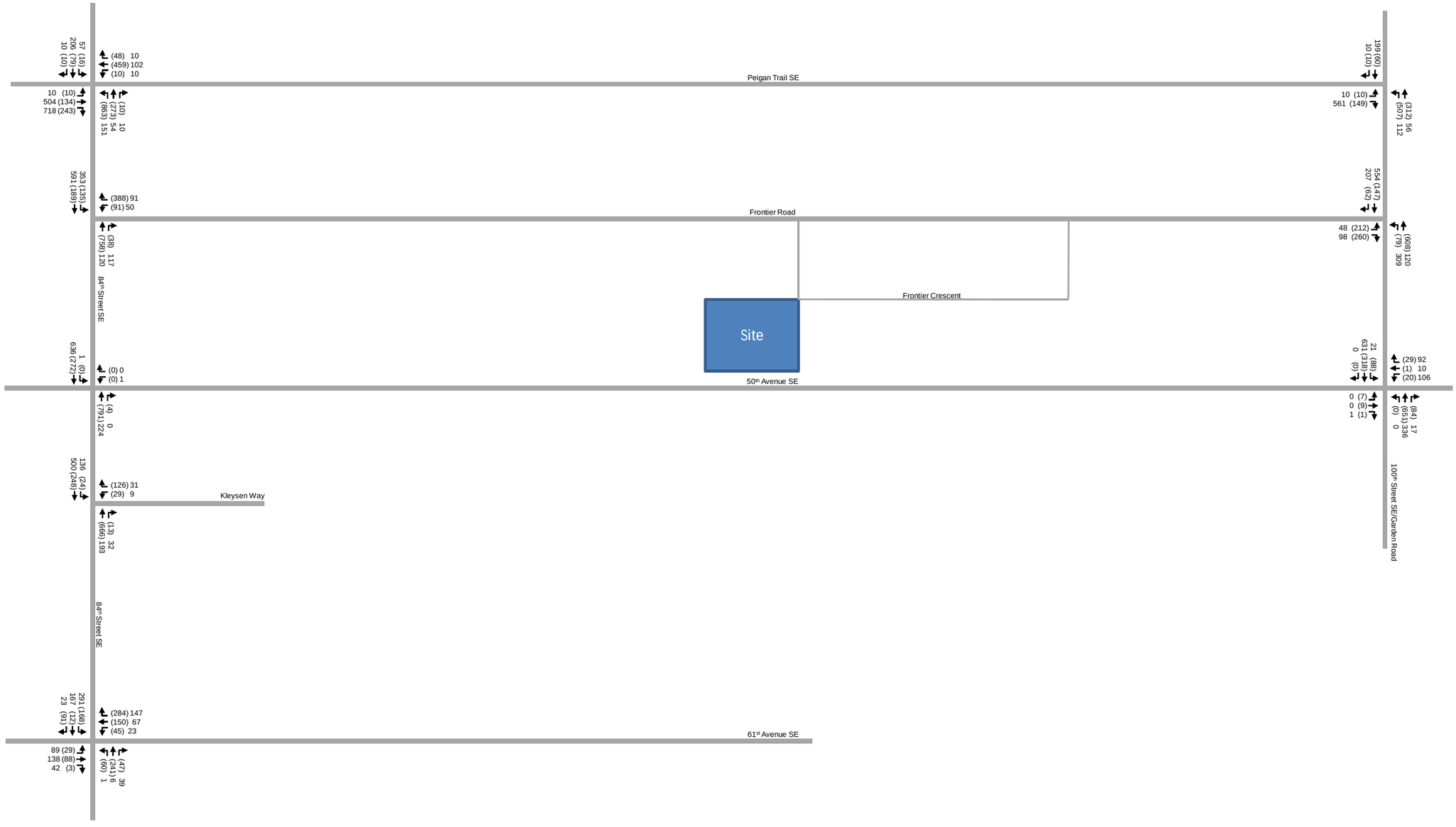
(PM) AM peak hour turning movement volumes

NOT TO SCALE

DILLON CONSULTING

Rocky View County Waste Transfer Station
November 2015

FIGURE 8:
Projected Site Traffic Volumes (with 61st Avenue Flyover)



Legend:

(123) 123
(123) 123
(123) 123

(PM) AM peak hour turning movement volumes

NOT TO SCALE

DILLON CONSULTING

Rocky View County Waste Transfer Station
November 2015

FIGURE 9:
Projected Total Traffic Volumes (with 61st Avenue Flyover)

Table 7: Projected Total Traffic Signalized Intersection Operations with 61 Flyover

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	v/c	Delay (s/veh)	Queue (m)	LOS	v/c	Delay (s/veh)	Queue (m)
Peigan Trail &	EBTL	B	0.36	13.2	41.2	B	0.13	18.0	15.9
84 Street SE	EBR	B	0.80	12.6	#123	A	0.37	4.4	15.0
	WBTLR	B	0.09	10.2	10.1	C	0.46	21.1	53.7
	NBL	D	0.60	49.0	#26	E	1.01	64.7	#124.1
	NBTR	C	0.17	23.5	17.4	C	0.44	20.3	57.9
	SBL	D	0.50	53.3	22.5	D	0.16	42.3	9.0
	SBTR	D	0.65	39.6	55.6	D	0.38	35.5	26.7
	Intersection	*C*		*20.4*		*D*		*37.1*	
Frontier Road &	WBLR	A	0.32	8.8	15.3	C	0.80	26.9	#88.8
84 Street SE	NBT	A	0.14	4.7	9.4	B	0.79	19.1	146.0
	NBR	A	0.15	1.5	4.3	A	0.05	2.7	3.6
	SBL	A	0.51	8.7	36.1	D	0.83	54.6	#55
	SBT	A	0.55	8.2	54.4	A	0.22	8.4	24.9
	Intersection	*A*		*7.5*		*C*		*22.8*	
Kleysen Way &	WBLR	B	0.18	10.9	7.2	B	0.39	11.1	20.50
84 Street SE	NBT	A	0.23	9.0	27.3	B	0.63	12.4	112.50
	NBR	A	0.05	4.7	4.1	A	0.02	3.6	2.20
	SBL	A	0.18	3.4	10.1	A	0.08	4.9	2.90
	SBT	A	0.37	4.1	41.4	A	0.25	4.8	20.60
	Intersection	*A*		*5.3*		*B*		*10.3*	
61 Avenue &	EBL	B	0.36	17.4	16.9	B	0.16	12.7	6.6
84 Street SE	EBTR	B	0.41	13.9	25.3	B	0.17	11.1	13.3
	WBL	B	0.09	12.7	5.7	B	0.12	11.2	8.1
	WBTR	A	0.44	7.8	17.7	B	0.72	14.6	46.7
	NBTL	A	0.01	6.6	1.8	B	0.47	13.5	44.0
	NBR	A	0.05	3.0	3.6	A	0.08	4.0	4.7
	SBL	B	0.45	10.7	40.2	B	0.50	17.4	31.5
	SBTR	A	0.22	7.0	20.2	A	0.16	4.1	7.9
	Intersection	*B*		*10.3*		*B*		*13.0*	
Frontier Road &	EBLR	E	0.76	64.9	#58.4	D	0.91	40.9	#94.5
100 Street SE	NBTL	E	1.01	58.2	#74.3	C	0.89	27.9	#129
	SBTR	A	0.64	6.5	93.9	A	0.26	5.7	16.6
	Intersection	*C*		*29.5*		*C*		*29.0*	

Table 8: Projected Total Traffic Unsignalized Intersection Operations with 61 Flyover

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	v/c	Total Delay (s/veh)	95 % Queue (m)	LOS	v/c	Total Delay (s/veh)	95 % Queue (m)
50 Avenue SE &	EBLTR	A	-	0.0	0.0	A	0.00	0.0	0.0
84 Street SE	WBLTR	C	0.00	20.4	0.1	A	0.00	0.0	0.0
	NBLTR	-	0.00	0.0	0.0	-	0.00	0.0	0.0
	SBLTR	A	0.00	0.0	0.0	-	0.00	0.0	0.0
	Intersection	*A*		*0.0*		*A*		*0.0*	
Peigan Trail &	EBLR	D	0.82	27.8	67.4	C	0.41	19.9	14.9
100 Street SE	NBLT	A	0.10	5.8	2.4	A	0.38	7.3	13.7
	SBTR	-	0.13	0.0	0.0	-	0.04	0.0	0.0
	Intersection	*C*		*17.8*		*C*		*8.7*	
50 Avenue SE &	EBLTR	B	0.00	13.7	0.1	E	0.14	38.0	3.6
100 Street SE	WBTLR	F	0.87	70.8	55.7	D	0.27	29.6	7.8
	NBLTR	-	0.00	0.0	0.0	-	0.00	0.0	0.0
	SBLTR	A	0.02	0.5	0.5	A	0.12	3.5	3.1
	Intersection	*D*		*12.4*		*D*		2.9	

10.0 Conclusions

The anticipated traffic volumes generated by the GFL Solid Waste Transfer Facility are less than those that would be generated by the approved land use for the site. The operating hours of the facility are offset from the peak hours of operation for the road network.

The sensitivity analysis indicates that there is residual capacity in the transportation network. There is enough residual capacity that the traffic generated by the GFL Solid Waste Transfer Facility could increase to design capacity and still not cause a significant impact to the local transportation system.

In our opinion, the development will not have a significant impact to the traffic operations of the road network.

Should you have any questions or concerns, please do not hesitate to contact Gordon Poon at (403) 215-8885 ext. 4359.

Yours sincerely,

Dillon Consulting Limited

Gordon Poon, P.Eng.
Transportation Engineer

Appendix A: Correspondence with Rocky View County
Appendix B: Level of Service Details
Appendix C: Synchro Output for 2015 Traffic Operations
Appendix D: Synchro Output for Total Traffic Operations
Appendix E: Synchro Output for Sensitivity Analysis
Our file: 14-1370

Appendix A

Correspondence with Rocky View Count

From: AYurkowski@rockyview.ca
Sent: Wednesday, October 14, 2015 4:59 PM
To: pmaloney@dillon.ca
Cc: JKwan@rockyview.ca
Subject: RE: PL20150033 TIA for GFL Waste Management Site

Hi Patricia,

I would say the key thing for this application is comparing the trip generation for this development vs the other approved land uses in Frontier Industrial Park as well as the assumptions for trip generation in the original Frontier development TIA. If the trips are significantly higher for the GFL site, then we can discuss a full TIA and the scope.

Is this in alignment with what you were thinking?

Angie

Appendix B

Level of Service Details

LEVEL OF SERVICE[1]

Level of Service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. This concept was introduced in the 1965 *Highway Capacity Manual* as a criteria for interrupted flow conditions. The 2000 *Highway Capacity Manual* changed the basis for measuring Level of Service at intersections to control delay[2].

Six Levels of Service are defined with LOS A representing the best operating conditions, and LOS F the worst (briefly described below). It should be noted that there is often significant variability in the amount of delay experienced by individual drivers.

LOS A: This Level of Service describes the highest quality of traffic flow and is referred to as free flow. The approach appears open, turning movements are easily made and drivers have freedom of operation. Control delay is less than 10 seconds/vehicle.

LOS B: This Level of Service is referred to as a stable flow. Drivers feel somewhat restricted and occasionally may have to wait to complete the minor movement. Control delay is 10-15 seconds/vehicle for unsignalized intersections and 10-20 seconds/vehicle for signalized intersections.

LOS C: At this level, the operation is stable. Drivers feel more restricted and may have to wait, with queues developing for short periods. Control delay is 15-25 seconds/vehicle at unsignalized intersections and 20-35 seconds/vehicle at signalized intersections.

LOS D: At this level, traffic is approaching unstable flow. The motorist experiences increasing restriction and instability of flow. There are substantial delays to approaching vehicles during short peaks within the peak period, but there are enough gaps to lower demand to permit occasional clearance of developing queues and prevent excessive back-ups. Control delay is 25-35 seconds/vehicle at unsignalized intersections and 35-55 seconds/vehicle at signalized intersections.

LOS E: At this level capacity occurs. Long queues of vehicles exist and delays to vehicles may extend. Control delay is 35-50 seconds/vehicle at unsignalized intersections and 55-80 seconds/vehicle at signalized intersections.

LOS F: At this Level of Service, the intersection has failed. Capacity of the intersection has been exceeded. Control delay exceeds 50 seconds/vehicle at unsignalized intersections and exceeds 80 seconds/vehicle at signalized intersections.

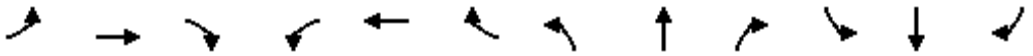
---

[1] *Transportation Research Board: Highway Capacity Manual 1965, 2000*

[2] *Control delay is defined as the component of delay that results when a control signal causes a lane group to reduce speed or to stop; it is measured by comparison with the uncontrolled condition.*

Appendix C

Synchro Output for 2015 Traffic Operations



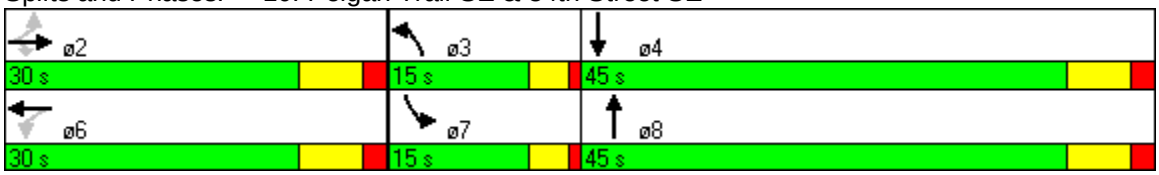
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	4.8	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	0.0		120.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	2		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2		15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.97		1.00		0.99	0.99		0.99	1.00	
Frt			0.850		0.987			0.974			0.993	
Flt Protected		0.999			0.996		0.950			0.950		
Satd. Flow (prot)	0	2959	1325	0	2903	0	2810	1509	0	1448	1546	0
Flt Permitted		0.949			0.899		0.950			0.950		
Satd. Flow (perm)	0	2810	1280	0	2619	0	2781	1509	0	1430	1546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			695		11			11			4	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.85	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		70			70			80			80	
Link Distance (m)		196.4			1636.6			325.0			127.1	
Travel Time (s)		10.1			84.2			14.6			5.7	
Volume (vph)	10	504	695	10	102	10	136	50	10	57	200	10
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	11	536	739	11	109	11	145	53	11	61	213	11
Lane Group Flow (vph)	0	547	739	0	131	0	145	64	0	61	224	0
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2		2	6								
Detector Phases	2	2	2	6	6		3	8		7	4	
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		12.0	29.0		12.0	29.0	
Total Split (s)	30.0	30.0	30.0	30.0	30.0	0.0	15.0	45.0	0.0	15.0	45.0	0.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	0.0%	16.7%	50.0%	0.0%	16.7%	50.0%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0		11.0	38.0		11.0	38.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lead/Lag							Lead	Lag		Lead	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	
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min		None	None		None	None	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)		48.9	48.9		48.9		9.5	21.3		13.1	19.6	
Actuated g/C Ratio		0.54	0.54		0.54		0.11	0.24		0.15	0.22	
v/c Ratio		0.36	0.73		0.09		0.49	0.18		0.29	0.66	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		13.7	7.0		10.9		43.5	24.0		39.2	40.4	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		13.7	7.0		10.9		43.5	24.0		39.2	40.4	
LOS		B	A		B		D	C		D	D	
Approach Delay		9.9			10.9			37.5			40.1	
Approach LOS		A			B			D			D	
90th %ile Green (s)	37.6	37.6	37.6	37.6	37.6		11.0	23.4		11.0	23.4	
90th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Max	Gap	
70th %ile Green (s)	41.8	41.8	41.8	41.8	41.8		11.0	19.5		10.7	19.2	
70th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Gap	Gap	
50th %ile Green (s)	45.6	45.6	45.6	45.6	45.6		9.9	17.4		9.0	16.5	
50th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Gap	Gap	
30th %ile Green (s)	49.6	49.6	49.6	49.6	49.6		8.6	0.0		29.4	13.8	
30th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Skip		Hold	Gap	
10th %ile Green (s)	55.0	55.0	55.0	55.0	55.0		6.9	21.0		0.0	10.1	
10th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Skip	Min	
Queue Length 50th (m)		26.7	3.4		4.9		12.3	7.4		10.1	35.0	
Queue Length 95th (m)		45.9	42.4		11.2		21.1	16.0		21.6	52.7	
Internal Link Dist (m)		172.4			1612.6			301.0			103.1	
Turn Bay Length (m)			120.0				120.0					
Base Capacity (vph)		1527	1013		1428		343	693		236	706	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.36	0.73		0.09		0.42	0.09		0.26	0.32	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 17.5 Intersection LOS: B
Intersection Capacity Utilization 83.1% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 10: Peigan Trail SE & 84th Street SE



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	4.8	3.7	3.7	3.5	3.7
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97	0.99	
Frt	0.892			0.850		
Flt Protected	0.990				0.950	
Satd. Flow (prot)	1722	0	1406	1195	1594	1716
Flt Permitted	0.990				0.675	
Satd. Flow (perm)	1719	0	1406	1161	1124	1716
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	76			74		
Headway Factor	0.85	0.85	0.99	0.99	1.01	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	1635.7		473.5			325.0
Travel Time (s)	117.8		21.3			14.6
Volume (vph)	18	71	120	70	324	591
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	33%	33%	9%	9%
Adj. Flow (vph)	19	76	128	74	345	629
Lane Group Flow (vph)	95	0	128	74	345	629
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Detector Phases	8		2	2	6	6
Minimum Initial (s)	10.0		20.0	20.0	20.0	20.0
Minimum Split (s)	23.5		27.5	27.5	27.5	27.5
Total Split (s)	23.5	0.0	36.5	36.5	36.5	36.5
Total Split (%)	39.2%	0.0%	60.8%	60.8%	60.8%	60.8%
Maximum Green (s)	18.0		30.0	30.0	30.0	30.0
Yellow Time (s)	3.5		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		1.5	1.5	1.5	1.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	13.6		48.1	48.1	48.1	48.1
Actuated g/C Ratio	0.19		0.76	0.76	0.76	0.76
v/c Ratio	0.24		0.12	0.08	0.41	0.48

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	7.7		3.9	1.5	6.3	6.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	7.7		3.9	1.5	6.3	6.3
LOS	A		A	A	A	A
Approach Delay	7.7		3.0			6.3
Approach LOS	A		A			A
90th %ile Green (s)	10.0		30.0	30.0	30.0	30.0
90th %ile Term Code	Min		Hold	Hold	Max	Max
70th %ile Green (s)	10.0		27.1	27.1	27.1	27.1
70th %ile Term Code	Min		Hold	Hold	Gap	Gap
50th %ile Green (s)	10.0		21.6	21.6	21.6	21.6
50th %ile Term Code	Min		Hold	Hold	Gap	Gap
30th %ile Green (s)	0.0		46.6	46.6	46.6	46.6
30th %ile Term Code	Skip		Dwell	Dwell	Dwell	Dwell
10th %ile Green (s)	0.0		113.5	113.5	113.5	113.5
10th %ile Term Code	Skip		Dwell	Dwell	Dwell	Dwell
Queue Length 50th (m)	1.1		4.0	0.0	14.3	28.4
Queue Length 95th (m)	10.2		8.9	3.1	29.5	50.9
Internal Link Dist (m)	1611.7		449.5			301.0
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	548		1090	916	871	1330
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		0.12	0.08	0.40	0.47

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 63.6			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 5.9		Intersection LOS: A	
Intersection Capacity Utilization 47.7%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 52			
70th %ile Actuated Cycle: 49.1			
50th %ile Actuated Cycle: 43.6			
30th %ile Actuated Cycle: 53.1			
10th %ile Actuated Cycle: 120			

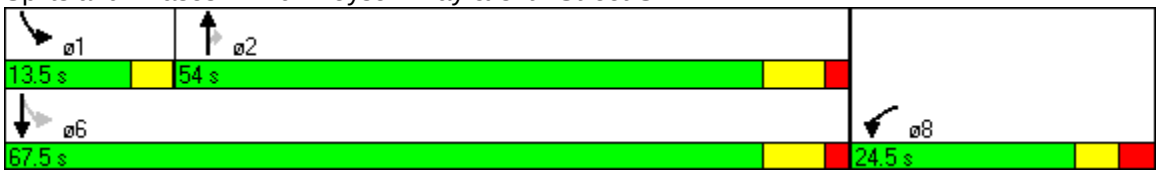
Splits and Phases: 12: Frontier Road & 84th Street SE

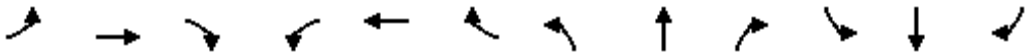
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	4.8	3.7	3.7	3.5	3.7
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97	0.99	
Frt	0.896			0.850		
Flt Protected	0.989				0.950	
Satd. Flow (prot)	1183	0	1450	1233	1580	1701
Flt Permitted	0.989				0.610	
Satd. Flow (perm)	1179	0	1450	1191	1004	1701
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	33			34		
Headway Factor	0.85	0.85	0.99	0.99	1.01	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	289.1		935.1			276.5
Travel Time (s)	20.8		42.1			12.4
Volume (vph)	9	31	146	32	136	468
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	53%	53%	29%	29%	10%	10%
Adj. Flow (vph)	10	33	155	34	145	498
Lane Group Flow (vph)	43	0	155	34	145	498
Turn Type				Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases				2	6	
Detector Phases	8		2	2	1	6
Minimum Initial (s)	10.0		20.0	20.0	7.0	20.0
Minimum Split (s)	24.5		27.0	27.0	10.5	27.0
Total Split (s)	24.5	0.0	54.0	54.0	13.5	67.5
Total Split (%)	26.6%	0.0%	58.7%	58.7%	14.7%	73.4%
Maximum Green (s)	18.0		47.0	47.0	10.0	60.5
Yellow Time (s)	3.5		5.0	5.0	3.4	5.0
All-Red Time (s)	3.0		2.0	2.0	0.1	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	13.4		33.9	33.9	45.0	47.3
Actuated g/C Ratio	0.21		0.61	0.61	0.78	0.85
v/c Ratio	0.16		0.17	0.05	0.17	0.34

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	10.6		8.7	4.7	3.3	3.9
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	10.6		8.7	4.7	3.3	3.9
LOS	B		A	A	A	A
Approach Delay	10.6		8.0			3.7
Approach LOS	B		A			A
90th %ile Green (s)	10.0		20.0	20.0	9.6	33.1
90th %ile Term Code	Min		Min	Min	Gap	Hold
70th %ile Green (s)	10.0		20.0	20.0	8.4	31.9
70th %ile Term Code	Min		Min	Min	Gap	Hold
50th %ile Green (s)	0.0		20.0	20.0	7.0	30.5
50th %ile Term Code	Skip		Min	Min	Min	Hold
30th %ile Green (s)	0.0		21.1	21.1	7.0	31.6
30th %ile Term Code	Skip		Dwell	Dwell	Min	Dwell
10th %ile Green (s)	0.0		82.1	82.1	0.0	82.1
10th %ile Term Code	Skip		Dwell	Dwell	Skip	Dwell
Queue Length 50th (m)	0.4		3.1	0.0	0.0	0.0
Queue Length 95th (m)	7.2		20.8	4.0	10.1	37.5
Internal Link Dist (m)	265.1		911.1			252.5
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	373		1089	903	852	1535
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	0.12		0.14	0.04	0.17	0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 92			
Actuated Cycle Length: 55.4			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.34			
Intersection Signal Delay: 5.0		Intersection LOS: A	
Intersection Capacity Utilization 43.5%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 56.6			
70th %ile Actuated Cycle: 55.4			
50th %ile Actuated Cycle: 37.5			
30th %ile Actuated Cycle: 38.6			
10th %ile Actuated Cycle: 89.1			

Splits and Phases: 16: Kleysen Way & 84th Street SE



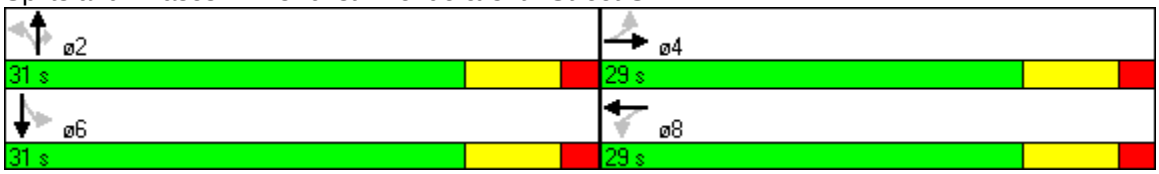


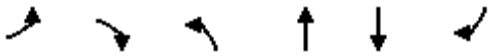
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	80.0		0.0	80.0		0.0	0.0		160.0	160.0		0.0
Storage Lanes	1		0	1		0	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2		15.2	15.2		15.2	15.2	15.2	15.2	15.2	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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	0.99	0.99		0.99	0.98			1.00	0.97	0.99	1.00	
Frt		0.965			0.907				0.850		0.986	
Flt Protected	0.950			0.950				0.993		0.950		
Satd. Flow (prot)	1448	1494	0	1448	1388	0	0	1548	1325	1448	1533	0
Flt Permitted	0.639			0.632				0.972		0.753		
Satd. Flow (perm)	967	1494	0	957	1388	0	0	1514	1286	1137	1533	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			115				26		12	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		155.5			815.5			180.8			935.1	
Travel Time (s)		11.2			58.7			8.1			42.1	
Volume (vph)	81	138	42	23	67	108	1	6	24	265	167	18
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	86	147	45	24	71	115	1	6	26	282	178	19
Lane Group Flow (vph)	86	192	0	24	186	0	0	7	26	282	197	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phases	4	4		8	8		2	2	2	6	6	
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		27.0	27.0	27.0	27.0	27.0	
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	31.0	31.0	31.0	31.0	31.0	0.0
Total Split (%)	48.3%	48.3%	0.0%	48.3%	48.3%	0.0%	51.7%	51.7%	51.7%	51.7%	51.7%	0.0%
Maximum Green (s)	22.0	22.0		22.0	22.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	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	Min	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	15.4	15.4		15.4	15.4			30.7	30.7	30.7	30.7	
Actuated g/C Ratio	0.29	0.29		0.29	0.29			0.61	0.61	0.61	0.61	
v/c Ratio	0.31	0.43		0.09	0.39			0.01	0.03	0.41	0.21	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	15.6	13.8		12.3	7.9			6.4	3.4	9.8	6.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	15.6	13.8		12.3	7.9			6.4	3.4	9.8	6.9	
LOS	B	B		B	A			A	A	A	A	
Approach Delay		14.4			8.4			4.0			8.6	
Approach LOS		B			A			A			A	
90th %ile Green (s)	16.2	16.2		16.2	16.2		24.0	24.0	24.0	24.0	24.0	
90th %ile Term Code	Gap	Gap		Hold	Hold		Hold	Hold	Hold	Max	Max	
70th %ile Green (s)	12.1	12.1		12.1	12.1		20.0	20.0	20.0	20.0	20.0	
70th %ile Term Code	Gap	Gap		Hold	Hold		Min	Min	Min	Min	Min	
50th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
50th %ile Term Code	Min	Min		Min	Min		Min	Min	Min	Min	Min	
30th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
30th %ile Term Code	Min	Min		Min	Min		Min	Min	Min	Min	Min	
10th %ile Green (s)	0.0	0.0		0.0	0.0		56.6	56.6	56.6	56.6	56.6	
10th %ile Term Code	Skip	Skip		Skip	Skip		Dwell	Dwell	Dwell	Dwell	Dwell	
Queue Length 50th (m)	5.0	9.5		1.3	4.0			0.3	0.0	11.9	6.7	
Queue Length 95th (m)	14.4	24.0		5.4	15.8			1.8	2.8	34.1	19.2	
Internal Link Dist (m)		131.5			791.5			156.8			911.1	
Turn Bay Length (m)	80.0			80.0					160.0	160.0		
Base Capacity (vph)	392	624		388	631			958	823	719	974	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.22	0.31		0.06	0.29			0.01	0.03	0.39	0.20	

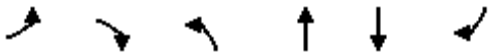
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.4			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 10.0		Intersection LOS: B	
Intersection Capacity Utilization 54.0%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 54.2			
70th %ile Actuated Cycle: 46.1			
50th %ile Actuated Cycle: 44			
30th %ile Actuated Cycle: 44			
10th %ile Actuated Cycle: 63.6			

Splits and Phases: 18: 61st Avenue & 84th Street SE





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	3.7	3.7	3.7	3.7	3.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Turning Speed (k/h)	24	14	24			14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98				0.99	
Frt	0.927				0.964	
Flt Protected	0.978			0.968		
Satd. Flow (prot)	1555	0	0	1509	1489	0
Flt Permitted	0.978			0.314		
Satd. Flow (perm)	1545	0	0	489	1489	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	56				52	
Headway Factor	0.85	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50			50	50	
Link Distance (m)	1635.7			470.4	335.4	
Travel Time (s)	117.8			33.9	24.1	
Volume (vph)	44	53	241	120	554	201
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	47	56	256	128	589	214
Lane Group Flow (vph)	103	0	0	384	803	0
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phases	4		2	2	6	
Minimum Initial (s)	10.0		20.0	20.0	20.0	
Minimum Split (s)	21.0		26.5	26.5	26.5	
Total Split (s)	21.0	0.0	69.0	69.0	69.0	0.0
Total Split (%)	23.3%	0.0%	76.7%	76.7%	76.7%	0.0%
Maximum Green (s)	16.0		62.5	62.5	62.5	
Yellow Time (s)	3.5		5.0	5.0	5.0	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	5.0		5.0	5.0	5.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	12.0			76.7	76.7	
Actuated g/C Ratio	0.12			0.82	0.82	
v/c Ratio	0.43			0.96	0.65	
Control Delay	22.5			50.5	7.3	
Queue Delay	0.0			0.0	0.0	



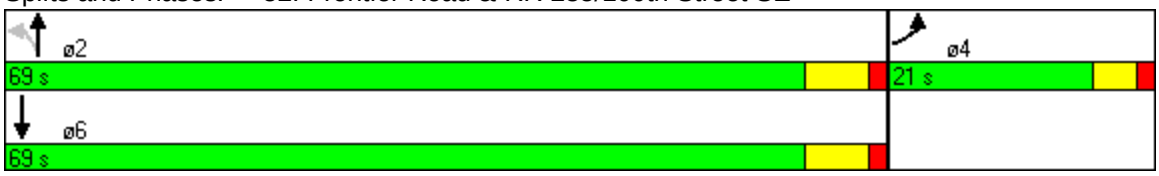
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	22.5			50.5	7.3	
LOS	C			D	A	
Approach Delay	22.5			50.5	7.3	
Approach LOS	C			D	A	
90th %ile Green (s)	12.8		62.5	62.5	62.5	
90th %ile Term Code	Gap		Max	Max	Max	
70th %ile Green (s)	10.0		62.5	62.5	62.5	
70th %ile Term Code	Min		Max	Max	Hold	
50th %ile Green (s)	10.0		62.5	62.5	62.5	
50th %ile Term Code	Min		Max	Max	Hold	
30th %ile Green (s)	10.0		72.4	72.4	72.4	
30th %ile Term Code	Min		Dwell	Dwell	Dwell	
10th %ile Green (s)	0.0		113.5	113.5	113.5	
10th %ile Term Code	Skip		Dwell	Dwell	Dwell	
Queue Length 50th (m)	6.9			~52.9	43.4	
Queue Length 95th (m)	20.8			#60.8	92.7	
Internal Link Dist (m)	1611.7			446.4	311.4	
Turn Bay Length (m)						
Base Capacity (vph)	313			400	1229	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.33			0.96	0.65	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 93.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 21.4	Intersection LOS: C
Intersection Capacity Utilization 81.9%	ICU Level of Service D
Analysis Period (min) 15	
90th %ile Actuated Cycle: 86.8	
70th %ile Actuated Cycle: 84	
50th %ile Actuated Cycle: 84	
30th %ile Actuated Cycle: 93.9	
10th %ile Actuated Cycle: 120	

~ 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.

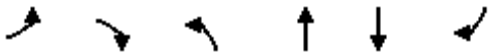
Splits and Phases: 52: Frontier Road & RR 285/100th Street SE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	0	0	177	0	1	604	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	0	1	0	0	0	188	0	1	643	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)								277				
pX, platoon unblocked												
vC, conflicting volume	833	833	643	833	833	188	643			188		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	833	833	643	833	833	188	643			188		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	268	285	443	268	285	810	862			1285		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	1	188	644
Volume Left	0	1	0	1
Volume Right	0	0	0	0
cSH	1700	268	862	1285
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.1	0.0	0.0
Control Delay (s)	0.0	18.5	0.0	0.0
Lane LOS	A	C		A
Approach Delay (s)	0.0	18.5	0.0	0.0
Approach LOS	A	C		

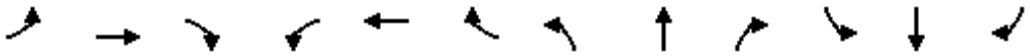
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	561	112	52	193	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	597	119	55	205	11
Pedestrians	5			10	10	
Lane Width (m)	4.8			4.8	4.8	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)				335		
pX, platoon unblocked						
vC, conflicting volume	519	226	221			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	519	226	221			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	98	21	90			
cM capacity (veh/h)	433	758	1242			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	607	174	216
Volume Left	11	119	0
Volume Right	597	0	11
cSH	748	1242	1700
Volume to Capacity	0.81	0.10	0.13
Queue Length 95th (m)	65.9	2.4	0.0
Control Delay (s)	27.1	5.9	0.0
Lane LOS	D	A	
Approach Delay (s)	27.1	5.9	0.0
Approach LOS	D		

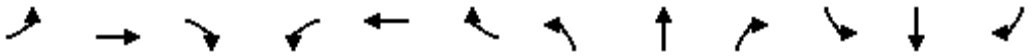
Intersection Summary			
Average Delay	17.5		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	1	106	10	89	0	272	17	19	588	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	1	113	11	95	0	289	18	20	626	0
Pedestrians		5			5			5			5	
Lane Width (m)		4.8			4.8			4.8			4.8	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1074	983	636	975	974	308	631			312		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1074	983	636	975	974	308	631			312		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	45	95	86	100			98		
cM capacity (veh/h)	147	225	442	206	228	684	866			1146		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1	218	307	646
Volume Left	0	113	0	20
Volume Right	1	95	18	0
cSH	442	298	866	1146
Volume to Capacity	0.00	0.73	0.00	0.02
Queue Length 95th (m)	0.1	40.5	0.0	0.4
Control Delay (s)	13.2	44.0	0.0	0.5
Lane LOS	B	E		A
Approach Delay (s)	13.2	44.0	0.0	0.5
Approach LOS	B	E		

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

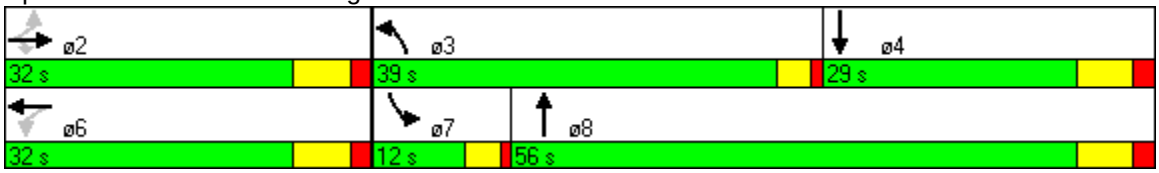


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	4.8	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	0.0		120.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	2		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2		15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.96		1.00		0.99	1.00		0.99	1.00	
Frt			0.850		0.986			0.994			0.980	
Flt Protected		0.996			0.999		0.950			0.950		
Satd. Flow (prot)	0	2950	1325	0	2908	0	2810	1547	0	1448	1523	0
Flt Permitted		0.905			0.948		0.950			0.950		
Satd. Flow (perm)	0	2679	1278	0	2759	0	2771	1547	0	1433	1523	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			211		11			3			7	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.85	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		70			70			80			80	
Link Distance (m)		196.4			1636.6			325.0			127.1	
Travel Time (s)		10.1			84.2			14.6			5.7	
Volume (vph)	10	134	200	10	459	48	799	257	10	16	68	10
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	11	141	211	11	483	51	841	271	11	17	72	11
Lane Group Flow (vph)	0	152	211	0	545	0	841	282	0	17	83	0
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2		2	6								
Detector Phases	2	2	2	6	6		3	8		7	4	
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		12.0	29.0		12.0	29.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0	0.0	39.0	56.0	0.0	12.0	29.0	0.0
Total Split (%)	32.0%	32.0%	32.0%	32.0%	32.0%	0.0%	39.0%	56.0%	0.0%	12.0%	29.0%	0.0%
Maximum Green (s)	25.0	25.0	25.0	25.0	25.0		35.0	49.0		8.0	22.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lead/Lag							Lead	Lag		Lead	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	
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min		None	None		None	None	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)		44.2	44.2		44.2		32.9	43.1		6.5	14.3	
Actuated g/C Ratio		0.44	0.44		0.44		0.33	0.43		0.06	0.14	
v/c Ratio		0.13	0.31		0.44		0.91	0.42		0.18	0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		19.7	4.5		22.7		46.7	21.2		48.1	40.1	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		19.7	4.5		22.7		46.7	21.2		48.1	40.1	
LOS		B	A		C		D	C		D	D	
Approach Delay		10.9			22.7			40.3			41.4	
Approach LOS		B			C			D			D	
90th %ile Green (s)	32.5	32.5	32.5	32.5	32.5		35.0	41.5		8.0	14.5	
90th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Max	Gap	
70th %ile Green (s)	35.2	35.2	35.2	35.2	35.2		35.0	39.4		7.4	11.8	
70th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Gap	Gap	
50th %ile Green (s)	36.1	36.1	36.1	36.1	36.1		35.9	49.9		0.0	10.0	
50th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Skip	Min	
30th %ile Green (s)	40.0	40.0	40.0	40.0	40.0		32.0	46.0		0.0	10.0	
30th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Skip	Min	
10th %ile Green (s)	62.3	62.3	62.3	62.3	62.3		26.7	23.7		0.0	0.0	
10th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Skip	Skip	
Queue Length 50th (m)		9.8	0.0		40.4		75.9	29.6		3.2	13.7	
Queue Length 95th (m)		17.6	14.6		59.6		#109.1	56.5		9.8	26.7	
Internal Link Dist (m)		172.4			1612.6			301.0			103.1	
Turn Bay Length (m)			120.0				120.0					
Base Capacity (vph)		1184	683		1226		989	809		116	386	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.13	0.31		0.44		0.85	0.35		0.15	0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 30.8		Intersection LOS: C	
Intersection Capacity Utilization 58.8%		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: 10: Peigan Trail SE & 84th Street SE



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	4.8	3.7	3.7	3.5	3.7
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97		
Frt	0.888			0.850		
Flt Protected	0.992				0.950	
Satd. Flow (prot)	1716	0	1716	1459	1402	1509
Flt Permitted	0.992				0.164	
Satd. Flow (perm)	1714	0	1716	1416	242	1509
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	153			20		
Headway Factor	0.85	0.85	0.99	0.99	1.01	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	1635.7		473.5			325.0
Travel Time (s)	117.8		21.3			14.6
Volume (vph)	62	308	758	19	81	189
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	9%	9%	24%	24%
Adj. Flow (vph)	65	324	798	20	85	199
Lane Group Flow (vph)	389	0	798	20	85	199
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Detector Phases	8		2	2	6	6
Minimum Initial (s)	10.0		20.0	20.0	20.0	20.0
Minimum Split (s)	23.5		27.5	27.5	27.5	27.5
Total Split (s)	23.5	0.0	36.5	36.5	36.5	36.5
Total Split (%)	39.2%	0.0%	60.8%	60.8%	60.8%	60.8%
Maximum Green (s)	18.0		30.0	30.0	30.0	30.0
Yellow Time (s)	3.5		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		1.5	1.5	1.5	1.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	15.0		29.2	29.2	29.2	29.2
Actuated g/C Ratio	0.29		0.56	0.56	0.56	0.56
v/c Ratio	0.65		0.83	0.03	0.63	0.24

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	15.8		20.6	3.3	36.3	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	15.8		20.6	3.3	36.3	7.3
LOS	B		C	A	D	A
Approach Delay	15.8		20.2			16.0
Approach LOS	B		C			B
90th %ile Green (s)	18.0		30.0	30.0	30.0	30.0
90th %ile Term Code	Max		Max	Max	Max	Max
70th %ile Green (s)	16.8		30.0	30.0	30.0	30.0
70th %ile Term Code	Gap		Max	Max	Max	Max
50th %ile Green (s)	13.4		30.0	30.0	30.0	30.0
50th %ile Term Code	Gap		Max	Max	Hold	Hold
30th %ile Green (s)	10.0		23.5	23.5	23.5	23.5
30th %ile Term Code	Min		Gap	Gap	Hold	Hold
10th %ile Green (s)	10.0		20.0	20.0	20.0	20.0
10th %ile Term Code	Min		Min	Min	Min	Min
Queue Length 50th (m)	20.0		53.3	0.0	4.7	8.2
Queue Length 95th (m)	43.5		#136.6	2.3	#27.6	20.1
Internal Link Dist (m)	1611.7		449.5			301.0
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	694		1006	839	142	884
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	0.56		0.79	0.02	0.60	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 52.3			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 18.3		Intersection LOS: B	
Intersection Capacity Utilization 91.1%		ICU Level of Service F	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 60			
70th %ile Actuated Cycle: 58.8			
50th %ile Actuated Cycle: 55.4			
30th %ile Actuated Cycle: 45.5			
10th %ile Actuated Cycle: 42			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

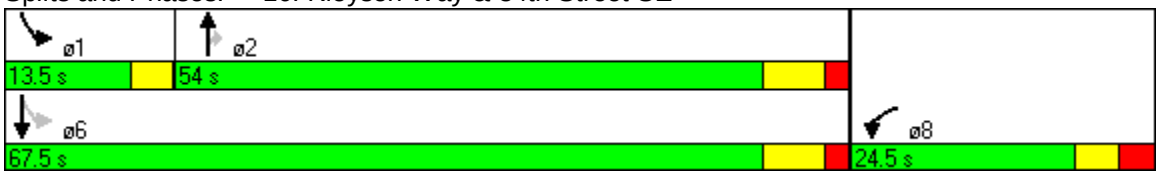
Splits and Phases: 12: Frontier Road & 84th Street SE

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97		
Frt	0.891			0.850		
Flt Protected	0.991				0.950	
Satd. Flow (prot)	1487	0	1685	1432	1422	1496
Flt Permitted	0.991				0.214	
Satd. Flow (perm)	1483	0	1685	1384	320	1496
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	133			14		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	289.1		935.1			276.5
Travel Time (s)	20.8		42.1			12.4
Volume (vph)	29	126	647	13	24	219
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	8%	11%	11%	25%	25%
Adj. Flow (vph)	31	133	681	14	25	231
Lane Group Flow (vph)	164	0	681	14	25	231
Turn Type				Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases				2	6	
Detector Phases	8		2	2	1	6
Minimum Initial (s)	10.0		20.0	20.0	6.5	20.0
Minimum Split (s)	24.5		27.0	27.0	10.5	27.0
Total Split (s)	24.5	0.0	54.0	54.0	13.5	67.5
Total Split (%)	26.6%	0.0%	58.7%	58.7%	14.7%	73.4%
Maximum Green (s)	18.0		47.0	47.0	10.0	60.5
Yellow Time (s)	3.5		5.0	5.0	3.4	5.0
All-Red Time (s)	3.0		2.0	2.0	0.1	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	14.2		41.7	41.7	44.1	45.0
Actuated g/C Ratio	0.21		0.65	0.65	0.63	0.70
v/c Ratio	0.39		0.62	0.02	0.08	0.22
Control Delay	10.9		12.2	3.7	5.0	4.7

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	10.9		12.2	3.7	5.0	4.7
LOS	B		B	A	A	A
Approach Delay	10.9		12.0			4.7
Approach LOS	B		B			A
90th %ile Green (s)	13.8		47.0	47.0	6.7	57.2
90th %ile Term Code	Gap		Max	Max	Gap	Hold
70th %ile Green (s)	10.0		37.4	37.4	6.5	47.4
70th %ile Term Code	Min		Gap	Gap	Min	Hold
50th %ile Green (s)	10.0		24.1	24.1	0.0	24.1
50th %ile Term Code	Min		Gap	Gap	Skip	Hold
30th %ile Green (s)	10.0		20.0	20.0	0.0	20.0
30th %ile Term Code	Min		Min	Min	Skip	Min
10th %ile Green (s)	0.0		66.0	66.0	0.0	66.0
10th %ile Term Code	Skip		Dwell	Dwell	Skip	Dwell
Queue Length 50th (m)	2.0		35.2	0.0	0.8	8.4
Queue Length 95th (m)	20.3		106.9	2.2	2.9	18.0
Internal Link Dist (m)	265.1		911.1			252.5
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	531		1224	1009	340	1194
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	0.31		0.56	0.01	0.07	0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 92			
Actuated Cycle Length: 63.9			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 10.2		Intersection LOS: B	
Intersection Capacity Utilization 52.2%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 84.5			
70th %ile Actuated Cycle: 70.9			
50th %ile Actuated Cycle: 47.6			
30th %ile Actuated Cycle: 43.5			
10th %ile Actuated Cycle: 73			

Splits and Phases: 16: Kleysen Way & 84th Street SE

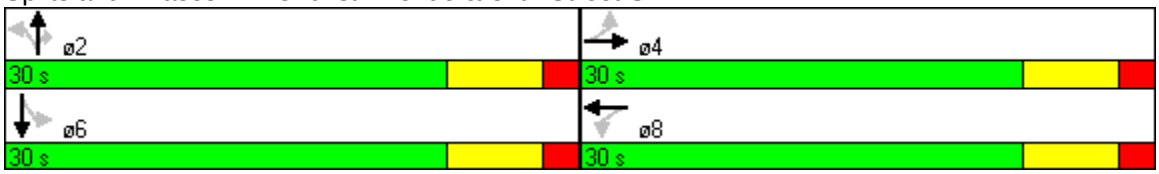


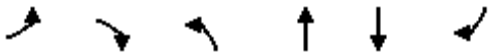
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	80.0		0.0	80.0		0.0	0.0		160.0	160.0		0.0
Storage Lanes	1		0	1		0	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2		15.2	15.2		15.2	15.2	15.2	15.2	15.2	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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	1.00	1.00		0.99	0.98			1.00	0.97	0.99	0.97	
Frt		0.995			0.903				0.850		0.871	
Flt Protected	0.950			0.950				0.990		0.950		
Satd. Flow (prot)	1448	1550	0	1448	1381	0	0	1543	1325	1448	1324	0
Flt Permitted	0.365			0.695				0.926		0.497		
Satd. Flow (perm)	554	1550	0	1051	1381	0	0	1441	1286	754	1324	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			193				49		80	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		155.5			288.9			180.8			935.1	
Travel Time (s)		11.2			20.8			8.1			42.1	
Volume (vph)	19	88	3	45	150	274	60	241	47	153	12	76
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	20	93	3	47	158	288	63	254	49	161	13	80
Lane Group Flow (vph)	20	96	0	47	446	0	0	317	49	161	93	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phases	4	4		8	8		2	2	2	6	6	
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		27.0	27.0	27.0	27.0	27.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	50.0%	50.0%	0.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	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	Min	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	18.8	18.8		18.8	18.8			24.0	24.0	24.0	24.0	
Actuated g/C Ratio	0.37	0.37		0.37	0.37			0.47	0.47	0.47	0.47	
v/c Ratio	0.10	0.17		0.12	0.71			0.47	0.08	0.45	0.14	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	11.3	10.9		11.0	14.2			13.4	4.0	16.2	4.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	11.3	10.9		11.0	14.2			13.4	4.0	16.2	4.2	
LOS	B	B		B	B			B	A	B	A	
Approach Delay		11.0			13.9			12.2			11.8	
Approach LOS		B			B			B			B	
90th %ile Green (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	
90th %ile Term Code	Hold	Hold		Max	Max		Max	Max	Max	Max	Max	
70th %ile Green (s)	21.5	21.5		21.5	21.5		20.8	20.8	20.8	20.8	20.8	
70th %ile Term Code	Hold	Hold		Gap	Gap		Hold	Hold	Hold	Gap	Gap	
50th %ile Green (s)	15.3	15.3		15.3	15.3		20.0	20.0	20.0	20.0	20.0	
50th %ile Term Code	Hold	Hold		Gap	Gap		Min	Min	Min	Min	Min	
30th %ile Green (s)	10.9	10.9		10.9	10.9		20.0	20.0	20.0	20.0	20.0	
30th %ile Term Code	Hold	Hold		Gap	Gap		Min	Min	Min	Min	Min	
10th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
10th %ile Term Code	Hold	Hold		Min	Min		Min	Min	Min	Min	Min	
Queue Length 50th (m)	1.1	5.2		2.6	16.4			17.4	0.0	8.8	0.6	
Queue Length 95th (m)	4.7	13.3		8.1	45.5			43.9	4.7	28.1	7.4	
Internal Link Dist (m)		131.5			264.9			156.8			911.1	
Turn Bay Length (m)	80.0			80.0					160.0	160.0		
Base Capacity (vph)	250	700		473	728			712	660	373	695	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.08	0.14		0.10	0.61			0.45	0.07	0.43	0.13	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.9			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 12.7		Intersection LOS: B	
Intersection Capacity Utilization 69.1%		ICU Level of Service C	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 60			
70th %ile Actuated Cycle: 56.3			
50th %ile Actuated Cycle: 49.3			
30th %ile Actuated Cycle: 44.9			
10th %ile Actuated Cycle: 44			

Splits and Phases: 18: 61st Avenue & 84th Street SE





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	3.7	3.7	3.7	3.7	3.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Turning Speed (k/h)	24	14	24			14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98			1.00	0.99	
Frt	0.926				0.964	
Flt Protected	0.978			0.995		
Satd. Flow (prot)	1557	0	0	1551	1491	0
Flt Permitted	0.978			0.954		
Satd. Flow (perm)	1551	0	0	1486	1491	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	103				50	
Headway Factor	0.85	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50			50	50	
Link Distance (m)	1635.7			470.4	335.4	
Travel Time (s)	117.8			33.9	24.1	
Volume (vph)	196	235	62	608	147	53
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	206	247	65	640	155	56
Lane Group Flow (vph)	453	0	0	705	211	0
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phases	4		2	2	6	
Minimum Initial (s)	10.0		20.0	20.0	20.0	
Minimum Split (s)	21.0		26.5	26.5	26.5	
Total Split (s)	22.0	0.0	38.0	38.0	38.0	0.0
Total Split (%)	36.7%	0.0%	63.3%	63.3%	63.3%	0.0%
Maximum Green (s)	17.0		31.5	31.5	31.5	
Yellow Time (s)	3.5		5.0	5.0	5.0	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	5.0		5.0	5.0	5.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	16.5			31.0	31.0	
Actuated g/C Ratio	0.30			0.56	0.56	
v/c Ratio	0.85			0.85	0.25	
Control Delay	32.6			23.5	5.9	
Queue Delay	0.0			0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	32.6			23.5	5.9	
LOS	C			C	A	
Approach Delay	32.6			23.5	5.9	
Approach LOS	C			C	A	
90th %ile Green (s)	17.0		31.5	31.5	31.5	
90th %ile Term Code	Max		Max	Max	Hold	
70th %ile Green (s)	17.0		31.5	31.5	31.5	
70th %ile Term Code	Max		Max	Max	Hold	
50th %ile Green (s)	17.0		31.5	31.5	31.5	
50th %ile Term Code	Max		Max	Max	Hold	
30th %ile Green (s)	16.9		28.3	28.3	28.3	
30th %ile Term Code	Gap		Gap	Gap	Hold	
10th %ile Green (s)	10.0		20.0	20.0	20.0	
10th %ile Term Code	Min		Min	Min	Min	
Queue Length 50th (m)	35.8			56.6	7.6	
Queue Length 95th (m)	#82.3			#122.6	16.3	
Internal Link Dist (m)	1611.7			446.4	311.4	
Turn Bay Length (m)						
Base Capacity (vph)	565			864	889	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.80			0.82	0.24	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 55.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 23.8	Intersection LOS: C
Intersection Capacity Utilization 89.3%	ICU Level of Service E
Analysis Period (min) 15	
90th %ile Actuated Cycle: 60	
70th %ile Actuated Cycle: 60	
50th %ile Actuated Cycle: 60	
30th %ile Actuated Cycle: 56.7	
10th %ile Actuated Cycle: 41.5	

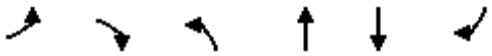
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 52: Frontier Road & RR 285/100th Street SE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	0	0	772	4	0	243	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	0	0	813	4	0	256	0
Pedestrians		5			5			5			5	
Lane Width (m)		4.8			4.8			3.7			3.7	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)								277				
pX, platoon unblocked	0.72	0.72		0.72	0.72	0.72				0.72		
vC, conflicting volume	1081	1083	266	1081	1081	825	261			822		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1111	1114	266	1111	1111	758	261			754		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	122	138	724	122	139	272	1199			562		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	817	256
Volume Left	0	0	0	0
Volume Right	0	0	4	0
cSH	1700	1700	1199	562
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

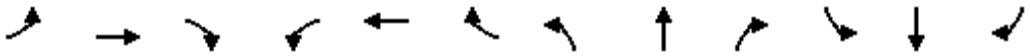
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	149	507	296	50	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	157	534	312	53	11
Pedestrians	5			10	10	
Lane Width (m)	4.8			4.8	4.8	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)				335		
pX, platoon unblocked	0.74					
vC, conflicting volume	1452	73	68			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1607	73	68			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	78	83	62			
cM capacity (veh/h)	48	926	1418			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	167	845	63
Volume Left	11	534	0
Volume Right	157	0	11
cSH	430	1418	1700
Volume to Capacity	0.39	0.38	0.04
Queue Length 95th (m)	13.8	13.5	0.0
Control Delay (s)	18.6	7.3	0.0
Lane LOS	C	A	
Approach Delay (s)	18.6	7.3	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		



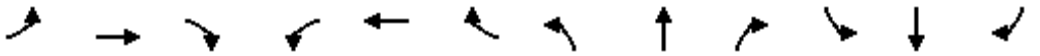
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	7	9	1	20	1	23	0	640	84	79	302	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	9	1	21	1	24	0	674	88	83	318	0
Pedestrians		5			5			5			5	
Lane Width (m)		4.8			4.8			4.8			4.8	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1237	1256	328	1218	1212	728	323			767		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1237	1256	328	1218	1212	728	323			767		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	94	93	100	83	99	94	100			89		
cM capacity (veh/h)	118	139	666	123	148	391	1136			767		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	18	46	762	401
Volume Left	7	21	0	83
Volume Right	1	24	88	0
cSH	135	193	1136	767
Volume to Capacity	0.13	0.24	0.00	0.11
Queue Length 95th (m)	3.4	6.9	0.0	2.8
Control Delay (s)	35.6	29.4	0.0	3.2
Lane LOS	E	D		A
Approach Delay (s)	35.6	29.4	0.0	3.2
Approach LOS	E	D		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

Appendix D

Synchro Output for Total Traffic Operations



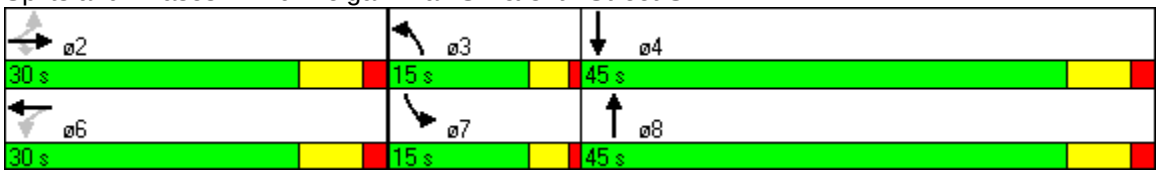
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	4.8	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	0.0		120.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	2		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2		15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.97		1.00		0.99	0.99		0.99	1.00	
Frt			0.850		0.987			0.974			0.993	
Flt Protected		0.999			0.996		0.950			0.950		
Satd. Flow (prot)	0	2959	1325	0	2903	0	2810	1509	0	1448	1546	0
Flt Permitted		0.949			0.899		0.950			0.950		
Satd. Flow (perm)	0	2810	1280	0	2619	0	2781	1509	0	1430	1546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			692		11			11			4	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.85	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		70			70			80			80	
Link Distance (m)		196.4			1636.6			325.0			127.1	
Travel Time (s)		10.1			84.2			14.6			5.7	
Volume (vph)	10	504	704	10	102	10	137	50	10	57	203	10
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	536	749	11	109	11	146	53	11	61	216	11
Lane Group Flow (vph)	0	547	749	0	131	0	146	64	0	61	227	0
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2		2	6								
Detector Phases	2	2	2	6	6		3	8		7	4	
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		12.0	29.0		12.0	29.0	
Total Split (s)	30.0	30.0	30.0	30.0	30.0	0.0	15.0	45.0	0.0	15.0	45.0	0.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	0.0%	16.7%	50.0%	0.0%	16.7%	50.0%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0		11.0	38.0		11.0	38.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lead/Lag							Lead	Lag		Lead	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	
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min		None	None		None	None	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)		48.7	48.7		48.7		9.5	21.4		13.2	19.8	
Actuated g/C Ratio		0.54	0.54		0.54		0.11	0.24		0.15	0.22	
v/c Ratio		0.36	0.74		0.09		0.49	0.17		0.29	0.66	
Control Delay		13.9	7.7		11.0		43.5	23.9		39.2	40.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		13.9	7.7		11.0		43.5	23.9		39.2	40.3	
LOS		B	A		B		D	C		D	D	
Approach Delay		10.3			11.0			37.5			40.1	
Approach LOS		B			B			D			D	
90th %ile Green (s)	37.4	37.4	37.4	37.4	37.4		11.0	23.6		11.0	23.6	
90th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Max	Gap	
70th %ile Green (s)	41.6	41.6	41.6	41.6	41.6		11.0	19.7		10.7	19.4	
70th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Gap	Gap	
50th %ile Green (s)	45.5	45.5	45.5	45.5	45.5		9.9	17.5		9.0	16.6	
50th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Gap	Gap	
30th %ile Green (s)	49.4	49.4	49.4	49.4	49.4		8.6	0.0		29.6	14.0	
30th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Skip		Hold	Gap	
10th %ile Green (s)	54.8	54.8	54.8	54.8	54.8		6.9	21.2		0.0	10.3	
10th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Skip	Min	
Queue Length 50th (m)		26.8	4.5		4.9		12.4	7.4		10.1	35.5	
Queue Length 95th (m)		46.1	48.9		11.3		21.3	15.9		21.6	53.3	
Internal Link Dist (m)		172.4			1612.6			301.0			103.1	
Turn Bay Length (m)			120.0				120.0					
Base Capacity (vph)		1522	1010		1423		343	693		237	706	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.36	0.74		0.09		0.43	0.09		0.26	0.32	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 17.8 Intersection LOS: B
Intersection Capacity Utilization 83.9% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 10: Peigan Trail SE & 84th Street SE



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	4.8	3.7	3.7	3.5	3.7
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98			0.97	0.99	
Frt	0.895			0.850		
Flt Protected	0.989				0.950	
Satd. Flow (prot)	1727	0	1406	1195	1594	1716
Flt Permitted	0.989				0.675	
Satd. Flow (perm)	1724	0	1406	1161	1124	1716
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	78			94		
Headway Factor	0.85	0.85	0.99	0.99	1.01	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	1635.7		473.5			325.0
Travel Time (s)	117.8		21.3			14.6
Volume (vph)	21	73	120	88	335	591
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	33%	33%	9%	9%
Adj. Flow (vph)	22	78	128	94	356	629
Lane Group Flow (vph)	100	0	128	94	356	629
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Detector Phases	8		2	2	6	6
Minimum Initial (s)	10.0		20.0	20.0	20.0	20.0
Minimum Split (s)	23.5		27.5	27.5	27.5	27.5
Total Split (s)	23.5	0.0	36.5	36.5	36.5	36.5
Total Split (%)	39.2%	0.0%	60.8%	60.8%	60.8%	60.8%
Maximum Green (s)	18.0		30.0	30.0	30.0	30.0
Yellow Time (s)	3.5		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		1.5	1.5	1.5	1.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	13.6		44.3	44.3	44.3	44.3
Actuated g/C Ratio	0.20		0.69	0.69	0.69	0.69
v/c Ratio	0.24		0.13	0.11	0.46	0.53

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	7.8		4.3	1.4	7.5	7.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	7.8		4.3	1.4	7.5	7.5
LOS	A		A	A	A	A
Approach Delay	7.8		3.1			7.5
Approach LOS	A		A			A
90th %ile Green (s)	10.0		30.0	30.0	30.0	30.0
90th %ile Term Code	Min		Hold	Hold	Max	Max
70th %ile Green (s)	10.0		27.1	27.1	27.1	27.1
70th %ile Term Code	Min		Hold	Hold	Gap	Gap
50th %ile Green (s)	10.0		21.6	21.6	21.6	21.6
50th %ile Term Code	Min		Hold	Hold	Gap	Gap
30th %ile Green (s)	10.0		35.5	35.5	35.5	35.5
30th %ile Term Code	Min		Dwell	Dwell	Dwell	Dwell
10th %ile Green (s)	0.0		113.5	113.5	113.5	113.5
10th %ile Term Code	Skip		Dwell	Dwell	Dwell	Dwell
Queue Length 50th (m)	1.2		4.0	0.0	14.9	28.4
Queue Length 95th (m)	10.7		8.9	3.5	31.1	50.9
Internal Link Dist (m)	1611.7		449.5			301.0
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	565		994	849	795	1214
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	0.18		0.13	0.11	0.45	0.52

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 64.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 6.8		Intersection LOS: A	
Intersection Capacity Utilization 47.7%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 52			
70th %ile Actuated Cycle: 49.1			
50th %ile Actuated Cycle: 43.6			
30th %ile Actuated Cycle: 57.5			
10th %ile Actuated Cycle: 120			

Splits and Phases: 12: Frontier Road & 84th Street SE

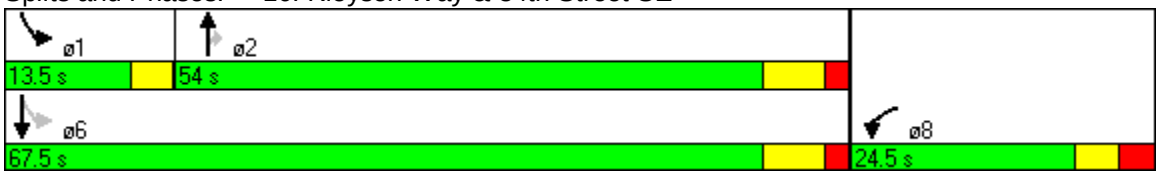
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97	0.99	
Frt	0.896			0.850		
Flt Protected	0.989				0.950	
Satd. Flow (prot)	1055	0	1450	1233	1615	1701
Flt Permitted	0.989				0.593	
Satd. Flow (perm)	1052	0	1450	1191	999	1701
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	33			34		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	289.1		935.1			276.5
Travel Time (s)	20.8		42.1			12.4
Volume (vph)	9	31	164	32	136	471
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	53%	53%	29%	29%	10%	10%
Adj. Flow (vph)	10	33	174	34	145	501
Lane Group Flow (vph)	43	0	174	34	145	501
Turn Type				Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases				2	6	
Detector Phases	8		2	2	1	6
Minimum Initial (s)	10.0		20.0	20.0	7.0	20.0
Minimum Split (s)	24.5		27.0	27.0	10.5	27.0
Total Split (s)	24.5	0.0	54.0	54.0	13.5	67.5
Total Split (%)	26.6%	0.0%	58.7%	58.7%	14.7%	73.4%
Maximum Green (s)	18.0		47.0	47.0	10.0	60.5
Yellow Time (s)	3.5		5.0	5.0	3.4	5.0
All-Red Time (s)	3.0		2.0	2.0	0.1	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	13.4		33.9	33.9	45.0	47.3
Actuated g/C Ratio	0.21		0.61	0.61	0.78	0.85
v/c Ratio	0.18		0.20	0.05	0.17	0.35
Control Delay	11.0		8.8	4.7	3.3	3.9

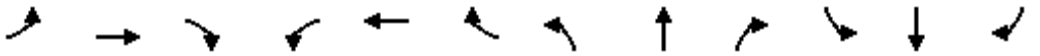
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	11.0		8.8	4.7	3.3	3.9
LOS	B		A	A	A	A
Approach Delay	11.0		8.1			3.8
Approach LOS	B		A			A
90th %ile Green (s)	10.0		20.0	20.0	9.6	33.1
90th %ile Term Code	Min		Min	Min	Gap	Hold
70th %ile Green (s)	10.0		20.0	20.0	8.3	31.8
70th %ile Term Code	Min		Min	Min	Gap	Hold
50th %ile Green (s)	0.0		20.0	20.0	7.0	30.5
50th %ile Term Code	Skip		Min	Min	Min	Hold
30th %ile Green (s)	0.0		21.1	21.1	7.0	31.6
30th %ile Term Code	Skip		Dwell	Dwell	Min	Dwell
10th %ile Green (s)	0.0		82.1	82.1	0.0	82.1
10th %ile Term Code	Skip		Dwell	Dwell	Skip	Dwell
Queue Length 50th (m)	0.4		3.6	0.0	0.0	0.0
Queue Length 95th (m)	7.3		23.2	4.0	10.1	37.9
Internal Link Dist (m)	265.1		911.1			252.5
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	335		1089	903	855	1535
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	0.13		0.16	0.04	0.17	0.33

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 55.4
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.35
Intersection Signal Delay: 5.1 Intersection LOS: A
Intersection Capacity Utilization 43.5% ICU Level of Service A
Analysis Period (min) 15
90th %ile Actuated Cycle: 56.6
70th %ile Actuated Cycle: 55.3
50th %ile Actuated Cycle: 37.5
30th %ile Actuated Cycle: 38.6
10th %ile Actuated Cycle: 89.1

Splits and Phases: 16: Kleysen Way & 84th Street SE





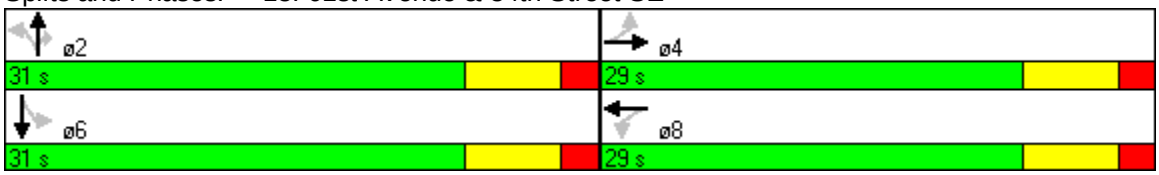
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	80.0		0.0	80.0		0.0	0.0		160.0	160.0		0.0
Storage Lanes	1		0	1		0	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2		15.2	15.2		15.2	15.2	15.2	15.2	15.2	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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	0.99	0.99		0.99	0.98			1.00	0.97	0.99	1.00	
Frt		0.965			0.903				0.850		0.986	
Flt Protected	0.950			0.950				0.993		0.950		
Satd. Flow (prot)	1448	1494	0	1448	1381	0	0	1548	1325	1448	1533	0
Flt Permitted	0.620			0.632				0.972		0.753		
Satd. Flow (perm)	939	1494	0	957	1381	0	0	1514	1286	1137	1533	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			131				27		12	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		155.5			815.5			180.8			935.1	
Travel Time (s)		11.2			58.7			8.1			42.1	
Volume (vph)	84	138	42	23	67	123	1	6	25	267	167	18
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	89	147	45	24	71	131	1	6	27	284	178	19
Lane Group Flow (vph)	89	192	0	24	202	0	0	7	27	284	197	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phases	4	4		8	8		2	2	2	6	6	
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		27.0	27.0	27.0	27.0	27.0	
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	31.0	31.0	31.0	31.0	31.0	0.0
Total Split (%)	48.3%	48.3%	0.0%	48.3%	48.3%	0.0%	51.7%	51.7%	51.7%	51.7%	51.7%	0.0%
Maximum Green (s)	22.0	22.0		22.0	22.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	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	Min	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	15.1	15.1		15.1	15.1			29.5	29.5	29.5	29.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29			0.61	0.61	0.61	0.61	
v/c Ratio	0.32	0.42		0.09	0.41			0.01	0.03	0.41	0.21	
Control Delay	16.0	13.7		12.3	7.8			6.4	3.4	9.9	6.9	

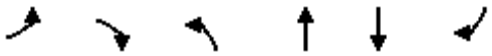
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	16.0	13.7		12.3	7.8			6.4	3.4	9.9	6.9	
LOS	B	B		B	A			A	A	A	A	
Approach Delay		14.4			8.3			4.0			8.7	
Approach LOS		B			A			A			A	
90th %ile Green (s)	16.2	16.2		16.2	16.2		24.0	24.0	24.0	24.0	24.0	
90th %ile Term Code	Gap	Gap		Hold	Hold		Hold	Hold	Hold	Max	Max	
70th %ile Green (s)	12.1	12.1		12.1	12.1		20.0	20.0	20.0	20.0	20.0	
70th %ile Term Code	Gap	Gap		Hold	Hold		Min	Min	Min	Min	Min	
50th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
50th %ile Term Code	Min	Min		Min	Min		Min	Min	Min	Min	Min	
30th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
30th %ile Term Code	Min	Min		Min	Min		Min	Min	Min	Min	Min	
10th %ile Green (s)	0.0	0.0		0.0	0.0		46.6	46.6	46.6	46.6	46.6	
10th %ile Term Code	Skip	Skip		Skip	Skip		Dwell	Dwell	Dwell	Dwell	Dwell	
Queue Length 50th (m)	5.2	9.5		1.3	4.0			0.3	0.0	12.0	6.7	
Queue Length 95th (m)	15.0	24.0		5.4	16.3			1.8	2.8	34.6	19.2	
Internal Link Dist (m)		131.5			791.5			156.8			911.1	
Turn Bay Length (m)	80.0			80.0					160.0	160.0		
Base Capacity (vph)	386	633		394	646			958	823	719	974	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.23	0.30		0.06	0.31			0.01	0.03	0.39	0.20	

Intersection Summary

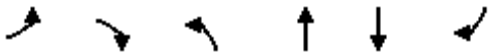
Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 48.4
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 10.0 Intersection LOS: B
Intersection Capacity Utilization 54.0% ICU Level of Service A
Analysis Period (min) 15
90th %ile Actuated Cycle: 54.2
70th %ile Actuated Cycle: 46.1
50th %ile Actuated Cycle: 44
30th %ile Actuated Cycle: 44
10th %ile Actuated Cycle: 53.6

Splits and Phases: 18: 61st Avenue & 84th Street SE





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	3.7	3.7	3.7	3.7	3.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Turning Speed (k/h)	24	14	24			14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97				0.99	
Frt	0.924				0.964	
Flt Protected	0.979			0.967		
Satd. Flow (prot)	1549	0	0	1507	1488	0
Flt Permitted	0.979			0.321		
Satd. Flow (perm)	1538	0	0	500	1488	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	56				53	
Headway Factor	0.85	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50			50	50	
Link Distance (m)	1635.7			470.4	335.4	
Travel Time (s)	117.8			33.9	24.1	
Volume (vph)	44	57	267	120	554	203
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	47	61	284	128	589	216
Lane Group Flow (vph)	108	0	0	412	805	0
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phases	4		2	2	6	
Minimum Initial (s)	10.0		20.0	20.0	20.0	
Minimum Split (s)	21.0		26.5	26.5	26.5	
Total Split (s)	21.0	0.0	79.0	79.0	79.0	0.0
Total Split (%)	21.0%	0.0%	79.0%	79.0%	79.0%	0.0%
Maximum Green (s)	16.0		72.5	72.5	72.5	
Yellow Time (s)	3.5		5.0	5.0	5.0	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	5.0		5.0	5.0	5.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	12.2			84.6	84.6	
Actuated g/C Ratio	0.12			0.83	0.83	
v/c Ratio	0.47			0.99	0.64	
Control Delay	26.8			56.3	6.9	
Queue Delay	0.0			0.0	0.0	
Total Delay	26.8			56.3	6.9	

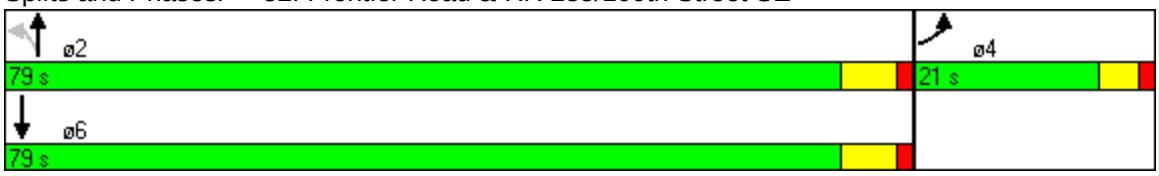


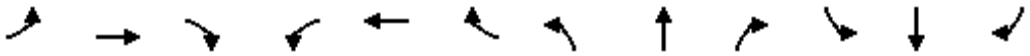
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	C			E	A	
Approach Delay	26.8			56.3	6.9	
Approach LOS	C			E	A	
90th %ile Green (s)	13.9		72.5	72.5	72.5	
90th %ile Term Code	Gap		Max	Max	Hold	
70th %ile Green (s)	10.7		72.5	72.5	72.5	
70th %ile Term Code	Gap		Max	Max	Hold	
50th %ile Green (s)	10.0		72.5	72.5	72.5	
50th %ile Term Code	Min		Max	Max	Hold	
30th %ile Green (s)	10.0		79.5	79.5	79.5	
30th %ile Term Code	Min		Dwell	Dwell	Dwell	
10th %ile Green (s)	0.0		113.5	113.5	113.5	
10th %ile Term Code	Skip		Dwell	Dwell	Dwell	
Queue Length 50th (m)	8.8			~80.8	43.7	
Queue Length 95th (m)	24.3			#69.8	94.9	
Internal Link Dist (m)	1611.7			446.4	311.4	
Turn Bay Length (m)						
Base Capacity (vph)	292			417	1249	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.37			0.99	0.64	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 101.5			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 23.9		Intersection LOS: C	
Intersection Capacity Utilization 83.5%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 97.9			
70th %ile Actuated Cycle: 94.7			
50th %ile Actuated Cycle: 94			
30th %ile Actuated Cycle: 101			
10th %ile Actuated Cycle: 120			

~ 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: 52: Frontier Road & RR 285/100th Street SE

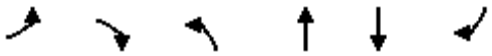




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	0	0	195	0	1	607	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	0	1	0	0	0	207	0	1	646	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)								277				
pX, platoon unblocked												
vC, conflicting volume	855	855	646	855	855	207	646			207		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	855	855	646	855	855	207	646			207		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	259	276	441	259	276	790	859			1263		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	1	207	647
Volume Left	0	1	0	1
Volume Right	0	0	0	0
cSH	1700	259	859	1263
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.1	0.0	0.0
Control Delay (s)	0.0	19.0	0.0	0.0
Lane LOS	A	C		A
Approach Delay (s)	0.0	19.0	0.0	0.0
Approach LOS	A	C		

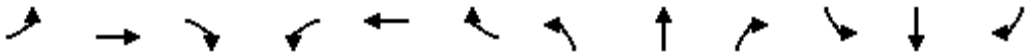
Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	43.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	561	112	52	195	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	597	119	55	207	11
Pedestrians	5			10	10	
Lane Width (m)	4.8			4.8	4.8	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)				335		
pX, platoon unblocked						
vC, conflicting volume	521	228	223			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	521	228	223			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	98	21	90			
cM capacity (veh/h)	431	756	1239			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	607	174	218
Volume Left	11	119	0
Volume Right	597	0	11
cSH	746	1239	1700
Volume to Capacity	0.81	0.10	0.13
Queue Length 95th (m)	66.4	2.4	0.0
Control Delay (s)	27.3	5.9	0.0
Lane LOS	D	A	
Approach Delay (s)	27.3	5.9	0.0
Approach LOS	D		

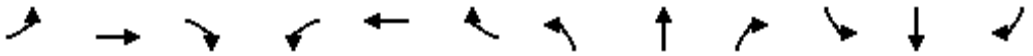
Intersection Summary			
Average Delay	17.6		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	1	106	10	90	0	297	17	19	591	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	1	113	11	96	0	316	18	20	629	0
Pedestrians		5			5			5			5	
Lane Width (m)		4.8			4.8			4.8			4.8	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1105	1013	639	1005	1004	335	634			339		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1105	1013	639	1005	1004	335	634			339		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	43	95	85	100			98		
cM capacity (veh/h)	138	216	440	197	219	660	864			1120		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1	219	334	649
Volume Left	0	113	0	20
Volume Right	1	96	18	0
cSH	440	286	864	1120
Volume to Capacity	0.00	0.77	0.00	0.02
Queue Length 95th (m)	0.1	44.2	0.0	0.4
Control Delay (s)	13.2	49.4	0.0	0.5
Lane LOS	B	E		A
Approach Delay (s)	13.2	49.4	0.0	0.5
Approach LOS	B	E		

Intersection Summary			
Average Delay	9.3		
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		



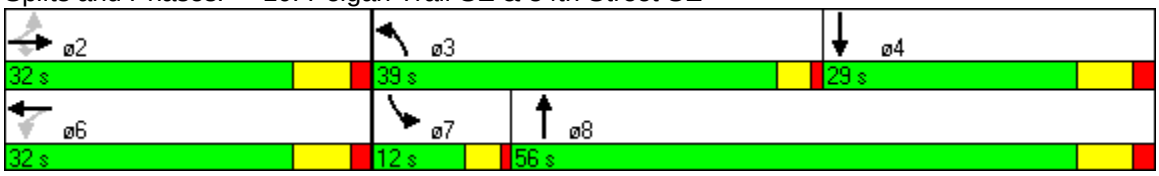
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	4.8	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	0.0		120.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	2		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2		15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.96		1.00		0.99	1.00		0.99	1.00	
Frt			0.850		0.986			0.994			0.980	
Flt Protected		0.996			0.999		0.950			0.950		
Satd. Flow (prot)	0	2950	1325	0	2908	0	2810	1547	0	1448	1523	0
Flt Permitted		0.905			0.948		0.950			0.950		
Satd. Flow (perm)	0	2679	1278	0	2759	0	2771	1547	0	1433	1523	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214		11			3			7	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.85	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		70			70			80			80	
Link Distance (m)		196.4			1636.6			325.0			127.1	
Travel Time (s)		10.1			84.2			14.6			5.7	
Volume (vph)	10	134	203	10	459	48	820	262	10	16	69	10
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	141	214	11	483	51	863	276	11	17	73	11
Lane Group Flow (vph)	0	152	214	0	545	0	863	287	0	17	84	0
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2		2	6								
Detector Phases	2	2	2	6	6		3	8		7	4	
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		12.0	29.0		12.0	29.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0	0.0	39.0	56.0	0.0	12.0	29.0	0.0
Total Split (%)	32.0%	32.0%	32.0%	32.0%	32.0%	0.0%	39.0%	56.0%	0.0%	12.0%	29.0%	0.0%
Maximum Green (s)	25.0	25.0	25.0	25.0	25.0		35.0	49.0		8.0	22.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lead/Lag							Lead	Lag		Lead	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	
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min		None	None		None	None	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)		43.7	43.7		43.7		33.4	43.6		6.5	14.3	
Actuated g/C Ratio		0.44	0.44		0.44		0.33	0.44		0.06	0.14	
v/c Ratio		0.13	0.32		0.45		0.92	0.42		0.18	0.38	
Control Delay		19.9	4.5		23.0		47.9	21.1		48.1	40.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		19.9	4.5		23.0		47.9	21.1		48.1	40.1	
LOS		B	A		C		D	C		D	D	
Approach Delay		10.9			23.0			41.2			41.5	
Approach LOS		B			C			D			D	
90th %ile Green (s)	32.5	32.5	32.5	32.5	32.5		35.0	41.5		8.0	14.5	
90th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Max	Gap	
70th %ile Green (s)	35.1	35.1	35.1	35.1	35.1		35.0	39.5		7.4	11.9	
70th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Gap	Gap	
50th %ile Green (s)	36.0	36.0	36.0	36.0	36.0		35.9	50.0		0.0	10.1	
50th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Skip	Min	
30th %ile Green (s)	38.8	38.8	38.8	38.8	38.8		33.2	47.2		0.0	10.0	
30th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Skip	Min	
10th %ile Green (s)	61.3	61.3	61.3	61.3	61.3		27.7	24.7		0.0	0.0	
10th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Skip	Skip	
Queue Length 50th (m)		9.8	0.0		40.5		78.8	30.1		3.2	13.9	
Queue Length 95th (m)		17.6	14.6		59.6		#114.1	57.7		9.8	26.9	
Internal Link Dist (m)		172.4			1612.6			301.0			103.1	
Turn Bay Length (m)			120.0				120.0					
Base Capacity (vph)		1172	679		1213		989	809		116	386	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.13	0.32		0.45		0.87	0.35		0.15	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 31.5 Intersection LOS: C
Intersection Capacity Utilization 59.4% 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: 10: Peigan Trail SE & 84th Street SE



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	4.8	3.7	3.7	3.5	3.7
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97		
Frt	0.889			0.850		
Flt Protected	0.991				0.950	
Satd. Flow (prot)	1717	0	1716	1459	1402	1509
Flt Permitted	0.991				0.164	
Satd. Flow (perm)	1714	0	1716	1416	242	1509
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	153			21		
Headway Factor	0.85	0.85	0.99	0.99	1.01	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	1635.7		473.5			325.0
Travel Time (s)	117.8		21.3			14.6
Volume (vph)	72	335	758	20	84	189
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	9%	9%	24%	24%
Adj. Flow (vph)	76	353	798	21	88	199
Lane Group Flow (vph)	429	0	798	21	88	199
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Detector Phases	8		2	2	6	6
Minimum Initial (s)	10.0		20.0	20.0	20.0	20.0
Minimum Split (s)	23.5		27.5	27.5	27.5	27.5
Total Split (s)	23.5	0.0	36.5	36.5	36.5	36.5
Total Split (%)	39.2%	0.0%	60.8%	60.8%	60.8%	60.8%
Maximum Green (s)	18.0		30.0	30.0	30.0	30.0
Yellow Time (s)	3.5		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		1.5	1.5	1.5	1.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	15.6		29.3	29.3	29.3	29.3
Actuated g/C Ratio	0.29		0.55	0.55	0.55	0.55
v/c Ratio	0.70		0.84	0.03	0.66	0.24

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	17.8		21.6	3.4	39.5	7.6
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	17.8		21.6	3.4	39.5	7.6
LOS	B		C	A	D	A
Approach Delay	17.8		21.2			17.4
Approach LOS	B		C			B
90th %ile Green (s)	18.0		30.0	30.0	30.0	30.0
90th %ile Term Code	Max		Max	Max	Max	Max
70th %ile Green (s)	18.0		30.0	30.0	30.0	30.0
70th %ile Term Code	Max		Max	Max	Max	Max
50th %ile Green (s)	15.0		30.0	30.0	30.0	30.0
50th %ile Term Code	Gap		Max	Max	Hold	Hold
30th %ile Green (s)	10.5		24.0	24.0	24.0	24.0
30th %ile Term Code	Gap		Gap	Gap	Hold	Hold
10th %ile Green (s)	10.0		20.0	20.0	20.0	20.0
10th %ile Term Code	Min		Min	Min	Min	Min
Queue Length 50th (m)	24.2		58.4	0.0	5.4	9.0
Queue Length 95th (m)	50.9		#136.6	2.4	#28.8	20.1
Internal Link Dist (m)	1611.7		449.5			301.0
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	693		995	830	140	874
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	0.62		0.80	0.03	0.63	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 53.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 93.4%		ICU Level of Service F	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 60			
70th %ile Actuated Cycle: 60			
50th %ile Actuated Cycle: 57			
30th %ile Actuated Cycle: 46.5			
10th %ile Actuated Cycle: 42			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

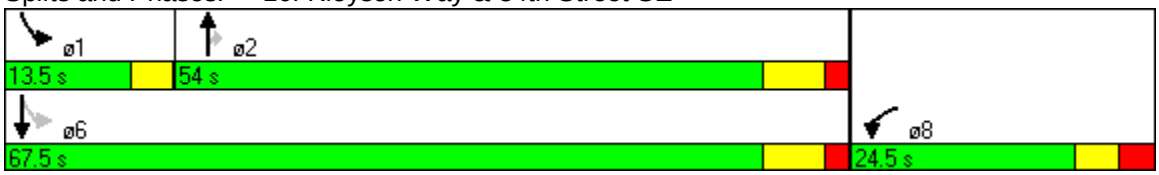
Splits and Phases: 12: Frontier Road & 84th Street SE

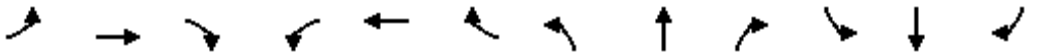
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97		
Frt	0.891			0.850		
Flt Protected	0.991				0.950	
Satd. Flow (prot)	1487	0	1685	1432	1422	1496
Flt Permitted	0.991				0.213	
Satd. Flow (perm)	1483	0	1685	1384	319	1496
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	133			14		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	289.1		935.1			276.5
Travel Time (s)	20.8		42.1			12.4
Volume (vph)	29	126	648	13	24	229
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	8%	11%	11%	25%	25%
Adj. Flow (vph)	31	133	682	14	25	241
Lane Group Flow (vph)	164	0	682	14	25	241
Turn Type				Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases				2	6	
Detector Phases	8		2	2	1	6
Minimum Initial (s)	10.0		20.0	20.0	6.5	20.0
Minimum Split (s)	24.5		27.0	27.0	10.5	27.0
Total Split (s)	24.5	0.0	54.0	54.0	13.5	67.5
Total Split (%)	26.6%	0.0%	58.7%	58.7%	14.7%	73.4%
Maximum Green (s)	18.0		47.0	47.0	10.0	60.5
Yellow Time (s)	3.5		5.0	5.0	3.4	5.0
All-Red Time (s)	3.0		2.0	2.0	0.1	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	14.2		41.7	41.7	44.1	45.0
Actuated g/C Ratio	0.21		0.65	0.65	0.63	0.70
v/c Ratio	0.39		0.62	0.02	0.08	0.23
Control Delay	10.9		12.2	3.7	5.0	4.7

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	10.9		12.2	3.7	5.0	4.7
LOS	B		B	A	A	A
Approach Delay	10.9		12.0			4.8
Approach LOS	B		B			A
90th %ile Green (s)	13.8		47.0	47.0	6.7	57.2
90th %ile Term Code	Gap		Max	Max	Gap	Hold
70th %ile Green (s)	10.0		37.5	37.5	6.5	47.5
70th %ile Term Code	Min		Gap	Gap	Min	Hold
50th %ile Green (s)	10.0		24.1	24.1	0.0	24.1
50th %ile Term Code	Min		Gap	Gap	Skip	Hold
30th %ile Green (s)	10.0		20.0	20.0	0.0	20.0
30th %ile Term Code	Min		Min	Min	Skip	Min
10th %ile Green (s)	0.0		66.0	66.0	0.0	66.0
10th %ile Term Code	Skip		Dwell	Dwell	Skip	Dwell
Queue Length 50th (m)	2.0		35.2	0.0	0.8	8.8
Queue Length 95th (m)	20.3		107.2	2.2	2.9	18.8
Internal Link Dist (m)	265.1		911.1			252.5
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	530		1224	1009	339	1194
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	0.31		0.56	0.01	0.07	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 92			
Actuated Cycle Length: 63.9			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 10.2		Intersection LOS: B	
Intersection Capacity Utilization 52.3%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 84.5			
70th %ile Actuated Cycle: 71			
50th %ile Actuated Cycle: 47.6			
30th %ile Actuated Cycle: 43.5			
10th %ile Actuated Cycle: 73			

Splits and Phases: 16: Kleysen Way & 84th Street SE





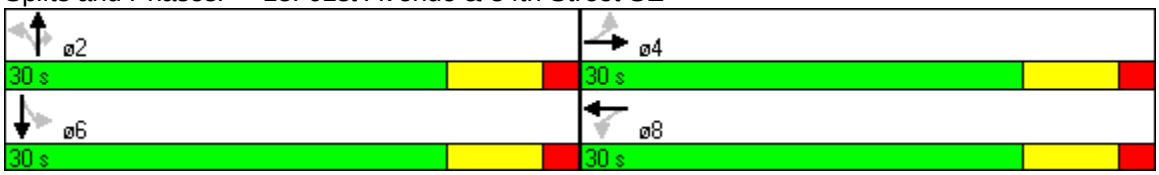
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	80.0		0.0	80.0		0.0	0.0		160.0	160.0		0.0
Storage Lanes	1		0	1		0	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2		15.2	15.2		15.2	15.2	15.2	15.2	15.2	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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	1.00	1.00		0.99	0.98			1.00	0.97	0.99	0.97	
Frt		0.995			0.903				0.850		0.870	
Flt Protected	0.950			0.950				0.990		0.950		
Satd. Flow (prot)	1448	1550	0	1448	1381	0	0	1543	1325	1448	1322	0
Flt Permitted	0.364			0.695				0.925		0.497		
Satd. Flow (perm)	553	1550	0	1051	1381	0	0	1440	1286	754	1322	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			194				49		85	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		155.5			288.9			180.8			935.1	
Travel Time (s)		11.2			20.8			8.1			42.1	
Volume (vph)	20	88	3	45	150	275	60	241	47	158	12	81
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	93	3	47	158	289	63	254	49	166	13	85
Lane Group Flow (vph)	21	96	0	47	447	0	0	317	49	166	98	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phases	4	4		8	8		2	2	2	6	6	
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		27.0	27.0	27.0	27.0	27.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	50.0%	50.0%	0.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	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	Min	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	18.8	18.8		18.8	18.8			24.1	24.1	24.1	24.1	
Actuated g/C Ratio	0.37	0.37		0.37	0.37			0.47	0.47	0.47	0.47	
v/c Ratio	0.10	0.17		0.12	0.71			0.47	0.08	0.47	0.15	
Control Delay	11.5	10.9		11.0	14.2			13.4	4.0	16.6	4.2	

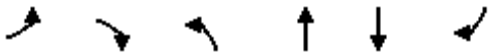
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	11.5	10.9		11.0	14.2			13.4	4.0	16.6	4.2	
LOS	B	B		B	B			B	A	B	A	
Approach Delay		11.0			13.9			12.2			12.0	
Approach LOS		B			B			B			B	
90th %ile Green (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	
90th %ile Term Code	Hold	Hold		Max	Max		Max	Max	Max	Max	Max	
70th %ile Green (s)	21.8	21.8		21.8	21.8		21.3	21.3	21.3	21.3	21.3	
70th %ile Term Code	Hold	Hold		Gap	Gap		Hold	Hold	Hold	Gap	Gap	
50th %ile Green (s)	15.3	15.3		15.3	15.3		20.0	20.0	20.0	20.0	20.0	
50th %ile Term Code	Hold	Hold		Gap	Gap		Min	Min	Min	Min	Min	
30th %ile Green (s)	10.9	10.9		10.9	10.9		20.0	20.0	20.0	20.0	20.0	
30th %ile Term Code	Hold	Hold		Gap	Gap		Min	Min	Min	Min	Min	
10th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
10th %ile Term Code	Hold	Hold		Min	Min		Min	Min	Min	Min	Min	
Queue Length 50th (m)	1.2	5.2		2.6	16.4			17.4	0.0	9.1	0.6	
Queue Length 95th (m)	4.8	13.3		8.1	45.3			43.9	4.7	29.0	7.6	
Internal Link Dist (m)		131.5			264.9			156.8			911.1	
Turn Bay Length (m)	80.0			80.0					160.0	160.0		
Base Capacity (vph)	249	699		472	727			711	660	372	696	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.08	0.14		0.10	0.61			0.45	0.07	0.45	0.14	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 51.1
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 12.7 Intersection LOS: B
Intersection Capacity Utilization 69.1% ICU Level of Service C
Analysis Period (min) 15
90th %ile Actuated Cycle: 60
70th %ile Actuated Cycle: 57.1
50th %ile Actuated Cycle: 49.3
30th %ile Actuated Cycle: 44.9
10th %ile Actuated Cycle: 44

Splits and Phases: 18: 61st Avenue & 84th Street SE





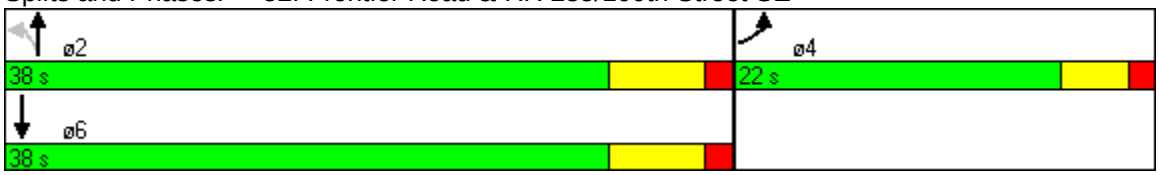
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	3.7	3.7	3.7	3.7	3.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Turning Speed (k/h)	24	14	24			14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98			1.00	0.99	
Frt	0.926				0.964	
Flt Protected	0.978			0.995		
Satd. Flow (prot)	1557	0	0	1551	1491	0
Flt Permitted	0.978			0.953		
Satd. Flow (perm)	1550	0	0	1485	1491	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	104				50	
Headway Factor	0.85	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50			50	50	
Link Distance (m)	1635.7			470.4	335.4	
Travel Time (s)	117.8			33.9	24.1	
Volume (vph)	201	243	63	608	147	53
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	212	256	66	640	155	56
Lane Group Flow (vph)	468	0	0	706	211	0
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phases	4		2	2	6	
Minimum Initial (s)	10.0		20.0	20.0	20.0	
Minimum Split (s)	21.0		26.5	26.5	26.5	
Total Split (s)	22.0	0.0	38.0	38.0	38.0	0.0
Total Split (%)	36.7%	0.0%	63.3%	63.3%	63.3%	0.0%
Maximum Green (s)	17.0		31.5	31.5	31.5	
Yellow Time (s)	3.5		5.0	5.0	5.0	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	5.0		5.0	5.0	5.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	16.6			31.0	31.0	
Actuated g/C Ratio	0.30			0.56	0.56	
v/c Ratio	0.87			0.85	0.25	
Control Delay	35.2			23.8	5.9	
Queue Delay	0.0			0.0	0.0	
Total Delay	35.2			23.8	5.9	

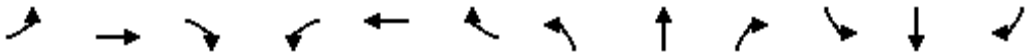
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D			C	A	
Approach Delay	35.2			23.8	5.9	
Approach LOS	D			C	A	
90th %ile Green (s)	17.0		31.5	31.5	31.5	
90th %ile Term Code	Max		Max	Max	Hold	
70th %ile Green (s)	17.0		31.5	31.5	31.5	
70th %ile Term Code	Max		Max	Max	Hold	
50th %ile Green (s)	17.0		31.5	31.5	31.5	
50th %ile Term Code	Max		Max	Max	Hold	
30th %ile Green (s)	17.0		28.4	28.4	28.4	
30th %ile Term Code	Max		Gap	Gap	Hold	
10th %ile Green (s)	10.5		20.0	20.0	20.0	
10th %ile Term Code	Gap		Min	Min	Min	
Queue Length 50th (m)	37.7			56.9	7.6	
Queue Length 95th (m)	#86.6			#123.1	16.3	
Internal Link Dist (m)	1611.7			446.4	311.4	
Turn Bay Length (m)						
Base Capacity (vph)	565			862	887	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.83			0.82	0.24	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 55.8
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 24.9 Intersection LOS: C
Intersection Capacity Utilization 90.2% ICU Level of Service E
Analysis Period (min) 15
90th %ile Actuated Cycle: 60
70th %ile Actuated Cycle: 60
50th %ile Actuated Cycle: 60
30th %ile Actuated Cycle: 56.9
10th %ile Actuated Cycle: 42
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 52: Frontier Road & RR 285/100th Street SE

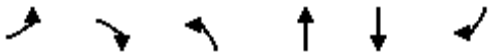




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	0	0	773	4	0	253	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	0	0	814	4	0	266	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)								277				
pX, platoon unblocked	0.72	0.72		0.72	0.72	0.72				0.72		
vC, conflicting volume	1082	1084	266	1082	1082	816	266			818		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1114	1117	266	1114	1114	745	266			748		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	124	139	731	124	140	279	1200			567		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	818	266
Volume Left	0	0	0	0
Volume Right	0	0	4	0
cSH	1700	1700	1200	567
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

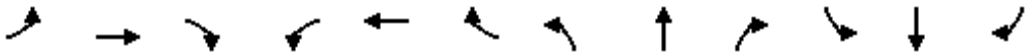
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	149	507	301	51	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	157	534	317	54	11
Pedestrians	5			10	10	
Lane Width (m)	4.8			4.8	4.8	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)				335		
pX, platoon unblocked	0.74					
vC, conflicting volume	1458	74	69			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1615	74	69			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	78	83	62			
cM capacity (veh/h)	47	924	1417			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	167	851	64
Volume Left	11	534	0
Volume Right	157	0	11
cSH	426	1417	1700
Volume to Capacity	0.39	0.38	0.04
Queue Length 95th (m)	14.0	13.6	0.0
Control Delay (s)	18.8	7.3	0.0
Lane LOS	C	A	
Approach Delay (s)	18.8	7.3	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		



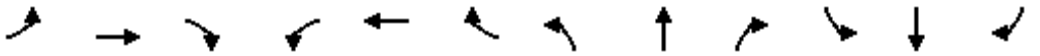
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	7	9	1	20	1	23	0	641	84	82	307	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	9	1	21	1	24	0	675	88	86	323	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1239	1259	323	1221	1215	719	323			763		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1239	1259	323	1221	1215	719	323			763		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	94	93	100	83	99	94	100			89		
cM capacity (veh/h)	119	140	678	125	149	400	1142			774		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	18	46	763	409
Volume Left	7	21	0	86
Volume Right	1	24	88	0
cSH	137	196	1142	774
Volume to Capacity	0.13	0.24	0.00	0.11
Queue Length 95th (m)	3.3	6.7	0.0	2.8
Control Delay (s)	35.3	28.9	0.0	3.3
Lane LOS	E	D		A
Approach Delay (s)	35.3	28.9	0.0	3.3
Approach LOS	E	D		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

Appendix E

Synchro Output for Sensitivity Analysis



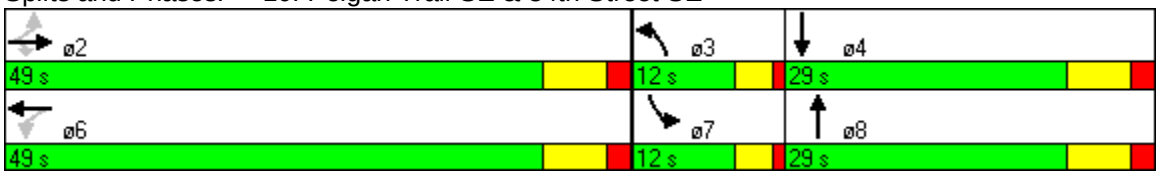
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	4.8	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	0.0		120.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	2		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2		15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.97		1.00		0.99	0.99		0.99	1.00	
Frt			0.850		0.987			0.976			0.993	
Flt Protected		0.999			0.996		0.950			0.950		
Satd. Flow (prot)	0	2959	1325	0	2903	0	2810	1513	0	1448	1546	0
Flt Permitted		0.950			0.909		0.950			0.950		
Satd. Flow (perm)	0	2813	1280	0	2648	0	2781	1513	0	1430	1546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			565		11			11			3	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.85	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		70			70			80			80	
Link Distance (m)		196.4			1636.6			325.0			127.1	
Travel Time (s)		10.1			84.2			14.6			5.7	
Volume (vph)	10	504	718	10	102	10	151	54	10	57	206	10
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	536	764	11	109	11	161	57	11	61	219	11
Lane Group Flow (vph)	0	547	764	0	131	0	161	68	0	61	230	0
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2		2	6								
Detector Phases	2	2	2	6	6		3	8		7	4	
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		12.0	29.0		12.0	29.0	
Total Split (s)	49.0	49.0	49.0	49.0	49.0	0.0	12.0	29.0	0.0	12.0	29.0	0.0
Total Split (%)	54.4%	54.4%	54.4%	54.4%	54.4%	0.0%	13.3%	32.2%	0.0%	13.3%	32.2%	0.0%
Maximum Green (s)	42.0	42.0	42.0	42.0	42.0		8.0	22.0		8.0	22.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lead/Lag							Lead	Lag		Lead	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	
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min		None	None		None	None	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)		48.9	48.9		48.9		8.7	23.3		7.6	20.4	
Actuated g/C Ratio		0.54	0.54		0.54		0.10	0.26		0.08	0.23	
v/c Ratio		0.36	0.80		0.09		0.60	0.17		0.50	0.65	
Control Delay		13.2	12.6		10.2		49.0	23.5		53.3	39.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		13.2	12.6		10.2		49.0	23.5		53.3	39.6	
LOS		B	B		B		D	C		D	D	
Approach Delay		12.9			10.2			41.4			42.5	
Approach LOS		B			B			D			D	
90th %ile Green (s)	42.0	42.0	42.0	42.0	42.0		8.0	22.0		8.0	22.0	
90th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Max	Max	
70th %ile Green (s)	43.1	43.1	43.1	43.1	43.1		8.0	20.9		8.0	20.9	
70th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Max	Gap	
50th %ile Green (s)	43.3	43.3	43.3	43.3	43.3		10.7	19.5		9.2	18.0	
50th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Gap	Gap	
30th %ile Green (s)	47.6	47.6	47.6	47.6	47.6		9.3	16.9		7.5	15.1	
30th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Gap	Gap	
10th %ile Green (s)	53.7	53.7	53.7	53.7	53.7		7.3	22.3		0.0	11.0	
10th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Gap	Hold		Skip	Gap	
Queue Length 50th (m)		28.4	21.8		5.2		13.6	7.7		10.1	35.5	
Queue Length 95th (m)		41.2	#123.0		10.1		#26.0	17.4		22.5	55.6	
Internal Link Dist (m)		172.4			1612.6			301.0			103.1	
Turn Bay Length (m)			120.0				120.0					
Base Capacity (vph)		1530	954		1445		275	429		133	432	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.36	0.80		0.09		0.59	0.16		0.46	0.53	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 20.4 Intersection LOS: C
Intersection Capacity Utilization 84.9% 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.

Splits and Phases: 10: Peigan Trail SE & 84th Street SE



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	4.8	3.7	3.7	3.5	3.7
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98			0.97	0.99	
Frt	0.913			0.850		
Flt Protected	0.983				0.950	
Satd. Flow (prot)	1758	0	1406	1195	1594	1716
Flt Permitted	0.983				0.675	
Satd. Flow (perm)	1752	0	1406	1161	1124	1716
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	97			124		
Headway Factor	0.85	0.85	0.99	0.99	1.01	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	1635.7		473.5			325.0
Travel Time (s)	117.8		21.3			14.6
Volume (vph)	50	91	120	117	353	591
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	33%	33%	9%	9%
Adj. Flow (vph)	53	97	128	124	376	629
Lane Group Flow (vph)	150	0	128	124	376	629
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Detector Phases	8		2	2	6	6
Minimum Initial (s)	10.0		20.0	20.0	20.0	20.0
Minimum Split (s)	23.5		27.5	27.5	27.5	27.5
Total Split (s)	23.5	0.0	36.5	36.5	36.5	36.5
Total Split (%)	39.2%	0.0%	60.8%	60.8%	60.8%	60.8%
Maximum Green (s)	18.0		30.0	30.0	30.0	30.0
Yellow Time (s)	3.5		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		1.5	1.5	1.5	1.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	13.2		37.4	37.4	37.4	37.4
Actuated g/C Ratio	0.22		0.66	0.66	0.66	0.66
v/c Ratio	0.32		0.14	0.15	0.51	0.55

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	8.8		4.7	1.5	8.7	8.2
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	8.8		4.7	1.5	8.7	8.2
LOS	A		A	A	A	A
Approach Delay	8.8		3.1			8.4
Approach LOS	A		A			A
90th %ile Green (s)	11.0		30.0	30.0	30.0	30.0
90th %ile Term Code	Gap		Hold	Hold	Max	Max
70th %ile Green (s)	10.0		27.1	27.1	27.1	27.1
70th %ile Term Code	Min		Hold	Hold	Gap	Gap
50th %ile Green (s)	10.0		21.6	21.6	21.6	21.6
50th %ile Term Code	Min		Hold	Hold	Gap	Gap
30th %ile Green (s)	10.0		20.6	20.6	20.6	20.6
30th %ile Term Code	Min		Dwell	Dwell	Dwell	Dwell
10th %ile Green (s)	0.0		87.6	87.6	87.6	87.6
10th %ile Term Code	Skip		Dwell	Dwell	Dwell	Dwell
Queue Length 50th (m)	3.0		4.0	0.0	16.2	28.4
Queue Length 95th (m)	15.3		9.4	4.3	36.1	54.4
Internal Link Dist (m)	1611.7		449.5			301.0
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	627		981	847	784	1197
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		0.13	0.15	0.48	0.53

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 56.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 7.5		Intersection LOS: A	
Intersection Capacity Utilization 48.2%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 53			
70th %ile Actuated Cycle: 49.1			
50th %ile Actuated Cycle: 43.6			
30th %ile Actuated Cycle: 42.6			
10th %ile Actuated Cycle: 94.1			

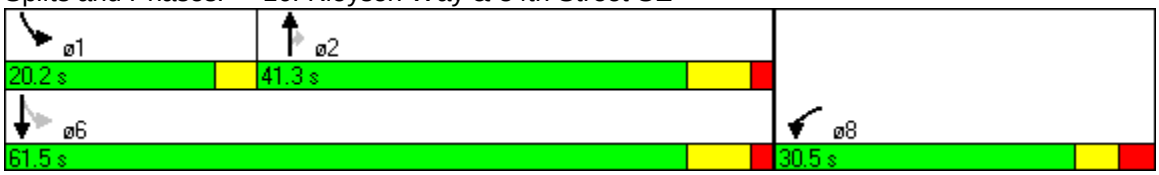
Splits and Phases: 12: Frontier Road & 84th Street SE

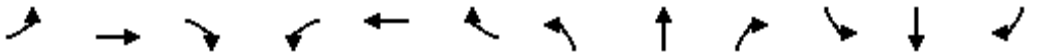
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97	0.99	
Frt	0.896			0.850		
Flt Protected	0.989				0.950	
Satd. Flow (prot)	1055	0	1450	1233	1615	1701
Flt Permitted	0.989				0.522	
Satd. Flow (perm)	1052	0	1450	1191	880	1701
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	33			34		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	289.1		935.1			276.5
Travel Time (s)	20.8		42.1			12.4
Volume (vph)	9	31	193	32	136	500
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	53%	53%	29%	29%	10%	10%
Adj. Flow (vph)	10	33	205	34	145	532
Lane Group Flow (vph)	43	0	205	34	145	532
Turn Type				Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases				2	6	
Detector Phases	8		2	2	1	6
Minimum Initial (s)	10.0		20.0	20.0	7.0	20.0
Minimum Split (s)	24.5		27.0	27.0	10.5	27.0
Total Split (s)	30.5	0.0	41.3	41.3	20.2	61.5
Total Split (%)	33.2%	0.0%	44.9%	44.9%	22.0%	66.8%
Maximum Green (s)	24.0		34.3	34.3	16.7	54.5
Yellow Time (s)	3.5		5.0	5.0	3.4	5.0
All-Red Time (s)	3.0		2.0	2.0	0.1	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	13.4		33.9	33.9	45.0	47.3
Actuated g/C Ratio	0.21		0.61	0.61	0.78	0.85
v/c Ratio	0.18		0.23	0.05	0.18	0.37
Control Delay	10.9		9.0	4.7	3.4	4.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	10.9		9.0	4.7	3.4	4.1
LOS	B		A	A	A	A
Approach Delay	10.9		8.4			3.9
Approach LOS	B		A			A
90th %ile Green (s)	10.0		20.0	20.0	9.5	33.0
90th %ile Term Code	Min		Min	Min	Gap	Hold
70th %ile Green (s)	10.0		20.0	20.0	8.3	31.8
70th %ile Term Code	Min		Min	Min	Gap	Hold
50th %ile Green (s)	0.0		20.0	20.0	7.0	30.5
50th %ile Term Code	Skip		Min	Min	Min	Hold
30th %ile Green (s)	0.0		21.1	21.1	7.0	31.6
30th %ile Term Code	Skip		Dwell	Dwell	Min	Dwell
10th %ile Green (s)	0.0		82.1	82.1	0.0	82.1
10th %ile Term Code	Skip		Dwell	Dwell	Skip	Dwell
Queue Length 50th (m)	0.4		4.3	0.0	0.0	0.0
Queue Length 95th (m)	7.2		27.3	4.1	10.1	41.4
Internal Link Dist (m)	265.1		911.1			252.5
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	391		1016	845	780	1522
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	0.11		0.20	0.04	0.19	0.35

Intersection Summary			
Area Type:	Other		
Cycle Length: 92			
Actuated Cycle Length: 55.4			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 5.3		Intersection LOS: A	
Intersection Capacity Utilization 43.5%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 56.5			
70th %ile Actuated Cycle: 55.3			
50th %ile Actuated Cycle: 37.5			
30th %ile Actuated Cycle: 38.6			
10th %ile Actuated Cycle: 89.1			

Splits and Phases: 16: Kleysen Way & 84th Street SE





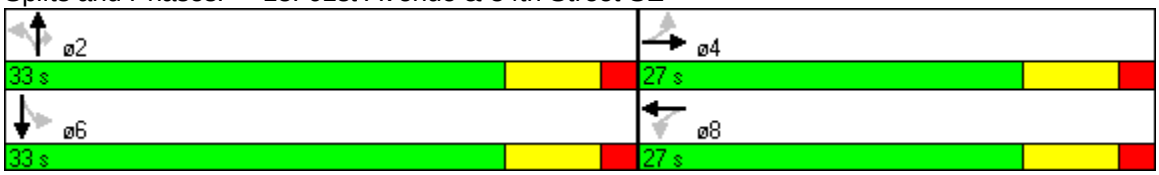
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	80.0		0.0	80.0		0.0	0.0		160.0	160.0		0.0
Storage Lanes	1		0	1		0	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2		15.2	15.2		15.2	15.2	15.2	15.2	15.2	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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	0.99	0.99		0.99	0.98			1.00	0.97	0.99	1.00	
Frt		0.965			0.897				0.850		0.982	
Flt Protected	0.950			0.950				0.993		0.950		
Satd. Flow (prot)	1448	1494	0	1448	1370	0	0	1548	1325	1448	1525	0
Flt Permitted	0.581			0.625				0.973		0.753		
Satd. Flow (perm)	880	1494	0	946	1370	0	0	1515	1286	1137	1525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			156				41		16	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		155.5			815.5			180.8			935.1	
Travel Time (s)		11.2			58.7			8.1			42.1	
Volume (vph)	89	138	42	23	67	147	1	6	39	291	167	23
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	95	147	45	24	71	156	1	6	41	310	178	24
Lane Group Flow (vph)	95	192	0	24	227	0	0	7	41	310	202	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phases	4	4		8	8		2	2	2	6	6	
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		27.0	27.0	27.0	27.0	27.0	
Total Split (s)	27.0	27.0	0.0	27.0	27.0	0.0	33.0	33.0	33.0	33.0	33.0	0.0
Total Split (%)	45.0%	45.0%	0.0%	45.0%	45.0%	0.0%	55.0%	55.0%	55.0%	55.0%	55.0%	0.0%
Maximum Green (s)	20.0	20.0		20.0	20.0		26.0	26.0	26.0	26.0	26.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	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	Min	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	15.0	15.0		15.0	15.0			28.8	28.8	28.8	28.8	
Actuated g/C Ratio	0.30	0.30		0.30	0.30			0.61	0.61	0.61	0.61	
v/c Ratio	0.36	0.41		0.09	0.44			0.01	0.05	0.45	0.22	
Control Delay	17.4	13.9		12.7	7.8			6.6	3.0	10.7	7.0	

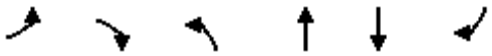
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	17.4	13.9		12.7	7.8			6.6	3.0	10.7	7.0	
LOS	B	B		B	A			A	A	B	A	
Approach Delay		15.0			8.3			3.5			9.2	
Approach LOS		B			A			A			A	
90th %ile Green (s)	17.5	17.5		17.5	17.5		26.0	26.0	26.0	26.0	26.0	
90th %ile Term Code	Gap	Gap		Hold	Hold		Hold	Hold	Hold	Max	Max	
70th %ile Green (s)	12.4	12.4		12.4	12.4		20.9	20.9	20.9	20.9	20.9	
70th %ile Term Code	Gap	Gap		Hold	Hold		Hold	Hold	Hold	Gap	Gap	
50th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
50th %ile Term Code	Min	Min		Min	Min		Min	Min	Min	Min	Min	
30th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
30th %ile Term Code	Min	Min		Min	Min		Min	Min	Min	Min	Min	
10th %ile Green (s)	0.0	0.0		0.0	0.0		35.9	35.9	35.9	35.9	35.9	
10th %ile Term Code	Skip	Skip		Skip	Skip		Dwell	Dwell	Dwell	Dwell	Dwell	
Queue Length 50th (m)	5.6	9.6		1.3	4.0			0.3	0.0	13.5	6.7	
Queue Length 95th (m)	16.9	25.3		5.7	17.7			1.8	3.6	40.2	20.2	
Internal Link Dist (m)		131.5			791.5			156.8			911.1	
Turn Bay Length (m)	80.0			80.0					160.0	160.0		
Base Capacity (vph)	349	611		375	637			975	842	731	987	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.27	0.31		0.06	0.36			0.01	0.05	0.42	0.20	

Intersection Summary

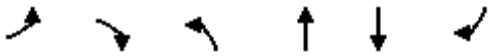
Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 47.1
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 10.3 Intersection LOS: B
Intersection Capacity Utilization 54.8% ICU Level of Service A
Analysis Period (min) 15
90th %ile Actuated Cycle: 57.5
70th %ile Actuated Cycle: 47.3
50th %ile Actuated Cycle: 44
30th %ile Actuated Cycle: 44
10th %ile Actuated Cycle: 42.9

Splits and Phases: 18: 61st Avenue & 84th Street SE





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	3.7	3.7	3.7	3.7	3.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Turning Speed (k/h)	24	14	24			14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96				0.99	
Frt	0.909				0.963	
Flt Protected	0.984			0.965		
Satd. Flow (prot)	1518	0	0	1504	1484	0
Flt Permitted	0.984			0.345		
Satd. Flow (perm)	1506	0	0	538	1484	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	55				54	
Headway Factor	0.85	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50			50	50	
Link Distance (m)	1635.7			470.4	335.4	
Travel Time (s)	117.8			33.9	24.1	
Volume (vph)	48	98	309	120	554	207
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	51	104	329	128	589	220
Lane Group Flow (vph)	155	0	0	457	809	0
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phases	4		2	2	6	
Minimum Initial (s)	10.0		20.0	20.0	20.0	
Minimum Split (s)	21.0		26.5	26.5	26.5	
Total Split (s)	21.0	0.0	129.0	129.0	129.0	0.0
Total Split (%)	14.0%	0.0%	86.0%	86.0%	86.0%	0.0%
Maximum Green (s)	16.0		122.5	122.5	122.5	
Yellow Time (s)	3.5		5.0	5.0	5.0	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	5.0		5.0	5.0	5.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	15.0			125.0	125.0	
Actuated g/C Ratio	0.10			0.84	0.84	
v/c Ratio	0.76			1.01	0.64	
Control Delay	64.9			58.2	6.5	
Queue Delay	0.0			0.0	0.0	
Total Delay	64.9			58.2	6.5	

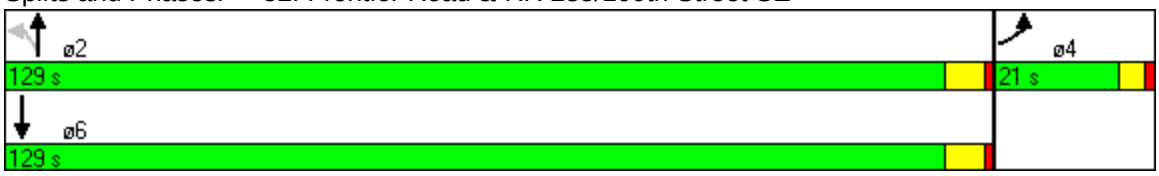


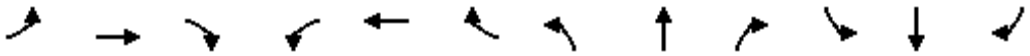
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	E			E	A	
Approach Delay	64.9			58.2	6.5	
Approach LOS	E			E	A	
90th %ile Green (s)	16.0		122.5	122.5	122.5	
90th %ile Term Code	Max		Max	Max	Hold	
70th %ile Green (s)	16.0		122.5	122.5	122.5	
70th %ile Term Code	Max		Max	Max	Hold	
50th %ile Green (s)	15.8		122.5	122.5	122.5	
50th %ile Term Code	Gap		Max	Max	Hold	
30th %ile Green (s)	12.4		122.5	122.5	122.5	
30th %ile Term Code	Gap		Max	Max	Hold	
10th %ile Green (s)	10.0		122.5	122.5	122.5	
10th %ile Term Code	Min		Max	Max	Hold	
Queue Length 50th (m)	29.1			~143.2	64.6	
Queue Length 95th (m)	#58.4			#74.3	93.9	
Internal Link Dist (m)	1611.7			446.4	311.4	
Turn Bay Length (m)						
Base Capacity (vph)	221			454	1262	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.70			1.01	0.64	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 148			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 29.5		Intersection LOS: C	
Intersection Capacity Utilization 87.0%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 150			
70th %ile Actuated Cycle: 150			
50th %ile Actuated Cycle: 149.8			
30th %ile Actuated Cycle: 146.4			
10th %ile Actuated Cycle: 144			

~ 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: 52: Frontier Road & RR 285/100th Street SE

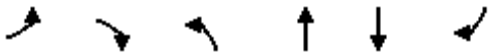




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	0	0	224	0	1	636	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	0	1	0	0	0	238	0	1	677	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)								277				
pX, platoon unblocked												
vC, conflicting volume	917	917	677	917	917	238	677			238		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	917	917	677	917	917	238	677			238		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	235	254	423	235	254	758	836			1230		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	1	238	678
Volume Left	0	1	0	1
Volume Right	0	0	0	0
cSH	1700	235	836	1230
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.1	0.0	0.0
Control Delay (s)	0.0	20.4	0.0	0.0
Lane LOS	A	C		A
Approach Delay (s)	0.0	20.4	0.0	0.0
Approach LOS	A	C		

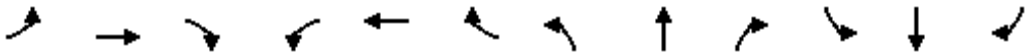
Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	561	112	56	199	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	597	119	60	212	11
Pedestrians	5			10	10	
Lane Width (m)	4.8			4.8	4.8	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)				335		
pX, platoon unblocked						
vC, conflicting volume	530	232	227			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530	232	227			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	98	21	90			
cM capacity (veh/h)	426	752	1235			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	607	179	222
Volume Left	11	119	0
Volume Right	597	0	11
cSH	742	1235	1700
Volume to Capacity	0.82	0.10	0.13
Queue Length 95th (m)	67.4	2.4	0.0
Control Delay (s)	27.8	5.8	0.0
Lane LOS	D	A	
Approach Delay (s)	27.8	5.8	0.0
Approach LOS	D		

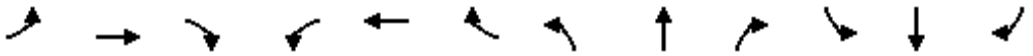
Intersection Summary			
Average Delay	17.8		
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	1	106	10	92	0	336	17	21	631	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	1	113	11	98	0	357	18	22	671	0
Pedestrians		5			5			5			5	
Lane Width (m)		4.8			4.8			4.8			4.8	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1196	1101	681	1094	1092	376	676			381		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1196	1101	681	1094	1092	376	676			381		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	34	94	84	100			98		
cM capacity (veh/h)	117	190	416	170	193	625	832			1080		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1	221	376	694
Volume Left	0	113	0	22
Volume Right	1	98	18	0
cSH	416	253	832	1080
Volume to Capacity	0.00	0.87	0.00	0.02
Queue Length 95th (m)	0.1	55.7	0.0	0.5
Control Delay (s)	13.7	70.8	0.0	0.5
Lane LOS	B	F		A
Approach Delay (s)	13.7	70.8	0.0	0.5
Approach LOS	B	F		

Intersection Summary			
Average Delay	12.4		
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		



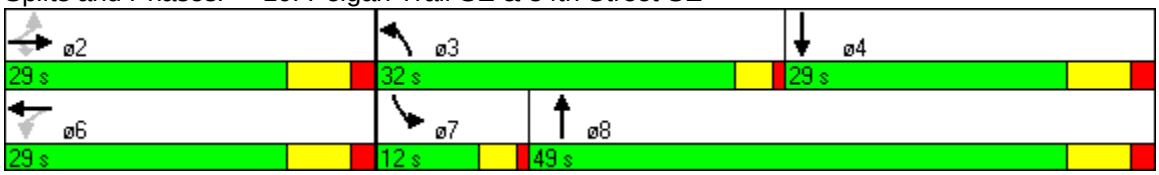
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	4.8	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	0.0		120.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	2		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2		15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.97		1.00		0.99	1.00		0.99	1.00	
Frt			0.850		0.986			0.994			0.982	
Flt Protected		0.996			0.999		0.950			0.950		
Satd. Flow (prot)	0	2950	1325	0	2908	0	2810	1548	0	1448	1527	0
Flt Permitted		0.904			0.948		0.950			0.950		
Satd. Flow (perm)	0	2676	1280	0	2759	0	2775	1548	0	1435	1527	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			256		12			3			7	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.85	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		70			70			80			80	
Link Distance (m)		196.4			1636.6			325.0			127.1	
Travel Time (s)		10.1			84.2			14.6			5.7	
Volume (vph)	10	134	243	10	459	48	863	273	10	16	79	10
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	141	256	11	483	51	908	287	11	17	83	11
Lane Group Flow (vph)	0	152	256	0	545	0	908	298	0	17	94	0
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2		2	6								
Detector Phases	2	2	2	6	6		3	8		7	4	
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		12.0	29.0		12.0	29.0	
Total Split (s)	29.0	29.0	29.0	29.0	29.0	0.0	32.0	49.0	0.0	12.0	29.0	0.0
Total Split (%)	32.2%	32.2%	32.2%	32.2%	32.2%	0.0%	35.6%	54.4%	0.0%	13.3%	32.2%	0.0%
Maximum Green (s)	22.0	22.0	22.0	22.0	22.0		28.0	42.0		8.0	22.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lead/Lag							Lead	Lag		Lead	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	
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min		None	None		None	None	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)		38.3	38.3		38.3		28.8	39.1		6.5	14.3	
Actuated g/C Ratio		0.43	0.43		0.43		0.32	0.43		0.07	0.16	
v/c Ratio		0.13	0.37		0.46		1.01	0.44		0.16	0.38	
Control Delay		18.0	4.4		21.1		64.7	20.3		42.3	35.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		18.0	4.4		21.1		64.7	20.3		42.3	35.5	
LOS		B	A		C		E	C		D	D	
Approach Delay		9.5			21.1			53.8			36.5	
Approach LOS		A			C			D			D	
90th %ile Green (s)	29.4	29.4	29.4	29.4	29.4		28.0	34.6		8.0	14.6	
90th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Max	Gap	
70th %ile Green (s)	32.1	32.1	32.1	32.1	32.1		28.0	32.6		7.3	11.9	
70th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Gap	Gap	
50th %ile Green (s)	33.9	33.9	33.9	33.9	33.9		28.0	42.1		0.0	10.1	
50th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Skip	Min	
30th %ile Green (s)	32.0	32.0	32.0	32.0	32.0		30.0	44.0		0.0	10.0	
30th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Skip	Min	
10th %ile Green (s)	49.0	49.0	49.0	49.0	49.0		30.0	27.0		0.0	0.0	
10th %ile Term Code	Coord	Coord	Coord	Coord	Coord		Max	Hold		Skip	Skip	
Queue Length 50th (m)		8.4	0.0		34.6		~88.1	29.9		2.8	13.8	
Queue Length 95th (m)		15.9	15.0		53.7		#124.1	57.9		9.0	26.7	
Internal Link Dist (m)		172.4			1612.6			301.0			103.1	
Turn Bay Length (m)			120.0				120.0					
Base Capacity (vph)		1138	692		1180		899	783		129	429	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.13	0.37		0.46		1.01	0.38		0.13	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 37.1 Intersection LOS: D
Intersection Capacity Utilization 60.7% ICU Level of Service B
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: 10: Peigan Trail SE & 84th Street SE



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	4.8	3.7	3.7	3.5	3.7
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97		
Frt	0.891			0.850		
Flt Protected	0.991				0.950	
Satd. Flow (prot)	1715	0	1716	1459	1402	1509
Flt Permitted	0.991				0.198	
Satd. Flow (perm)	1710	0	1716	1409	292	1509
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	187			40		
Headway Factor	0.85	0.85	0.99	0.99	1.01	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	1635.7		473.5			325.0
Travel Time (s)	117.8		21.3			14.6
Volume (vph)	91	388	758	38	135	189
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	9%	9%	24%	24%
Adj. Flow (vph)	96	408	798	40	142	199
Lane Group Flow (vph)	504	0	798	40	142	199
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Detector Phases	8		2	2	6	6
Minimum Initial (s)	10.0		20.0	20.0	20.0	20.0
Minimum Split (s)	23.5		27.5	27.5	27.5	27.5
Total Split (s)	32.0	0.0	58.0	58.0	58.0	58.0
Total Split (%)	35.6%	0.0%	64.4%	64.4%	64.4%	64.4%
Maximum Green (s)	26.5		51.5	51.5	51.5	51.5
Yellow Time (s)	3.5		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		1.5	1.5	1.5	1.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	21.1		42.6	42.6	42.6	42.6
Actuated g/C Ratio	0.29		0.59	0.59	0.59	0.59
v/c Ratio	0.80		0.79	0.05	0.83	0.22

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	26.9		19.1	2.7	54.6	8.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	26.9		19.1	2.7	54.6	8.4
LOS	C		B	A	D	A
Approach Delay	26.9		18.3			27.6
Approach LOS	C		B			C
90th %ile Green (s)	26.5		51.5	51.5	51.5	51.5
90th %ile Term Code	Max		Max	Max	Max	Max
70th %ile Green (s)	26.5		51.5	51.5	51.5	51.5
70th %ile Term Code	Max		Max	Max	Max	Max
50th %ile Green (s)	23.2		51.5	51.5	51.5	51.5
50th %ile Term Code	Gap		Hold	Hold	Max	Max
30th %ile Green (s)	13.3		28.7	28.7	28.7	28.7
30th %ile Term Code	Gap		Hold	Hold	Gap	Gap
10th %ile Green (s)	10.0		20.0	20.0	20.0	20.0
10th %ile Term Code	Min		Min	Min	Min	Min
Queue Length 50th (m)	49.8		84.2	0.0	15.6	12.9
Queue Length 95th (m)	#88.8		146.0	3.6	#55.0	24.9
Internal Link Dist (m)	1611.7		449.5			301.0
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	746		1119	933	190	984
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	0.68		0.71	0.04	0.75	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 72.5			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 22.8		Intersection LOS: C	
Intersection Capacity Utilization 97.8%		ICU Level of Service F	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 90			
70th %ile Actuated Cycle: 90			
50th %ile Actuated Cycle: 86.7			
30th %ile Actuated Cycle: 54			
10th %ile Actuated Cycle: 42			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

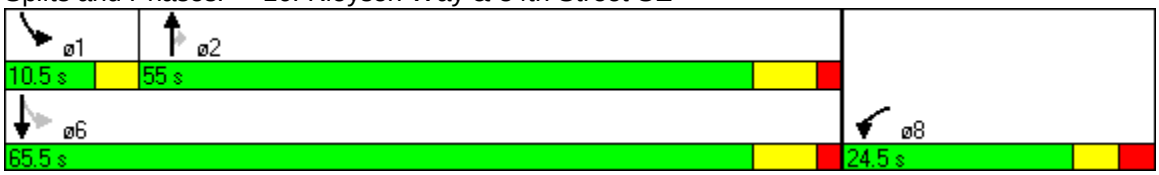
Splits and Phases: 12: Frontier Road & 84th Street SE

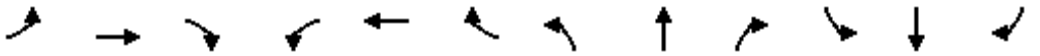
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0	0.0		150.0	150.0	
Storage Lanes	1	0		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97			0.97		
Frt	0.891			0.850		
Flt Protected	0.991				0.950	
Satd. Flow (prot)	1487	0	1685	1432	1422	1496
Flt Permitted	0.991				0.218	
Satd. Flow (perm)	1483	0	1685	1384	326	1496
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	133			14		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50		80			80
Link Distance (m)	289.1		935.1			276.5
Travel Time (s)	20.8		42.1			12.4
Volume (vph)	29	126	666	13	24	248
Confl. Peds. (#/hr)	5	5		5	5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	8%	11%	11%	25%	25%
Adj. Flow (vph)	31	133	701	14	25	261
Lane Group Flow (vph)	164	0	701	14	25	261
Turn Type				Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases				2	6	
Detector Phases	8		2	2	1	6
Minimum Initial (s)	10.0		20.0	20.0	6.5	20.0
Minimum Split (s)	24.5		27.0	27.0	10.5	27.0
Total Split (s)	24.5	0.0	55.0	55.0	10.5	65.5
Total Split (%)	27.2%	0.0%	61.1%	61.1%	11.7%	72.8%
Maximum Green (s)	18.0		48.0	48.0	7.0	58.5
Yellow Time (s)	3.5		5.0	5.0	3.4	5.0
All-Red Time (s)	3.0		2.0	2.0	0.1	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	14.2		42.1	42.1	44.5	45.4
Actuated g/C Ratio	0.21		0.66	0.66	0.63	0.71
v/c Ratio	0.39		0.63	0.02	0.08	0.25
Control Delay	11.1		12.4	3.6	4.9	4.8

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	11.1		12.4	3.6	4.9	4.8
LOS	B		B	A	A	A
Approach Delay	11.1		12.2			4.8
Approach LOS	B		B			A
90th %ile Green (s)	13.9		48.0	48.0	6.6	58.1
90th %ile Term Code	Gap		Max	Max	Gap	Hold
70th %ile Green (s)	10.0		38.9	38.9	6.5	48.9
70th %ile Term Code	Min		Gap	Gap	Min	Hold
50th %ile Green (s)	10.0		25.0	25.0	0.0	25.0
50th %ile Term Code	Min		Gap	Gap	Skip	Hold
30th %ile Green (s)	10.0		20.0	20.0	0.0	20.0
30th %ile Term Code	Min		Min	Min	Skip	Min
10th %ile Green (s)	0.0		64.2	64.2	0.0	64.2
10th %ile Term Code	Skip		Dwell	Dwell	Skip	Dwell
Queue Length 50th (m)	2.0		36.9	0.0	0.8	9.7
Queue Length 95th (m)	20.5		112.5	2.2	2.9	20.6
Internal Link Dist (m)	265.1		911.1			252.5
Turn Bay Length (m)				150.0	150.0	
Base Capacity (vph)	528		1230	1014	309	1187
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	0.31		0.57	0.01	0.08	0.22

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 64.2			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 10.3		Intersection LOS: B	
Intersection Capacity Utilization 53.2%		ICU Level of Service A	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 85.5			
70th %ile Actuated Cycle: 72.4			
50th %ile Actuated Cycle: 48.5			
30th %ile Actuated Cycle: 43.5			
10th %ile Actuated Cycle: 71.2			

Splits and Phases: 16: Kleysen Way & 84th Street SE





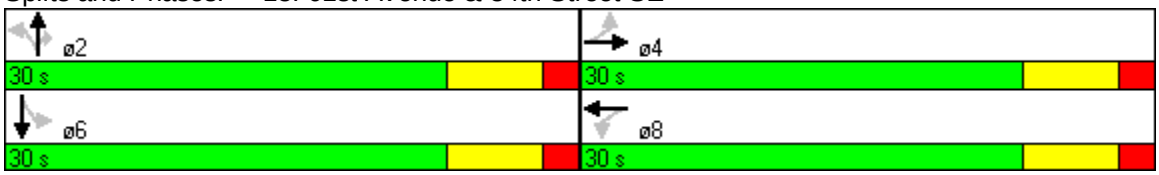
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7
Storage Length (m)	80.0		0.0	80.0		0.0	0.0		160.0	160.0		0.0
Storage Lanes	1		0	1		0	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2		15.2	15.2		15.2	15.2	15.2	15.2	15.2	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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	1.00	1.00		0.99	0.98			1.00	0.97	0.99	0.97	
Frt		0.995			0.902				0.850		0.868	
Flt Protected	0.950			0.950				0.990		0.950		
Satd. Flow (prot)	1448	1550	0	1448	1379	0	0	1543	1325	1448	1318	0
Flt Permitted	0.354			0.695				0.923		0.497		
Satd. Flow (perm)	538	1550	0	1051	1379	0	0	1436	1286	754	1318	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			200				49		96	
Headway Factor	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.01	0.99	0.99
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		155.5			288.9			180.8			935.1	
Travel Time (s)		11.2			20.8			8.1			42.1	
Volume (vph)	29	88	3	45	150	284	60	241	47	168	12	91
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	93	3	47	158	299	63	254	49	177	13	96
Lane Group Flow (vph)	31	96	0	47	457	0	0	317	49	177	109	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phases	4	4		8	8		2	2	2	6	6	
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		27.0	27.0	27.0	27.0	27.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	50.0%	50.0%	0.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	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	Min	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	19.1	19.1		19.1	19.1			24.4	24.4	24.4	24.4	
Actuated g/C Ratio	0.37	0.37		0.37	0.37			0.47	0.47	0.47	0.47	
v/c Ratio	0.16	0.17		0.12	0.72			0.47	0.08	0.50	0.16	
Control Delay	12.7	11.1		11.2	14.6			13.5	4.0	17.4	4.1	

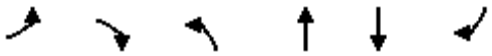
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	12.7	11.1		11.2	14.6			13.5	4.0	17.4	4.1	
LOS	B	B		B	B			B	A	B	A	
Approach Delay		11.4			14.3			12.3			12.3	
Approach LOS		B			B			B			B	
90th %ile Green (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	
90th %ile Term Code	Hold	Hold		Max	Max		Max	Max	Max	Max	Max	
70th %ile Green (s)	22.7	22.7		22.7	22.7		22.9	22.9	22.9	22.9	22.9	
70th %ile Term Code	Hold	Hold		Gap	Gap		Hold	Hold	Hold	Gap	Gap	
50th %ile Green (s)	15.6	15.6		15.6	15.6		20.0	20.0	20.0	20.0	20.0	
50th %ile Term Code	Hold	Hold		Gap	Gap		Min	Min	Min	Min	Min	
30th %ile Green (s)	11.1	11.1		11.1	11.1		20.0	20.0	20.0	20.0	20.0	
30th %ile Term Code	Hold	Hold		Gap	Gap		Min	Min	Min	Min	Min	
10th %ile Green (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	
10th %ile Term Code	Hold	Hold		Min	Min		Min	Min	Min	Min	Min	
Queue Length 50th (m)	1.7	5.2		2.6	16.7			17.7	0.0	10.1	0.6	
Queue Length 95th (m)	6.6	13.3		8.1	46.7			44.0	4.7	31.5	7.9	
Internal Link Dist (m)		131.5			264.9			156.8			911.1	
Turn Bay Length (m)	80.0			80.0					160.0	160.0		
Base Capacity (vph)	240	695		470	727			705	657	371	697	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.13	0.14		0.10	0.63			0.45	0.07	0.48	0.16	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 51.7
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 13.0 Intersection LOS: B
Intersection Capacity Utilization 69.7% ICU Level of Service C
Analysis Period (min) 15
90th %ile Actuated Cycle: 60
70th %ile Actuated Cycle: 59.6
50th %ile Actuated Cycle: 49.6
30th %ile Actuated Cycle: 45.1
10th %ile Actuated Cycle: 44

Splits and Phases: 18: 61st Avenue & 84th Street SE



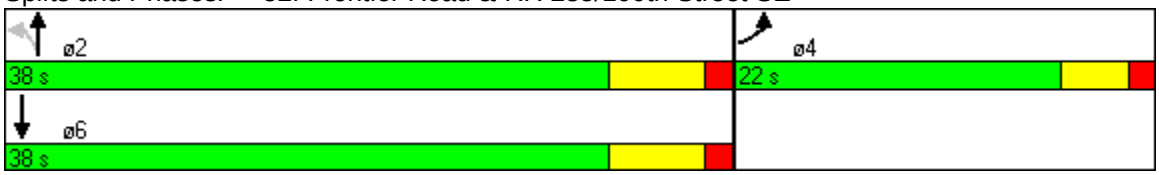


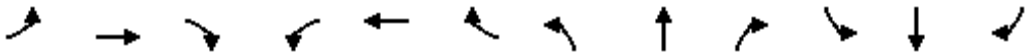
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Width (m)	4.8	3.7	3.7	3.7	3.7	3.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2		15.2	15.2	15.2	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Turning Speed (k/h)	24	14	24			14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98			1.00	0.99	
Frt	0.926				0.960	
Flt Protected	0.978			0.994		
Satd. Flow (prot)	1557	0	0	1549	1484	0
Flt Permitted	0.978			0.938		
Satd. Flow (perm)	1550	0	0	1461	1484	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	105				58	
Headway Factor	0.85	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	50			50	50	
Link Distance (m)	1635.7			470.4	335.4	
Travel Time (s)	117.8			33.9	24.1	
Volume (vph)	212	260	79	608	147	62
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	223	274	83	640	155	65
Lane Group Flow (vph)	497	0	0	723	220	0
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phases	4		2	2	6	
Minimum Initial (s)	10.0		20.0	20.0	20.0	
Minimum Split (s)	21.0		26.5	26.5	26.5	
Total Split (s)	22.0	0.0	38.0	38.0	38.0	0.0
Total Split (%)	36.7%	0.0%	63.3%	63.3%	63.3%	0.0%
Maximum Green (s)	17.0		31.5	31.5	31.5	
Yellow Time (s)	3.5		5.0	5.0	5.0	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	5.0		5.0	5.0	5.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	17.3			31.5	31.5	
Actuated g/C Ratio	0.30			0.55	0.55	
v/c Ratio	0.91			0.89	0.26	
Control Delay	40.9			27.9	5.7	
Queue Delay	0.0			0.0	0.0	
Total Delay	40.9			27.9	5.7	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D			C	A	
Approach Delay	40.9			27.9	5.7	
Approach LOS	D			C	A	
90th %ile Green (s)	17.0		31.5	31.5	31.5	
90th %ile Term Code	Max		Max	Max	Hold	
70th %ile Green (s)	17.0		31.5	31.5	31.5	
70th %ile Term Code	Max		Max	Max	Hold	
50th %ile Green (s)	17.0		31.5	31.5	31.5	
50th %ile Term Code	Max		Max	Max	Hold	
30th %ile Green (s)	17.0		31.5	31.5	31.5	
30th %ile Term Code	Max		Max	Max	Hold	
10th %ile Green (s)	13.1		20.0	20.0	20.0	
10th %ile Term Code	Gap		Min	Min	Min	
Queue Length 50th (m)	41.9			60.5	7.7	
Queue Length 95th (m)	#94.5			#129.0	16.6	
Internal Link Dist (m)	1611.7			446.4	311.4	
Turn Bay Length (m)						
Base Capacity (vph)	562			839	877	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.88			0.86	0.25	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 56.9			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 29.0		Intersection LOS: C	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 60			
70th %ile Actuated Cycle: 60			
50th %ile Actuated Cycle: 60			
30th %ile Actuated Cycle: 60			
10th %ile Actuated Cycle: 44.6			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 52: Frontier Road & RR 285/100th Street SE

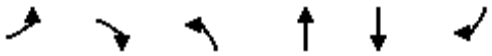




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	0	0	791	4	0	272	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	0	0	833	4	0	286	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)								277				
pX, platoon unblocked	0.71	0.71		0.71	0.71	0.71				0.71		
vC, conflicting volume	1121	1123	286	1121	1121	835	286			837		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1171	1174	286	1171	1171	767	286			770		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	111	126	712	111	126	266	1179			545		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	837	286
Volume Left	0	0	0	0
Volume Right	0	0	4	0
cSH	1700	1700	1179	545
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

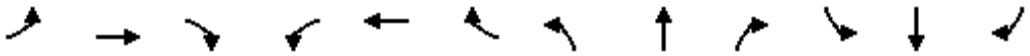
Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	46.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	149	507	312	60	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	157	534	328	63	11
Pedestrians	5			10	10	
Lane Width (m)	4.8			4.8	4.8	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)				335		
pX, platoon unblocked	0.74					
vC, conflicting volume	1479	83	79			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1651	83	79			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	76	83	62			
cM capacity (veh/h)	44	913	1405			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	167	862	74
Volume Left	11	534	0
Volume Right	157	0	11
cSH	407	1405	1700
Volume to Capacity	0.41	0.38	0.04
Queue Length 95th (m)	14.9	13.7	0.0
Control Delay (s)	19.9	7.3	0.0
Lane LOS	C	A	
Approach Delay (s)	19.9	7.3	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	8.7		
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	7	9	1	20	1	29	0	651	84	88	318	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	9	1	21	1	31	0	685	88	93	335	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1281	1294	335	1255	1249	729	335			774		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1281	1294	335	1255	1249	729	335			774		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	93	93	100	82	99	92	100			88		
cM capacity (veh/h)	109	132	668	117	140	394	1130			767		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	18	53	774	427
Volume Left	7	21	0	93
Volume Right	1	31	88	0
cSH	127	198	1130	767
Volume to Capacity	0.14	0.27	0.00	0.12
Queue Length 95th (m)	3.6	7.8	0.0	3.1
Control Delay (s)	38.0	29.6	0.0	3.5
Lane LOS	E	D		A
Approach Delay (s)	38.0	29.6	0.0	3.5
Approach LOS	E	D		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		