Traffic and Pavement Monitoring Year 9 (2024)

Prepared in accordance with

Construction Safety Management Plan: Section 5.4.12 Traffic and Pavement Monitoring

and

Appendix B: Traffic Monitoring and Mitigation Plan – Fort St. John and North Bank Area Roads

Site C Clean Energy Project

March 31, 2025

Contents

1.0 Background

1.1 Site C Clean Energy Project

The Site C Clean Energy Project (the Project) is a hydroelectric dam and generating station under construction in northeast B.C. Construction started in July 2015 and the facility will be in service in 2024. The Project will help meet future electricity needs by providing 1,100 megawatts of dependable capacity, and producing about 5,100 gigawatt hours of energy each year — enough to power the equivalent of 450,000 homes per year. Once built, the Project will be a source of clean, reliable and cost-effective electricity in B.C. for more than 100 years.

The key components of the Project are:

- Access roads and a temporary construction bridge across the river, at the dam site.
- Worker accommodation at the dam site.
- Upgrades to 240, 269, 271 and Old Fort roads.
- The realignment of six segments of Highway 29.
- Two temporary cofferdams across the river to allow for construction of the earthfill dam.
- Two new 500 kilovolt transmission lines connecting Site C to the Peace Canyon Substation, within an existing right-of-way.
- Shoreline protection at Hudson's Hope, including upgrades to DA Thomas Road.
- An 800-metre roller-compacted-concrete buttress to enhance seismic protection.
- An earthfill dam, approximately 1,050 metres long and 60 metres high above the riverbed.
- A generating station with six generating units.
- An 83-kilometre-long reservoir that will be, on average, two to three times the width of the current river.

1.2 Traffic Assessment

The Project's Environmental Assessment assessed how the Project traffic might affect both road safety and potential delays on the local road network by segment (BC Hydro 2013a). The assessment quantified the forecasted impact of the peak year traffic for major Project components in addition to forecasted base case traffic (BC Hydro 2013b). The assessment and all associated data are found in Volume 4, Section 31 Transportation and Volume 4, Appendix B Project Traffic Analysis Report of the Site C Clean Energy Project Environmental Impact Statement.

Traffic forecasts are affected by the planned location and schedule of the Project construction activities, and results illustrate that Project traffic patterns will be different between seasons, between years and in different parts of the region due to the location and schedule of Project activities. Examples include:

- the majority of Project traffic is associated with construction and commuter traffic entering the dam site construction area on the north bank;

- there is generally expected to be more Project traffic in the summer than the winter due to the requirement to schedule some work outside of winter conditions, resulting in a larger summer workforce commuting into the site on north bank roads;
- Project traffic in the vicinity of Hudson's Hope increases during months in which construction activities for shoreline protection works and Highway 29 realignment works are active;
- Project contractors will have the option to access the dam site from the north or south bank over the temporary construction bridge across the Peace River within the dam site;
- Private vehicles are not permitted within the dam site or over the temporary construction bridge across the Peace River, therefore no changes to public traffic patterns are forecast as a result of the Project;
- Project plan changes since the Assessment with potential impacts on road use:
    - Peace River Hydro Partners has decided that the majority of the riprap from West Pine Quarry will be transported by rail and as such, large scale road mitigation measures including the Project Access Road are unnecessary;
    - Materials and equipment transport for the worker accommodation will come from the north bank roads.

1.3 Traffic Monitoring

Traffic monitoring is described in two locations in the Construction Safety Management Plan:

- Construction Safety Management Plan: Section 5.4.12 Traffic and Pavement Monitoring (BC Hydro, 2017a) and
- Appendix B: Traffic Monitoring and Mitigation Plan – Fort St. John and North Bank Area Roads (TMMP) (BC Hydro, 2017b)

The schedule for traffic monitoring during Year 9 of Project construction is shown in Table 4.

The TMMP was developed by BC Hydro with the City of Fort St. John (City) to describe monitoring that will occur within and near the City, conditions that may trigger the need for additional mitigation measures, and to assess potential mitigation measures.

In addition to monitoring seven locations forecasted to be used by Project traffic, BC Hydro is also providing raw count data for one additional intersection of interest to the City at 100th Avenue at West Bypass Road. In previous years, the data for this one intersection has been provided directly to the City for their purposes however the data was unavailable this year due to equipment failure.

Section 4.1.2 of the TMMP describes that in the first 12 months of the Project, turning movement counts at the intersections listed below would occur quarterly to provide seasonal traffic information useful for future construction years. Future years would include annual monitoring until the year before the anticipated peak year of traffic when quarterly monitoring would begin again. Year 5 was the anticipated peak year of traffic; thus, quarterly monitoring was conducted with subsequent years returning to annual monitoring activities.

BC Hydro also collected pre-construction baseline intersection data in 2014-2015. The methodology and results of this data collection were provided in the Traffic and Pavement Monitoring Report (January 22, 2016).

1.4 Pavement Monitoring

Pavement monitoring is described in the Construction Safety Management Plan: Section 5.4.12 Traffic and Pavement Monitoring. Pre-construction baseline pavement monitoring was conducted in summer 2014 by the Ministry of Transportation and Transit (MoTT). Construction phase pavement monitoring by MoTT was completed every other year in the summer/fall, with events in 2016, 2018, 2020, 2022 and 2024. The results of the monitoring are retained by MoTT and are not included in the results of this report.

BC Hydro and MoTT have an agreement for BC Hydro to pay the reasonable costs associated with pavement surveys that are in addition to MoTT's normal monitoring program. Given that the Project has moved into the Operations phase, the enhanced pavement monitoring program was concluded in 2024.

1.5 Project Activities During Monitoring Period

Year 9 of Project construction: dam site construction works continued including removal of the cofferdam, as well as diversion tunnel conversion and closure. Activities in work areas away from the dam site decreased significantly.

The following Project activities occurred during Year 9 of construction at or in the vicinity of the dam site, as well as away from the dam site:

1. Between August 2023 and October 2024, there was a monthly average of 3,405 total workers. The monthly average for total PRRD residents is 572 or 22%.

2. On August 25, 2024, BC Hydro began the 11-week process of filling the Site C reservoir concluding on November 7, 2024.

3. On October 28, 2024, the first of six generating units on the Site C project came into operation.

1.5.1 Project Workforce

BC Hydro collected workforce information since the start of the Project. Workforce information regarding the number of PRRD residents was captured between August 2023-October 2024 and is displayed in Table 1 below. The date range, in typical years ending in July, now extends to October 2024 to reflect when the first generating unit came into service (October 28, 2024).

Based on the data available, the Project has a high number of local hires (e.g. workers who are primary residents of the PRRD). While local workers may commute daily to the site because they are predominately existing PRRD residents, they are likely people who would be on the road to work in the region anyway. Their route may have changed but the volume of traffic

would not have increased along main routes such as Highway 97 due to the Project.

Table 1- Project Workforce from August 2023 – October 2024

Reporting Period (Month)	Total Workforce	Construction and Environmental Contractors Workforce Numbers (Onsite Workforce)	# of PRRD Primary Residents of Onsite Workforce	% of PRRD Primary Residents of Onsite Workforce
August 2023	5,808	4,949	985	20%
September 2023	5,442	4,584	904	20%
October 2023	4,903	4,059	892	22%
November 2023	4,302	3,465	828	24%
December 2023	3,153	2,365	638	27%
January 2024	2,518	1,733	436	25%
February 2024	2,721	1,942	446	23%
March 2024	2,801	2,043	411	20%
April 2024	2,808	2,084	411	20%
May 2024	2,986	2,256	437	19%
June 2024	2,953	2,217	463	21%
July 2024	2,993	2,253	497	22%
August 2024	2,766	2,026	454	22%
September 2024	2,542	1,803	383	21%
October 2024	2,379	1,691	402	24%

Source: BC Hydro 2023-2024 https://www.sitecproject.com/document-library/employment- statistics

Note: Based on survey samples in fall 2019, approximately 38% of workers who are residents of the PRRD were existing residents prior to taking up work on the Project. As these workers were pre-existing residents, their employment on the Project has not resulted in a change in regional population.

2.0 Traffic Performance Monitoring

2.1 Monitoring Period and Locations

The Construction Safety Management Plan and the TMMP identify the intersections and frequency for traffic data collection. In accordance with the Plans, Table 2, Table 3 and Table 4 show the data collection schedule for Project construction. Project "Years" start on July 27th and continue until July 26th of the following year.

Within each monitoring period, data collection dates are selected to avoid holiday weeks, weekends or short-term road works to avoid their possible influences on normal traffic patterns.

Table 2 - Quarterly Monitoring Periods

Q1	January - February
Q2	April - May
Q3	July - August
Q4	October - November

Table 3 - Quarterly Traffic Performance Monitoring Schedule (Year 1, Year Prior to Peak, and Peak Year)

		Project Year 1			
Road Corridor	**Intersection**	**Q4**	**Q1**	**Q2**	**Q3**
Hwy 29	Canyon Drive / Beattie (Hwy 29)			1	
Hwy 29	Hwy 29 (Canyon Drive) / Clarke Road			1	
Hwy 97	Hwy 97 / 269 Rd (Year 1 Only)[1]			1	
Hwy 97 N	Hwy 97 / Old Fort Road	1	1	1	1
Hwy 97 N	Hwy 97 / 100 Street	1	1	1	1
Hwy 97 N	Hwy 97 / 85th Avenue	1	1	1	1
Hwy 97 S	Hwy 97 / Hwy 29 (Chetwynd)			1	
Jackfish Lake Road	Hwy 29 / Jackfish Lake Road			1	
NB Roads	Old Fort Road / 85th Avenue	1	1	1	1
NB Roads	85th Avenue / 100th Street	1	1	1	1
NB Roads	Dam Site Entrance – Gate B	1	1	1	1
NB Roads	Dam Site Entrance – Gate D[2]	1	1	1	1
NB Roads	Hwy 97 / 86th Street	1	1	1	1
NB Roads	100th Avenue / West Bypass	1	1	1	1

Note 1: In addition to the intersections listed in the TMMP, data was also captured for Highway 97 at 269 Rd in April 2016 because of road improvements. These improvements were completed summer 2017 and this intersection was included in any future years.
Note 2: Gate A was renamed to Gate D in 2016.

Table 4 - Project Year 9 Intersection Function Monitoring Schedule (Year Post Peak Year)

		Project Year 9			
Road Corridor	**Intersection**	**Q4**	**Q1**	**Q2**	**Q3**
Hwy 29	Canyon Drive / Beattie (Hwy 29)			1	
Hwy 29	Hwy 29 (Canyon Drive) / Clarke Road			1	
Hwy 97 N	Hwy 97 / Old Fort Road			1	
Hwy 97 N	Hwy 97 / 100th Street			N/A	
Hwy 97 N	Hwy 97 / 85th Avenue			N/A	
Hwy 97 S	Hwy 97 / Hwy 29 (Chetwynd)			1	
Jackfish Lake Road	Hwy 29 / Jackfish Lake Road			1	
NB Roads	Old Fort Road / 85th Avenue			1	
NB Roads	85th Avenue / 100th Street			N/A	
NB Roads	Dam Site Entrance – Gate B			1	
NB Roads	Dam Site Entrance – Gate D[1]			1	
NB Roads	100th Avenue / West Bypass			N/A	

Note 1: Gate A was renamed to Gate D in 2016.
Note 2: Hwy 97 at 86th Avenue intersection function data gathering ceased after Year 1 of construction as traffic lights have been installed at the intersection.
Note 3: Analysis was not completed at the intersections listed as N/A due to incomplete data capture in Year 9.

2.2 Summary of Results

Please see Appendix A for the full Year 9 traffic performance monitoring program methodology and results completed in accordance with Section 4.1.2 of the TMMP. Traffic performance monitoring is carried out for all intersections identified in the TMMP and the four regional intersections in Hudson's Hope and Chetwynd.

Summary and Conclusion

In light of the findings of this study, the following is concluded:

- None of the thresholds identified in the TMMP have been exceeded and as such no additional mitigation measures are planned.

Year 9 Traffic Volumes

- Hudson's Hope Intersections |
    - When compared to the baseline, there was a general increase (15%-40%) in the traffic volumes at both study intersections in Year 9 Construction during both peak hours, except at Canyon Drive and Clarke Avenue which had a decrease of -6% during the AM peak.
    - Traffic volumes decreased during the AM peak and remained similar (±5%) in the PM peak when comparing Year 8 to Year 9 Construction.

- Chetwynd Intersections |
    - When compared to the baseline, there was a general increase in the traffic volumes at both study intersections in Year 9 Construction during both peak hours.
    - The peak for Year 9 Construction at all intersections decreased from Year 8 volumes, except Highway 29 and Jackfish Lake Road increased 16% from Year 8 in the AM Peak.

- Fort St. John Intersections |
    - Traffic volumes at the study intersections saw a general increase during both AM and PM peak hours when comparing the Year 9 Construction to the baseline.
    - The intersection of 85 Avenue and Old Fort Road experienced large increases in Year 9 Construction traffic compared to the baseline, in the order of 84% in the AM Peak and 116% in the PM peak.
    - When compared to Year 8 Construction, the Year 9 Construction volumes experienced minor changes (0% to 9%) at Old Fort Road / 100 Avenue, and a somewhat significant decrease at the 85 Avenue and Old Fort Road intersection (-23% to -41%).

Year 9 Study Intersection Peak Hours

Morning Peak Hour

- It was identified that the construction traffic peaked at a different time compared to typical commuter traffic during the AM peak period for most study intersections. Commuter traffic volumes at the study intersections peaked between 7:45 AM and 8:45 AM or 7:15 AM to 8:15 AM while construction activities recorded at Gate B and Gate D (269 Road entrance) peaked earlier, between 6:15 AM and 7:30 AM.
- The peak hour timing at 85 Avenue and Old Fort Road in Fort St. John aligned with the Gate Peak hours at 6:15-7:13 AM.
- Highway 97 and Old Fort Road in Fort St. John peaked later than the gates, between 7:45-8:45 AM.
- Intersections in Hudson's Hope peaked earlier than Fort St. John and Chetwynd, with Canyon Drive, Highway 29 and Beattie Drive peaking at 7:15-8:15 AM. Although Highway 29 and Clarke Avenue shows a higher traffic volume at this time, the morning peak is still 7:45-8:45 AM.
- Intersections in Chetwynd peaked later, from 7:45-9:00 AM.

Afternoon Peak Hour

- Construction volumes at Gate B and Gate D / 269 Road Entrance peak activities did not coincide with commuter traffic peak traffic volumes, except for 85th Avenue and Old Fort Road.

Year 9 Traffic Operational Analysis

- All movements operate at Level of Service (LOS) C or better during the AM peak hour for Year 9 Construction.
- All movements operate at LOS C or better during the PM peak hour for Year 9 Construction, except for the eastbound left turn movement at the intersection of Highway 97 and Old Fort Road / 100 Avenue which operates at LOS D and experiences a one LOS degradation compared to background conditions. Therefore, it would not constitute an operational deficiency.
- For all movements, 95th percentile queue lengths do not exceed the available storage during the AM peak hour for Year 9 Construction. During the PM peak hour, the 95th percentile queue length exceeds the storage length only for the shared eastbound through-right movement at the intersection of Highway 97 and Old Fort Road / 100 Avenue. However, the average queue length for this movement does not exceed the available storage length.

2.3 Conclusions

Based on the findings of this study, the following is concluded:

- Based on the traffic operational analysis for the construction year (Year 9), no operational deficiencies are observed for either of the AM or PM peak hours.
- Additionally, monitoring indicated that construction traffic increased queue lengths for some of the movements at the study intersections resulting in 95th percentile queues for those movements to exceed the storage lengths. However, the average queue lengths did not exceed the storage lengths at any of the study intersections.
- Given the Site C project construction has now finished, there are no further recommendations for mitigation measures at any of the intersections.

3.0 Road Safety Monitoring Program

In accordance with the TMMP, collision data for the monitoring period of August 2023 to July 2024 was requested from ICBC to allow WSP time to complete the road safety monitoring program for Year 9(A).

In addition, ICBC provided collision data for August 2024 to October 2024 to align with the inundation of the Site C reservoir and the first generating unit in service; this data is reflected as Year 9(B).

The collision data was received from ICBC on February 28, 2025.

3.1 Monitoring Period and Locations

Study years:

- Year 9(B) Construction collision review from August 1, 2024 to October 31, 2024;
- Year 9(A) Construction collision review from August 1, 2023 to July 31, 2024;
- Year 8 Construction collision review from August 1, 2022 to July 31, 2023;
- Year 7 Construction collision review from August 1, 2021 to July 31, 2022;
- Year 7 Construction collision review from August 1, 2020 to July 31, 2021;
- Year 6 Construction collision review from August 1, 2019 to July 31, 2020;
- Year 6 Construction collision review from August 1, 2018 to July 31, 2019;
- Year 3 Construction collision review from August 1, 2017 to July 31, 2018;
- Year 2 Construction collision review from August 1, 2016 to July 31, 2017;
- Year 1 Construction collision review from August 1, 2015 to July 31, 2016
- Previous collision history August 1, 2010 to July 31, 2015

Study intersections in Fort St. John:

- 85th Avenue and Old Fort Road,
- Highway 97 and Old Fort Road,
- Highway 97 and 100th Street,
- Highway 97 and 85th Avenue, and
- 85th Avenue and 100th Street.

3.2 Summary of Results

Please see Appendix B for the full Year 9(A) and Year 9(B) road safety monitoring program methodology and results completed in accordance with section 4.2.2 of the TMMP. Road safety monitoring is carried out for the intersections identified in the TMMP as they would be the most likely to experience a change due to the Project due to their proximity to the dam site and anticipated vehicle routings. It is not completed for the four regional intersections in Hudson's Hope and Chetwynd due to their distance form the Project and the results of the environmental assessment.

The results from the road safety monitoring program are summarized below:

Table 5 below shows the pre-construction and benchmark annual average collision rates against the number of collisions in both Year 9(A) and Year 9(B) for both total and severe collisions at each of the study intersections. At intersections which have exceeded the benchmark, the section following Table 5 provide more context as to whether the Site C Project has affected road safety at these intersections.

Table 5 - Project Year 9 Intersection Function Monitoring Schedule (Year Post Peak Year)

Intersection	Collision Rates (per year)									
	Pre-Construction Average		BENCHMARK Pre-Construction Average +10%		Year 9(A)		BENCHMARK Pre-Construction Average +10%		Year 9(B)	
	Total	Severe	Total	Severe	Total	Severe	Total	Severe	Total	Severe
Highway 97 / Old Fort Road	19.2	7.4	21.1	8.1	22	8	5.3	2.0	4	2
85th Avenue / Old Fort Road	0.4	0.0	0.4	0.0	0	0	0.1	0	0	0
Highway 97 / 100th Street	17.6	5.0	19.4	5.5	10	2	4.8	1.4	2	1
Highway 97 / 85th Avenue	5.0	1.2	5.5	1.3	4	2	1.4	0.3	2	0
85th Avenue / 100th Street	1.2	0.6	1.3	0.7	3	0	0.3	0.2	0	0

Highway 97 and Old Fort Road

The intersection of Highway 97, Old Fort Road and 100 Avenue had markedly less collisions during most of the construction than in the pre-construction period, except in Year 9(A), with Year 9(A) collision frequencies similar to the benchmarks (slightly higher for total collisions and slightly lower for severe collisions). As such, the Site C project had no significant negative effects on road safety at this intersection. Notable changes in Year 9(A) and Year 9(B) compared to other years in the time of day and month of year graphs include:

- Year 9(B) had a higher proportion of undetermined collision configurations (25%) than other years. However, there were only 4 collisions in Year 9(B), so this only represents 1 collision.
- Year 9(A) had more collisions in the 12:00PM – 17:59PM period than pre-construction period. This could be due to slightly higher volumes at the intersection during the PM peak than in some other years.
- Year 9(A) had more collisions in January (5 total) than is typical. Much lower temperatures were recorded in Fort St. John in January 2024 than typical, so it is likely that severe Winter conditions may have resulted in an increased number of collisions at this intersection in Year 9(A) particularly in January.

85th Avenue and Old Fort Road

The intersection of 85 Avenue and Old Fort Road has a small number of collisions, such that it is difficult to draw meaningful conclusions from the analysis, especially considering the rare and random nature of crashes. For instance, the benchmark of the pre-construction annual average collision frequency + 10% is set at 0.4 total crashes per year, such that even one collision per year would exceed the benchmark and comparing the collision configuration proportions from one year to the next and against the pre-construction period is far less meaningful when there is only about one crash each year. However, two key patterns can be observed from the analysis nonetheless:

- There were no severe collisions at all during the construction period, which is consistent

with the pre-construction period. This is important, as severe collisions are those where people are injured, while the total collisions also include property damage only crashes. As such, no collisions at this intersection during the study period resulted in injuries.

- The time of year pattern with more collisions in October-December months during construction is consistent with the pre-construction period, showing that this pattern is likely due to other factors aside from the increased traffic volumes in some years. Several other likely explanations for increased collisions during these months are the change in weather conditions from Fall to Winter resulting in increased ice on the road in relation to the timing at which drivers install Winter tires on their vehicles, and the change in natural lighting conditions with more travel in the dark.

Highway 97 and 100th Street

The intersection of Highway 97 and 100 Street had fewer total collisions per year (15.7) during construction compared to the benchmark pre-construction average + 10% (19.4), and similar quantities of severe collisions per year (5.6) than during pre-construction average + 10% (5.5). While the average annual severe collision frequency is higher during construction than the benchmark, this is not concerning as crashes are rare and random events and the difference between the benchmark and the during-construction average is not sufficiently different to conclude the construction influenced road safety at this intersection.

From the collision configuration proportions, Year 9(A) had a higher proportion of side impacts and fewer rear-end collisions; however, there were markedly less collisions overall in Year 9(A) such that a change in collision configuration proportions is not unexpected. From the time of day and time of year graphs, there are no unusual patterns in either Year 9(A) or Year 9(B) in comparison to previous years either before or during construction.

Highway 97 and 85th Avenue

For Year 9(A) the total collisions for the year were below the benchmark, but the severe collisions for the year were slightly above the benchmark. The benchmark for severe collisions is set at 1.3 collisions per year, such that having two severe collisions in any one year would flag. However, this is a low number and it is more likely that the rare and random nature of collisions is driving the increase in Year 9(A) than any particular road safety issue. Additionally, the background volumes at this intersection appear to be increasing, which could contribute to an increase in collisions over time which is not captured in the setting of the performance benchmark.

For Year 9(B), total collisions for the quarter were slightly above the benchmark, which is also more likely to signify the rare and random nature of collisions than a particular safety issue as the benchmark is set at 1.4 collisions per quarter and two collisions occurred in Year 9(B). Other notable trends include:

- In Year 9(A), there are two collisions in the period 6:00PM – 8:59PM, with neither the pre-construction nor other construction years showing this pattern. However, two collisions are a low number and this does not suggest any particular trend.
    - Year 9(A) had two collisions in October and Year 9(B) had two collisions in August, both of which were above the typical monthly collision frequencies. As per the previous point, two collisions are a low number and do not suggest a trend.

85th Avenue and 100th Street

The intersection of 85 Avenue and 100 Street has a small number of collisions, such that it is difficult to draw meaningful conclusions from the analysis, especially considering the rare and random nature of crashes. For instance, the benchmark of the pre-construction annual average severe collision frequency + 10% is set at 0.7 collisions per year, such that even one collision per year would exceed the benchmark. Additionally, comparing the collision configuration proportions from one year to the next and against the pre-construction period is far less meaningful when there are only about one or two collisions each year.

Given the low incidence of collisions at this intersection and the consistent patterns in terms of dominant collision configuration types, time of day and month of year when comparing the pre-construction and construction periods, it appears that the Site C project has had no significant effects on road safety at this intersection.

3.3 Conclusions

Based on the review of the ICBC collision data for Year 9(A) and 9(B) of the Project, WSP has the following observations relating to the collision monitoring for the project.

- There were three intersections where the collision frequency during Year 9(A) or Year 9(B) exceeded the benchmark; however, all three intersections have likely explanations outside of the Site C Project's control as to why the benchmark was exceeded:
    - At the intersection of Highway 97 and Old Fort Road, 22 total collisions occurred in Year 9(A) with an annual benchmark of 21.1 collisions. The collision frequency is sufficiently close to the benchmark that the exceedance is not representative of a particular safety issue.
    - At the intersection of Highway 97 and 85 Avenue, there were two total collisions in Year 9(B) with a quarterly benchmark collision frequency of 1.4 collisions, and two severe collisions in Year 9(A) with a benchmark of 1.3 collisions per year. Similarly, the difference between the observed collision frequency and the benchmark is not enough to indicate a safety issue.
    - At 85 Avenue and 100 Street, there were 3 total collisions in Year 9(A) with a benchmark of 1.3 collisions per year. Both the total collisions and the benchmark at this intersection are low, such that one or two collisions in any year would exceed the benchmark. Given the rare and random nature of collisions, it is unlikely that a benchmark exceedance is reflective of any decrease or improvement in safety at this intersection.
- Based on the reasons above for benchmarks being exceeded, WSP concludes that the Site C project has not had any negative impacts on the road safety at any of the study intersections in Years 9(A) and 9(B) of the construction period.
- Given the Site C project construction has now finished, there are no further recommendations for mitigation measures at any of the intersections.

4.0 Road Safety Mitigation – Road Safety Audits

Under Section 5.2 of the TMMP it states, “BC Hydro proposes to complete an in-service road safety audit after road upgrades are complete at the intersections of:

1. 85th Avenue and Old Fort Road
2. 240 Road and 269 Road
3. 85th Avenue and 100th Street

Public road improvements to 240 Road and 269 Road were substantially completed in fall 2016. Upgrades to Old Fort Road and 271 Road were completed in 2017. At the time of the report, no road safety audit has been completed.

5.0 Program Next Steps

5.1 Traffic Technical Working Group

BC Hydro coordinated a Traffic Technical Working Group meeting with representatives from MoTT, Fort St. John and the PRRD to participate in a review of annual results. The meetings to discuss each year’s report were held annually from 2017 to 2021, however due to no exceedances of the thresholds identified in the TMMP being reported, the representatives recommended and endorsed the conclusion of the working group.

6.0 References

BC Hydro. 2013a. *Site C Clean Energy Project Environmental Impact Statement: Section 31 Transportation.* Vancouver, BC.

BC Hydro. 2013b. *Site C Clean Energy Project Environmental Impact Statement: Volume 4, Appendix B: Project Traffic Analysis.* Vancouver, BC.

BC Hydro. 2017a. *Construction Safety Management Plan: Section 5.4 Traffic Management Plan.* Vancouver, BC.

BC Hydro. 2017b. *Construction Safety Management Plan, Appendix B: Traffic Monitoring and Mitigation Plan – Fort St. John and North Bank Area Roads.* Vancouver, BC.

BC Hydro 2023-2024. Employment Statistics. Vancouver BC. Available at: https://www.sitecproject.com/document-library/employment-statistics. Accessed. March 24, 2025.

Appendix A. Year 9 Traffic Performance Monitoring Program

2025-03-26

Confidential

File: CA-WSP-16M0177806

Site C Clean Energy Project
BC Hydro & Power Authority

Attention: Ben Rauscher, Project Manager – Community and Social Mitigation Manager

Dear Ben,

Reference: Year 9 (2023-2024) Traffic Performance Monitoring Program – Transportation Review
Site C Clean Energy Project – Fort St. John, BC

INTRODUCTION

We are pleased to provide the following letter report outlining the results and findings for the Year 9 (2023-24) Construction Traffic Monitoring Program for the Site C Clean Energy Project (the Project). Construction started in July 2015 and became operational in 2024.

As part of the Site C Clean Energy Project's Environmental Impact Statement (EIS), BC Hydro developed the Construction Safety Management Plan: Section 5.4.12 Traffic and Pavement Monitoring and the Traffic Monitoring and Mitigation Plan (TMMP) that form the framework for studying the potential effects that an increase in vehicle traffic during construction on the regional road network may have on traffic performance.

As part of the Traffic Monitoring and Mitigation Plan (TMMP) program, BC Hydro committed to providing on-going traffic performance monitoring efforts at the defined intersections in Chetwynd, Hudson's Hope, Fort St. John, and the Peace River Regional District (PRRD) at regular periods throughout Project Construction. The data collection program is scheduled to be completed quarterly for the dam site at Gate B and Gate D (269 Road entrance) and annually for typical construction years at the defined intersections while the following years were proposed to be conducted quarterly for the horizons:

- First year (Construction Year 1);
- The year prior to the peak year (Construction Year 4); and,
- The peak year of construction (Construction Year 5).

The data collection program was completed at the study intersections as well as at the gates. One intersection count was conducted at the study intersections in Chetwynd, Hudson's Hope and Fort St. John. Data at the gates were collected quarterly for Year 9 Construction, as required. This letter report summarizes the results of the Year 9 Construction Traffic Performance Monitoring Program identifying characteristics and operations of traffic patterns at the study intersections between August 2023 and August 2024.

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METHODOLOGY

In order to satisfy the monitoring program, WSP completed the following work program:

Study Horizon Years:

- Year 9 Construction (August 2023 to August 2024)

Study Scenarios:

- June 2024 (intersections in Chetwynd, Hudson's Hope and Fort St. John)
- November 2023, February 2024, May 2024, August 2024 (Gates B and D)

Study Periods:

- Weekday AM peak (6:00 AM to 9:00 AM)
- Weekday PM peak (15:30 PM to 18:30 PM)
- 24 hours (Gate B and Gate D only)

Study Area Intersections:

- Learmonth Street / Beattie Drive and Canyon Drive – Hudson's Hope
- Canyon Drive and Clarke Avenue – Hudson's Hope
- Highway 29 / 50th Street and Highway 97 – Chetwynd
- Highway 29 and Jackfish Lake Road – Chetwynd
- Highway 97 and Old Fort Road / 100 Avenue – Fort St. John
- Highway 97 and 100 Street – Fort St. John
- Highway 97 and 85 Avenue / 92A Street – Fort St. John
- Old Fort Road and 85 Avenue – Fort St. John
- 100 Street / 265 Road and 85 Avenue – Fort St. John
- Site Access Gate D (269 Road entrance) – PRRD
- Site Access Gate B – PRRD
- Reviewed traffic data provided by BC Hydro
- Reviewed the signal timing plans for the signalized study intersections from the British Columbia Ministry of Transportation and Infrastructure (Ministry).

Assessed traffic operations:

- Reviewed existing transportation network and identified changes, if any;
- Analyzed intersection operations for Background Forecast scenarios (no Site C construction) using the estimated 2022 and 2023 baseline volumes;
- Analyzed intersection operating conditions for Total Forecast scenarios (Site C Construction) based on the traffic data provided, using Synchro 11 to evaluate operating parameters, including level of service (LOS), volume-to-capacity ratio (v/c ratio), and queuing (95th percentile queues) at the study intersections.
- The results of the traffic analysis were compared against thresholds at which mitigation measures could be considered for implementation. As indicated in the TMMP, the thresholds are:
- Left-turn and right-turn queue lengths that exceed the available storage; and
- Delays that result in vehicles experiencing a degradation of two levels of service or more (relative to service levels associated with no project traffic).

If these thresholds are exceeded, then additional traffic observations or counts would be taken at the location(s) of concern to confirm that the reduction in traffic performance is frequent and continuous, and not just periodic.

Intersections that experience traffic performance that reaches / exceeds these thresholds would be considered for mitigation and mitigation measures will be proposed.

FINDINGS

Study Road Network

Traffic data at the study area intersections in Hudson's Hope, Chetwynd, Fort St. John and the PRRD was collected using Miovision Scout video collection units during the weekday AM peak (6:00 AM – 9:00 AM) and PM peak (3:30 PM – 6:30 PM) periods. **Table 1** identifies the gate counts, study intersections and traffic data collection periods for Year 9 of the Project Construction.

Three of the five study intersections in Fort St. John did not have traffic data collected in May-August 2024, due to a member of the public tampering with the cameras during the traffic data collection. As such, no traffic data is available at the following intersections in Fort St. John for the Year 9 construction period:

- Highway 97 and 100 Street
- Highway 97 and 85 Avenue
- 85 Avenue and 100 Street

Table 2 describes the study road network. **Figure 1, Figure 2,** and **Figure 3** illustrate the laning configuration of the study roadway network.

Table 1 | Year Traffic Count Locations and Data Collection Periods

Intersection	Year 1				Year 2				Year 3				Year 4				Year 5				Year 6				Year 7				Year 8				Year 9			
	Nov 15	Feb 16	Apr 16	Jul 16	Oct 16	Feb 17	May 17	Jul 17	Oct 17	Feb 18	Apr* / May 18	Jul 18	Oct / Nov 18	Jan 19	Apr* / May 19	Aug 19	Dec 19	Jan 20	Apr* / May 20	Jul 20	Nov / Dec 20	Feb / Mar 21	May 21	Aug 21	Nov 21	Mar 22	May[#] 22	Aug 22	Nov 22	Feb 23	Jun[t] 23	Aug 23	Nov 23	Feb 24	May 24[&]	Aug 24
Learmonth Street / Beattie Drive and Canyon Drive (Hudson's Hope)	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--
Canyon Drive and Clarke Avenue (Hudson's Hope)	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--
Highway 29 and 50th Street / Highway 97 (Chetwynd)	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--
Highway 29 and Jackfish Lake Road (Chetwynd)	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--
Highway 97 and Old Fort Road / 100 Avenue (Fort St. John)	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	✓	✓	✓	✓	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--
Highway 97 and 100 Street (Fort St. John)	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	✓	✓	✓	✓	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✗	--
Highway 97 and 85 Avenue / 92A Street (Fort St. John)	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	✓	✓	✓	✓	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✗	--
Old Fort Road and 85 Avenue (Fort St. John)	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	✓	✓	✓	✓	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✓	--
100 Street / 265 Road and 85 Avenue (Fort St. John)	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	✓	✓	✓	✓	✓	✓	✓	✓	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	✗	--
Site Access Gate D (PRRD)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site Access Gate B (PRRD)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: *Traffic Counts for intersections in Fort St. John were performed in late April. [t] Traffic Counts at Highway 97 and 85 Avenue in Fort St John were recorded in July in 2023 and at Gates B and D in May 2023. [#]Traffic counts at Gates B and D were recorded in June 2022. [&]Traffic counts were trecorded in May in Hudsons Hope, June in Chetwynd, and July in Fort St John.

Table 2 | Road Network Characteristics

Street	Street Classification	Function	Laning	Land Access
Highway 29 (Hudson's Hope)	Highway	Carries regional traffic connecting surrounding communities	North of Canyon Drive: 2 lanes undivided; unsignalized control South of Canyon Drive: 4 lanes undivided; unsignalized control	- Primarily serves commercial areas with connection to road systems that serve the general community and residential areas. - Direct vehicle access is provided.
Highway 97 (Chetwynd)	Highway	Carries regional traffic connecting surrounding communities	2 lanes; signal control at most major intersections	- Primarily serves commercial and industrial areas. - Direct vehicle access is limited.
Highway 29 (Chetwynd)	Highway	Carries regional traffic connecting surrounding communities	Mostly 2 lanes, some sections also have between 3 to 4 lanes and raised or striped medians; signal control at most major intersections	- Primarily serves commercial and industrial areas with connection to road systems that serve the general community, and residential, and commercial areas. - Direct vehicle access is limited.
Highway 97 (Fort St. John)	Highway	Carries regional traffic connecting surrounding communities	4 lanes with isolated raised medians and turning lanes at most intersections; signal control at most major intersections	- Primarily serves service commercial and light industrial areas. - Direct vehicle access is limited.
Old Fort Road	Collector	Services both traffic mobility and land service; Provides connection between local and major roadways	2 lanes; unsignalized control	- Primarily serves service commercial and light industrial areas. - Direct vehicle access is provided.
100 Street	Arterial	Accommodates medium to high traffic demands for local and regional traffic; connects between neighbourhoods and community to regional thoroughfares; limited access	North of Highway 97: 4 lanes with turning lanes and parking on both sides of the road; signal control at major intersections. South of Highway 97: 2 lanes; unsignalized control	- Primarily serves service commercial and light industrial areas. - Direct vehicle access is provided.
85 Avenue	Collector	Services both traffic mobility and land service; Provides connection between local and major roadways	2 lanes; unsignalized control	- Primarily serves service commercial and light industrial areas. - Direct vehicle access is provided.

Figure 1 | Laning Configuration (Fort St. John)

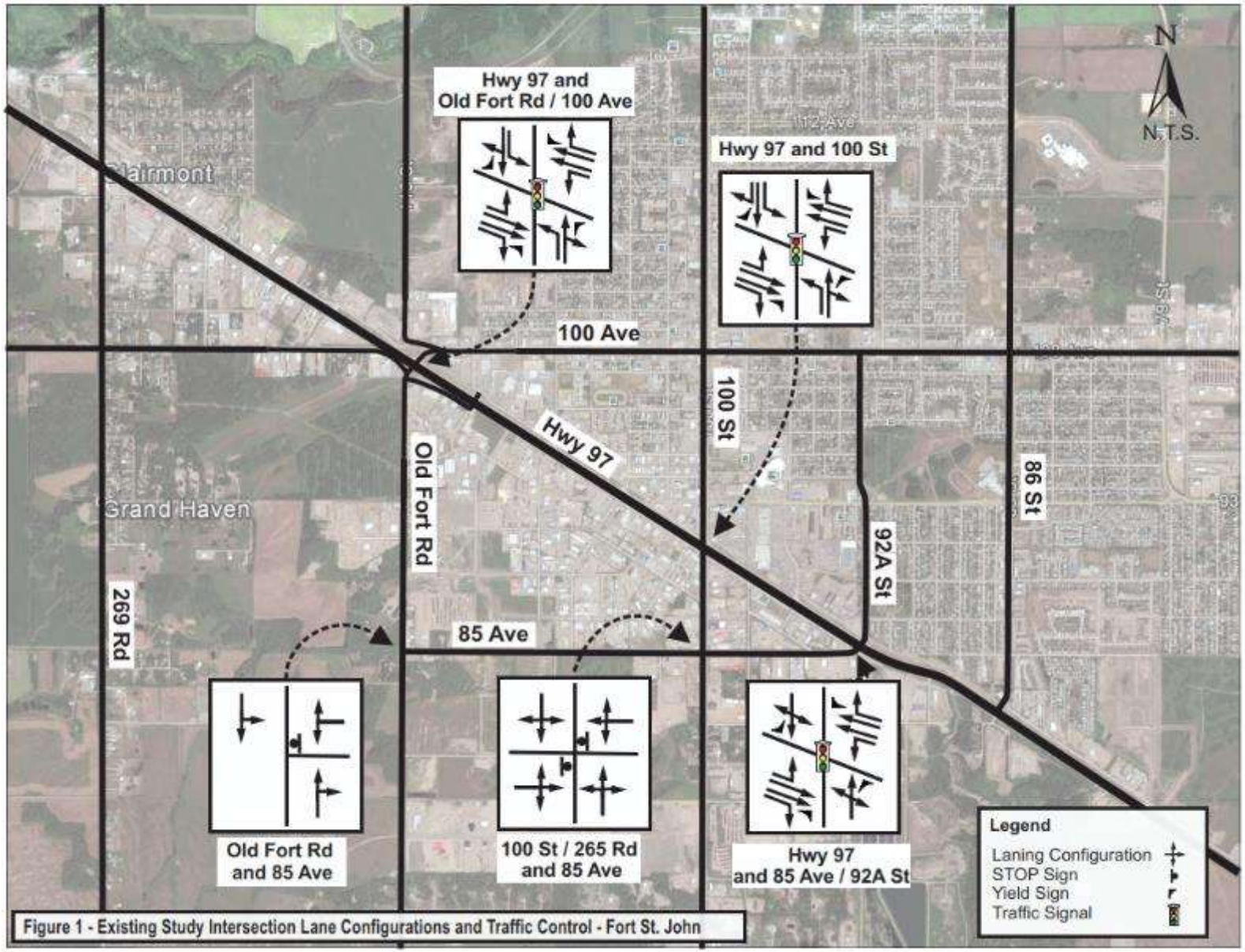


Figure 2 | Laning Configuration (Hudson's Hope)

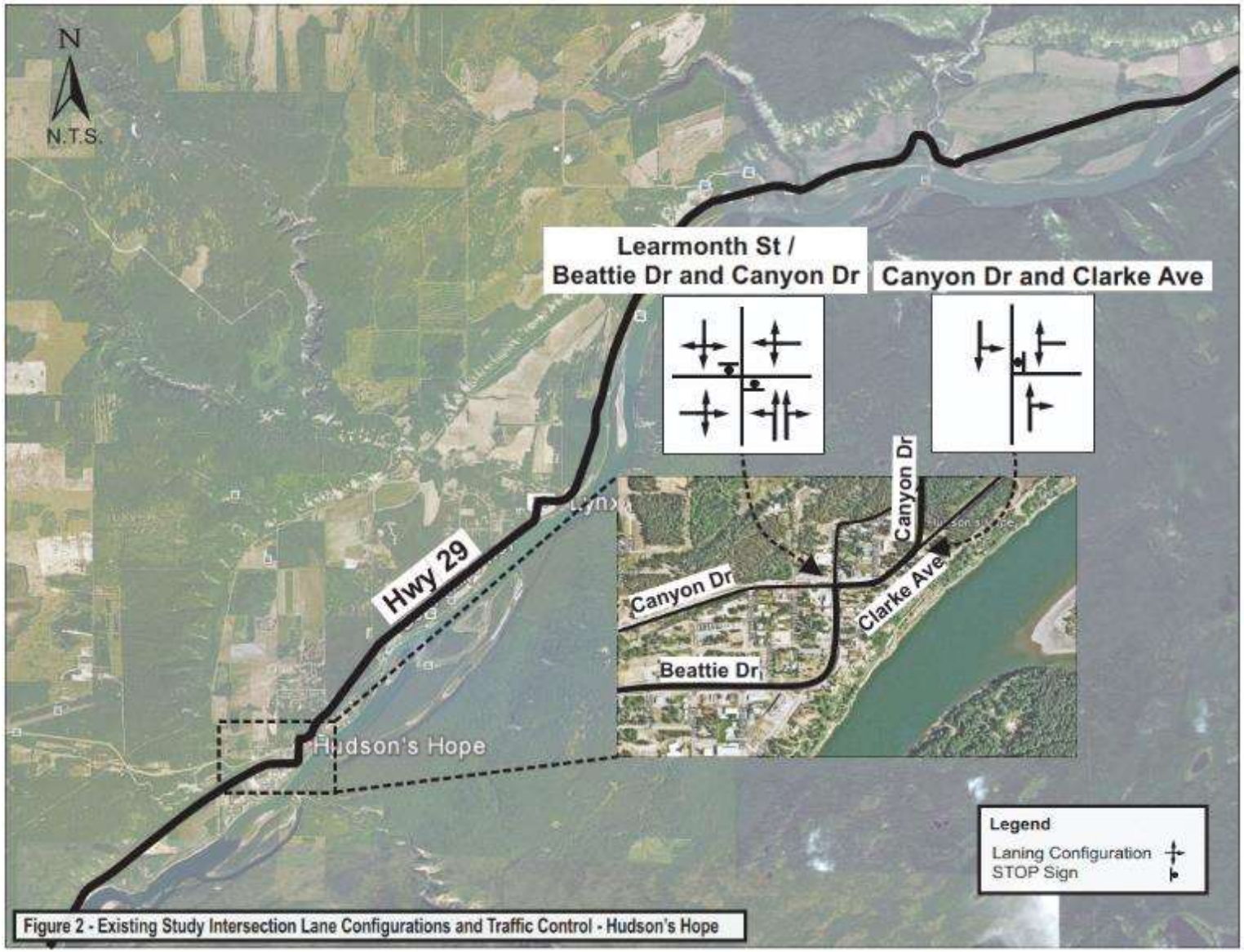
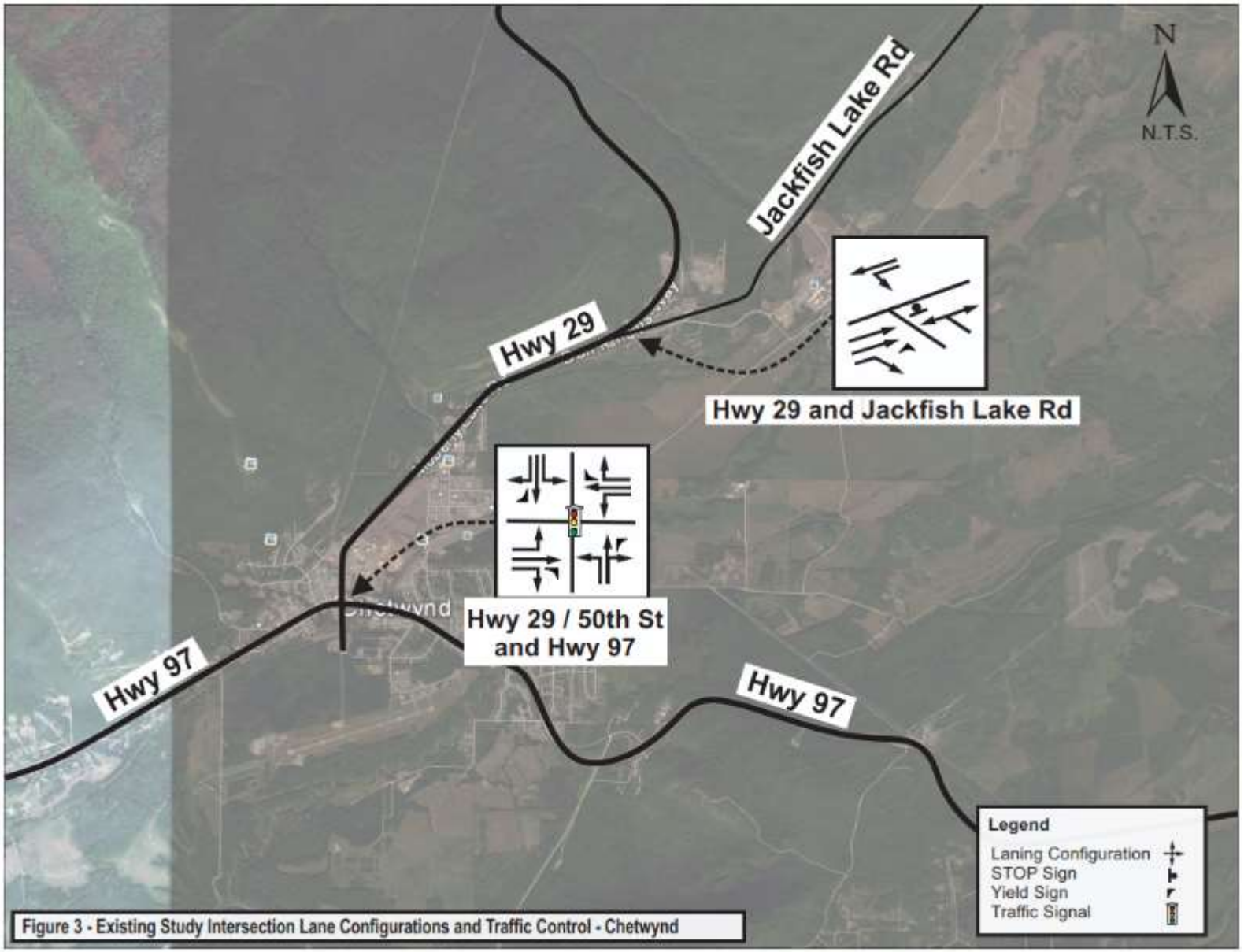


Figure 3 | Laning Configuration (Chetwynd)



TRAFFIC VOLUMES

The following sections summarize the traffic volumes and travel patterns observed in Year 9 of Project Construction.

Background Traffic Volumes

For the Year 9 traffic monitoring report, a comparison between 2014 (pre-construction of Site C) and 2024 annual average daily traffic volumes (AADT) was conducted to identify the changes in traffic volumes, using the Ministry permanent count station data at Inga Lake (P-44-1NS). For the year of 2024, Inga Lake had a decrease (-14%) in weekday traffic volumes compared to 2014. Note that 2014 data was not available for the count station at Willow Flats (P-43-2NS).

While 2024 data was available for the count station at Farmington (P-43-3-NS), the traffic growth rate was much higher than Inga Lake (-2%) and this was the first year in several years that traffic data has been available at the Farmington count station. To take both a conservative approach and be consistent with previous years where only the Inga Lake count station data has been available, only the Inga Lake station was used to estimate traffic growth rates from 2014 to 2024.

A summary of the comparison is attached in **Appendix A** for both Inga Lake and Farmington stations.

For conservative estimates, the 2024 background traffic volumes (without Site C Construction) was estimated by applying the -14% reduction rate to the traffic volumes collected in 2014 pre-construction conditions. The 2024 background volumes were calculated to develop a baseline comparison for the Year 9 (2024) Site C Construction traffic volumes to determine potential impacts to the adjacent road network, if any.

Existing Traffic Volumes with Year 9 Construction Traffic

Year 9 (2024) construction traffic volumes were collected once at all study intersections (except three intersections in Fort St. John) during the AM and PM peak periods in May to July 2024, while the volumes at Gates B and D were collected quarterly.

Table 5 and **Table 6** present the comparison between 2024 Baseline / Background traffic volumes and the 2024 Year 9 construction traffic volumes. The traffic data provided insights to changes in traffic volumes for the previous years, Year 1 to Year 8 Construction (shown in grey), compared to Year 9 Construction.

Using the available traffic volumes for all study intersections in Chetwynd, Hudson's Hope and Fort St. John, key findings include:

- There was an increase between 10-35% in traffic volumes in Chetwynd's study intersections in the both the AM and PM peak when compared to the baseline.
- In Hudsons Hope, the Beattie Drive and Canyon Drive intersection has higher volumes in Year 9 (25% to 40%) compared to the baseline than the Canyon Drive and Clarke Avenue intersection (-6% to 15%).
- In Fort St. John, the Old Fort Road and 85 Avenue intersection had higher traffic volumes compared to the baseline in Year 9 (84% to 116%) than the Highway 97, Old Fort Road and 100 Avenue intersection (9% to 24%).
- Although the Old Fort Road intersection had higher volumes compared to the baseline in Year 9 than all other intersections, the traffic volumes in Year 9 were lower than those measured at the intersection in Year 8 in both peak hours (-23% to -41%).

- The measured traffic volumes at the intersection of Highway 97 and Old Fort Road in Fort St. John are higher in Year 9 than at any other point in the project, with 1,871 vph in the AM peak and 2,399 vph in the PM peak.

Hudson's Hope Intersections |

- When compared to the baseline, there was a general increase (15%-40%) in the traffic volumes at both study intersections in Year 9 Construction during both peak hours, except Canyon Drive and Clarke Avenue which had a decrease of -6% during the AM peak.
- Traffic volumes decreased during the AM peak, and remained similar (±5%) in the PM peak when comparing Year 8 to Year 9 Construction.

Chetwynd Intersections |

- When compared to the baseline, there was a general increase in the traffic volumes at both study intersections in Year 9 Construction during both peak hours.
- The peak for Year 9 Construction at all intersections decreased from Year 8 volumes, except Highway 29 and Jackfish Lake Road increased 16% from Year 8 in the AM Peak.

Fort St. John Intersections |

- Traffic volumes at the study intersections saw a general increase during both AM and PM peak hours when comparing the Year 9 Construction to the baseline.
- When compared to Year 8 Construction, the Year 9 Construction volumes experienced minor changes (0% to 9%) at Old Fort Road / 100 Avenue, and a somewhat significant decrease at the 85 Avenue and Old Fort Road intersection (-23% to -41%).
- The intersection of 85 Avenue and Old Fort Road experienced large increases in Year 9 Construction traffic compared to the baseline, in the order of 84% in the AM Peak and 116% in the PM peak.

Table 3 | Year 9 Intersection Traffic Comparison – AM Peak

Intersection	2024 - AM	2015	2016	2016	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Background	Nov	Feb	Apr	Jul	May	May	Peak*	Peak**	May	May	Jun	Jun*
	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)
Learmonth Street / Beattie Drive and Canyon Drive (Hudson's Hope)	102	-	-	124	-	149	176	144	133	178	129	142	127
				46%		75%	107%	69%	56%	109%	43%	45%	25%
Canyon Drive and Clarke Avenue (Hudson's Hope)	85	-	-	85	-	110	125	89	104	141	104	126	80
				21%		57%	79%	27%	49%	101%	41%	59%	-6%
Highway 29 / 50th Street and Highway 97 (Chetwynd)	567	-	-	701	-	802	686	725	489	700	632	739	637
				48%		69%	44%	53%	3%	47%	26%	37%	12%
Highway 29 and Jackfish Lake Road (Chetwynd)	175	-	-	211	-	204	220	242	189	231	197	204	234
				44%		39%	50%	65%	29%	57%	26%	22%	34%
Highway 97 and Old Fort Road / 100 Avenue (Fort St. John)	1713	1804	1722	1701	1521	1728	1684	1780	1732	1728	1737	1717	1871
		26%	20%	19%	6%	21%	17%	24%	21%	21%	15%	5%	9%
Highway 97 and 100 Street (Fort St. John)	1705	1766	1692	1629	1739	1739	1675	1677	1602	1538	1630	1662	-
		24%	18%	14%	22%	22%	17%	17%	12%	8%	8%	2%	
Highway 97 and 85 Avenue / 92A Street (Fort St. John)	1479	1629	1339	1338	1411	1506	1469	1521	1433	1321	1335	1382	-
		32%	8%	8%	14%	22%	19%	23%	16%	7%	2%	-2%	
Old Fort Road and 85 Avenue (Fort St. John)	157	168	119	111	197	285	182	230	217	226	318	378	289
		28%	-9%	-15%	50%	118%	39%	76%	66%	73%	152%	152%	84%
100 Street / 265 Road and 85 Avenue (Fort St. John)	293	350	267	263	253	359	276	325	364	339	382	362	-
		42%	9%	7%	3%	46%	12%	32%	48%	38%	47%	30%	

Note: *Peak traffic demand in Fort St. John occurred in October / November quarterly count period and data collection only collected in May in Chetwynd and Hudson's Hope.

** Peak traffic demand in Fort St. John occurred in December quarterly count period and data only collected in May in Chetwynd and Hudson's Hope.

Jun* Counts were undertaken in May in Hudsons Hope, June in Chetwyn and July in Fort St John.

Table 4 | Year 9 Intersection Traffic Comparison – PM Peak

Intersection	2024 - PM	2015	2016	2016	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Background	Nov	Feb	Apr	Jul	May	May	Peak*	Peak**	May	May	Jun	Jun*
	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)
Learmonth Street / Beattie Drive and Canyon Drive (Hudson's Hope)	187	-	-	222	-	259	282	271	211	234	250	259	261
				41%		65%	80%	73%	34%	49%	51%	45%	40%
Canyon Drive and Clarke Avenue (Hudson's Hope)	127	-	-	137	-	170	169	159	144	164	155	153	146
				28%		59%	58%	49%	35%	53%	37%	26%	15%
Highway 29 / 50th Street and Highway 97 (Chetwynd)	858	-	-	944	-	1027	1014	1079	996	994	946	1041	932
				31%		43%	41%	50%	39%	38%	25%	27%	9%
Highway 29 and Jackfish Lake Road (Chetwynd)	250	-	-	241	-	243	266	309	292	281	239	307	307
				15%		16%	27%	47%	39%	34%	8%	28%	23%
Highway 97 and Old Fort Road / 100 Avenue (Fort St. John)	1930	2056	1857	1941	1958	2233	1805	2083	2130	2185	2275	2400	2399
		27%	15%	20%	21%	38%	12%	29%	32%	35%	33%	30%	24%
Highway 97 and 100 Street (Fort St. John)	2201	2416	2040	2126	2190	2354	1984	2288	2302	2184	2398	2256	-
		31%	11%	15%	19%	28%	8%	24%	25%	19%	23%	8%	
Highway 97 and 85 Avenue / 92A Street (Fort St. John)	1520	1779	1527	1530	1815	1903	1530	1848	1776	1640	1740	1802	-
		40%	20%	20%	43%	49%	20%	45%	40%	29%	30%	25%	
Old Fort Road and 85 Avenue (Fort St. John)	156	209	181	178	187	266	231	297	354	267	338	420	337
		61%	39%	37%	44%	105%	78%	128%	172%	105%	149%	182%	116%
100 Street / 265 Road and 85 Avenue (Fort St. John)	345	329	328	245	282	365	284	346	354	386	399	406	-
		13%	13%	-16%	-3%	26%	-2%	19%	27%	33%	30%	23%	

Note: *Peak traffic demand in Fort St. John occurred in October / November quarterly count period and data collection only collected in May in Chetwynd and Hudson's Hope.

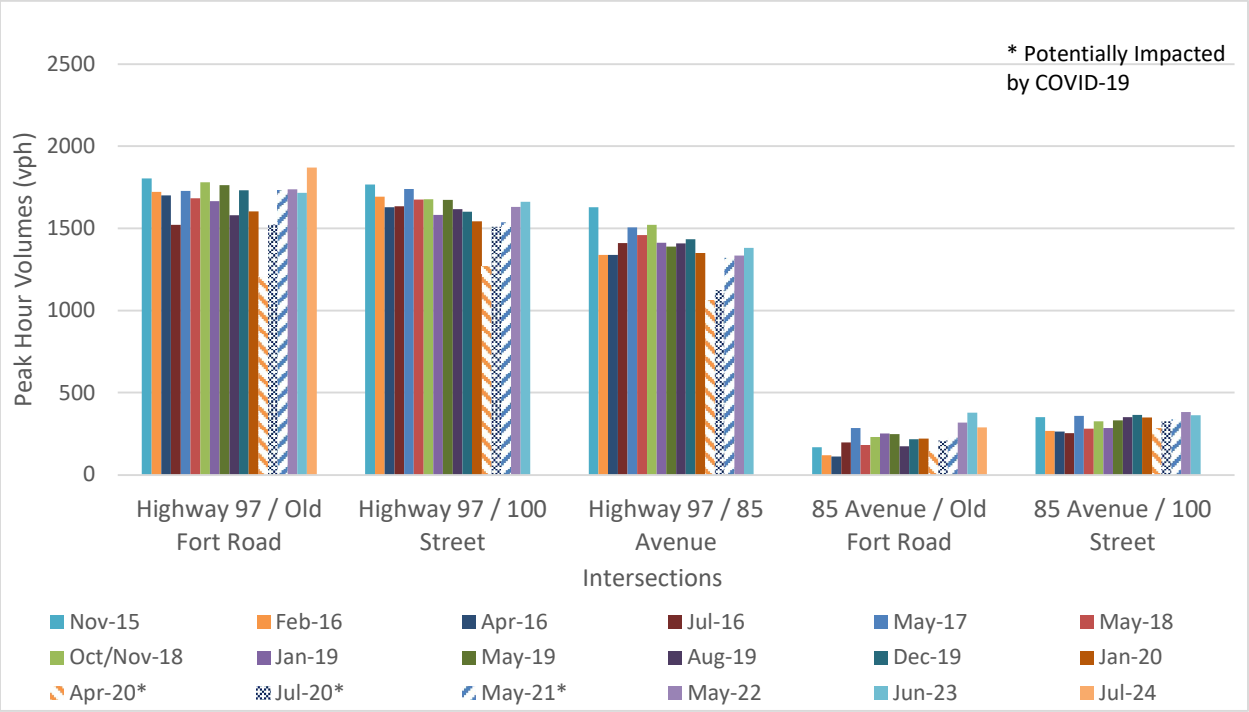
** Peak traffic demand in Fort St. John occurred in December quarterly count period and data only collected in May in Chetwynd and Hudson's Hope.

Jun* Counts were undertaken in May in Hudsons Hope, June in Chetwynd and July in Fort St John.

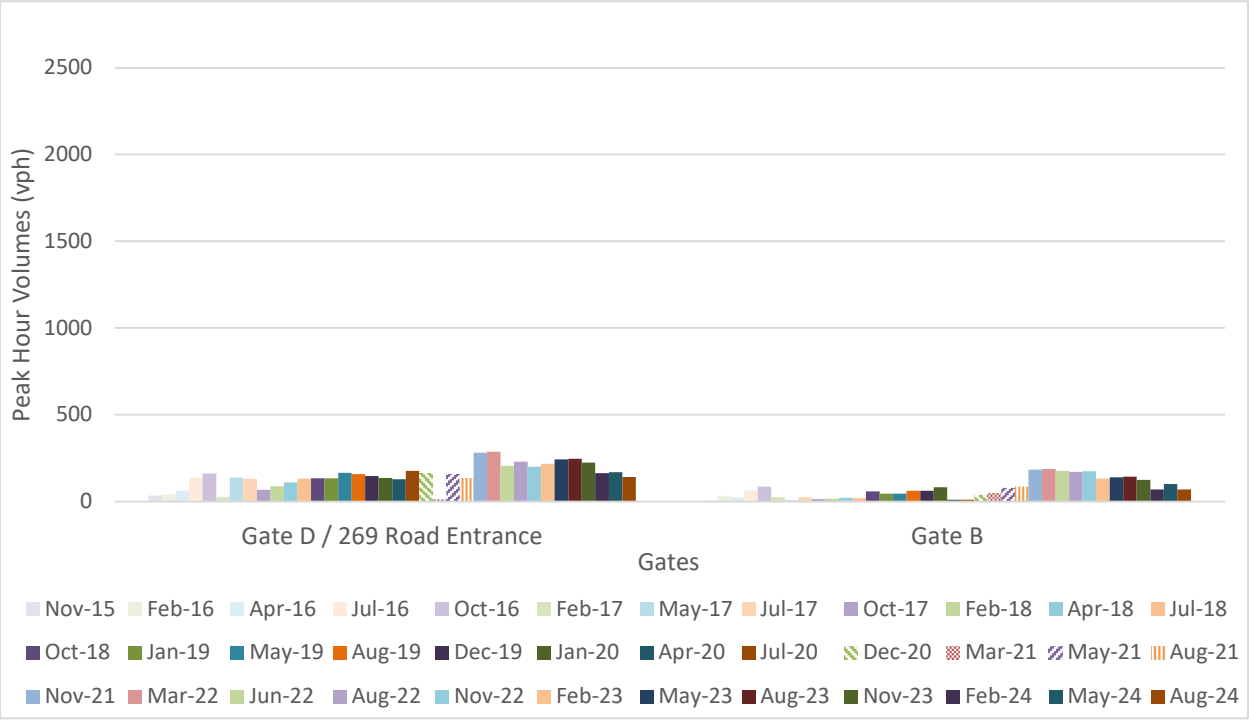
Figure 4 and **Figure 5** illustrate the AM and PM peak hour traffic volumes at the study intersections in Fort St. John. Note that the data collection program was conducted once annually for Year 2 (2017), Year 3 (2018), Year 6 (2021), and Year 7 (2022) while Year 1 (2016), Year 4 (2019) and Year 5 (2020) data was collected quarterly at key intersections in Fort St. John, as required. Traffic volumes for Year 9 Construction of the area are illustrated in **Appendix B.**

Activities at both Gate D and Gate B were similar to Year 8 in November 2023 (-11% to 9%), but were significantly lower in Year 9 than Year 8 in Ferbruary, May and August 2024 (-29% to -55%). The peak construction activities recorded at Gate B and Gate D (269 Road entrance) occurred during the November quarter for both gates.

Figure 4 | Year 9 Peak Hour Entering Traffic Comparison – AM: (a) Studied Intersections; (b) Gate B and Gate D

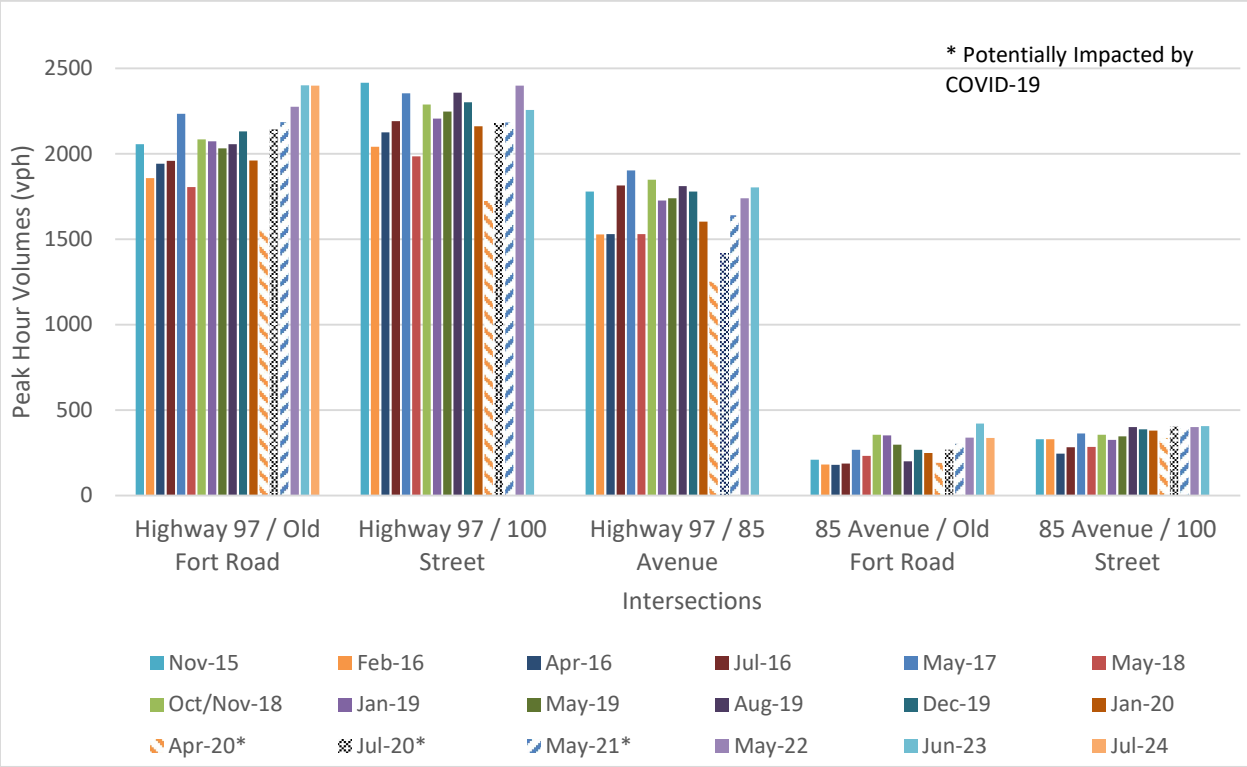


(a)

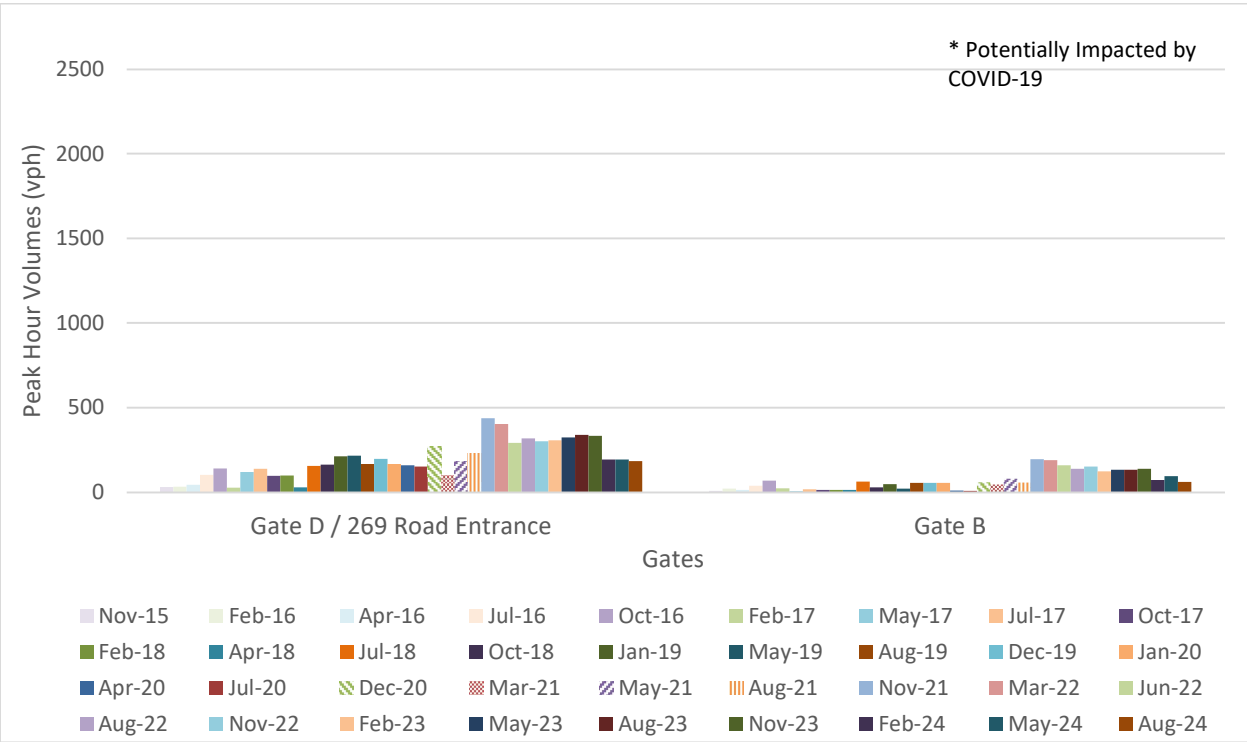


(b)

Figure 5 | Year 9 Peak Hour Entering Traffic Comparison – PM (a) Studied Intersections; (b) Gate B and Gate D



(a)



(b)

STUDY INTERSECTION PEAK HOURS

Year 9 Peak Hours

Figure 6 and **Figure 7** illustrate the percentage of hourly intersection volumes compared against the peak hour volume at the same intersection at the AM and PM peak periods.

Figure 6 | Hourly Intersection Traffic Comparison – AM Peak – Year 9 Peak Traffic (May/June/July)

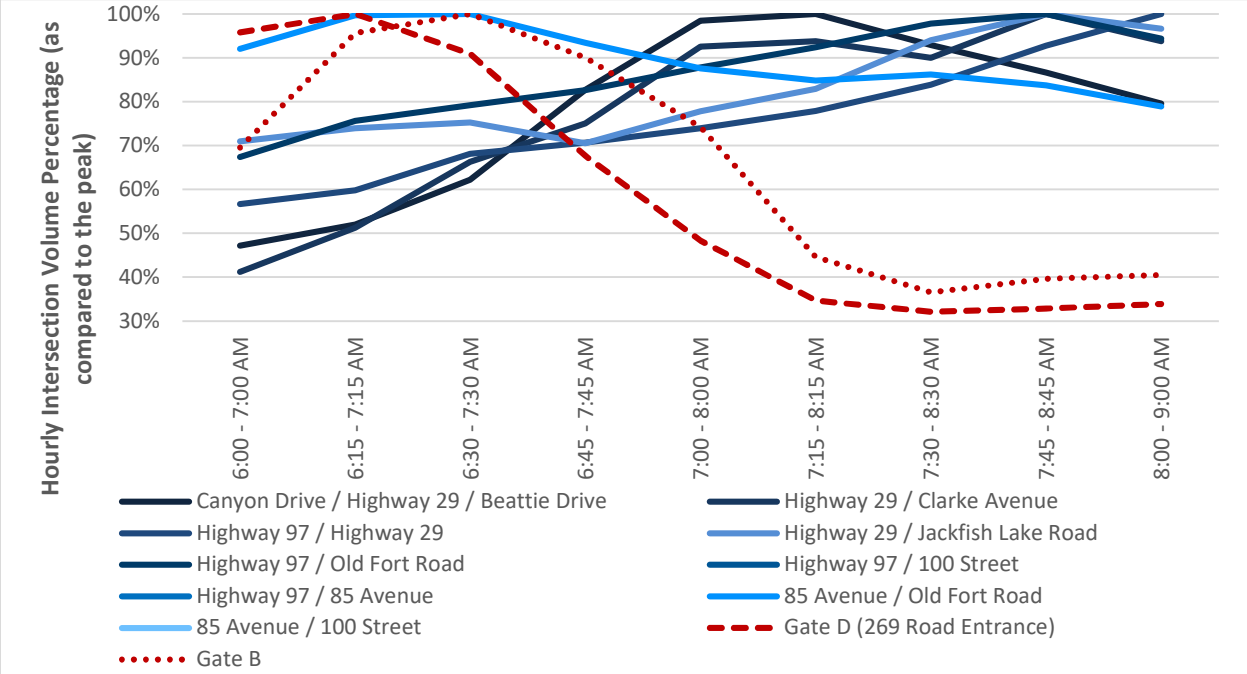
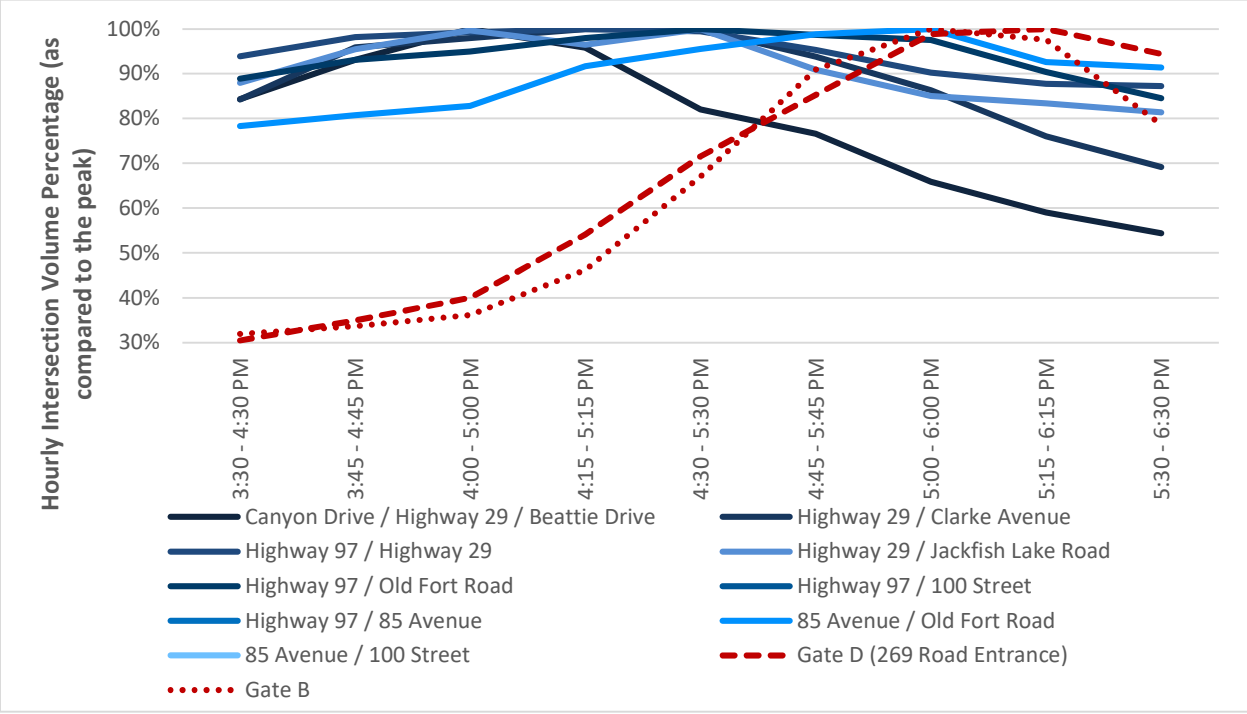


Figure 7 | Hourly Intersection Traffic Comparison – PM Peak – Year 9 Peak Traffic (May/June/July)



Key findings include:

AM Peak Hour |

- It was identified that the construction traffic peaked at a different time compared to typical commuter traffic during the AM peak period for most study intersections. Commuter traffic volumes at the study intersections peaked between 7:45 AM and 8:45 AM or 7:15 AM to 8:15 AM while construction activities recorded at Gate B and Gate D (269 Road entrance) peaked earlier, between 6:15 AM and 7:30 AM.
- The peak hour timing at 85 Avenue and Old Fort Road in Fort St. John aligned with the Gate Peak hours at 6:15-7:13 AM.
- Highway 97 and Old Fort Road in Fort St. John peaked later than the gates, between 7:45-8:45 AM.
- Intersections in Hudsons Hope peaked earlier than Fort St. John and Chetwynd, with Canyon Drive, Highway 29 and Beattie Drive peaking at 7:15-8:15 AM. Although Highway 29 and Clarke Avenue shows a higher traffic volume at this time, the morning peak is still 7:45-8:45 AM.
- Intersections in Chetwynd peaked later, from 7:45-9:00 AM.

PM Peak Hour |

- Construction volumes at Gate B and Gate D (269 Road entrance) peak activities did not coincide with commuter traffic peak traffic volumes, except for 85 Avenue and Old Fort Road.

TRAFFIC OPERATIONAL ANALYSIS

Synchro (Version 11) software was used to evaluate the performance of intersections in the study area for the study scenarios during both AM and PM peak hours. Reported measures of traffic performance include volume to capacity (v/c) ratio and a delay-based traffic Level of Service (LOS) indicator ranging from LOS A (ideal) to LOS F (over-saturated) conditions. As a rule, LOS E and F indicate congested operations.

The results of the traffic analysis were compared against thresholds to determine traffic operational deficiencies. As indicated in the TMMP, the thresholds are:

- Delays that result in vehicles experiencing a degradation in two LOS or more (relative to service levels associated with no Project traffic); and
- 95th percentile left and right turn queue lengths that exceed the available storage. The 95th percentile queue length is the maximum back of the queue with 95th percentile traffic volumes (on a typical cycle). The 95th percentile queue is not typically experienced mainly when upstream metering controls the incoming volumes; therefore, the queue is not necessarily observed. The 95th percentile queue represents the worst-case scenario and is used as an indicator to determine where further examination of storage length is required. The value reported as the 95th percentile queue must be used with caution since it may result in a significant over-design if applied as reported. Therefore, for movements where the 95th percentile queue exceeds the storage length, 50th percentiles were also reviewed. 50th percentile queue length represents the maximum back of the queue with 50th percentile traffic volumes.

Year 9 Traffic Operational Analysis

Table 5 and **Table 6** summarize the capacity analysis results for the Year 9 (2024) background/baseline and total scenarios during the AM and PM peak hours respectively.

Key findings include:

- All movements operate at LOS C or better during the AM peak hour for Year 9 Construction.
- All movements operate at LOS C or better during the PM peak hour for Year 9 Construction, except for the following:
  - Eastbound left turn movement at the intersection of Highway 97 and Old Fort Road / 100 Avenue which operates at LOS D in the 2024 Total PM peak scenario. Compared to the 2024 Background PM peak scenario, this movement has experienced a one LOS degradation **and would, therefore, not constitute an operational deficiency**.
- For all movements, 95th percentile queue lengths do not exceed the available storage during the AM peak hour for Year 9 Construction.
- 95th percentile queue lengths exceed the available storage during the PM peak hour for Year 9 Construction only for the following movements:
  - Shared eastbound through-right movement at the intersection of Highway 97 and Old Fort Road / 100 Avenue. However, the 95th percentile queue for this movement does not exceed the available storage length in the 2024 Background PM peak scenario. In the 2024 Total PM peak scenario, the 95th percentile queue exceeds the available storage length by approximately three car lengths (22 m). The queue spills over to the adjacent intersection of Old Fort Road and Alaska Road S. However, the average queue for this movement does not exceed the available storage length under this scenario.

Table 5 | Operational Analysis Result – 2024 (AM)

Location	Movement	Background 2024 AM Peak Hour					Total 2024 AM Peak Hour				
		LOS	Delay (s)	V/C Ratio	Queue (m)	Storage (m)	LOS	Delay (s)	V/C Ratio	Queue (m)	Storage (m)
Learmonth Street / Beattie Drive and Canyon Drive	*EB L/T/R*	A	1	0.00	0	90	A	0	0.00	0	90
	WB L/T/R	A	5	0.03	1	80	A	4	0.02	1	80
	NB L/T	A	10	0.04	1	>100	A	10	0.11	3	>100
	NB T/R	A	9	0.04	1	>100	A	9	0.04	1	>100
	SB L/T/R	A	10	0.02	1	>100	A	9	0.01	0	>100
Canyon Drive and Clarke Avenue	*WB L/R*	A	9	0.02	1	>100	A	9	0.00	0	>100
	NB T/R	A	0	0.03	0	>100	A	0	0.03	0	>100
	SB L/T	A	2	0.01	0	>100	A	0	0.00	0	>100
Highway 29 / 50th Street and Highway 97	*EB L*	A	9	0.06	5	75	A	9	0.06	6	75
	EB T	A	9	0.15	17	>100	A	9	0.17	17	>100
	EB R	A	2	0.02	1	70	A	4	0.04	2	70
	WB L	A	9	0.03	3	35	A	9	0.07	7	35
	WB T	A	9	0.22	18	>100	A	9	0.21	25	>100
	WB R	A	3	0.13	5	80	A	4	0.09	5	80
	NB L	A	9	0.03	3	40	A	9	0.07	4	40
	NB T/R	A	7	0.15	5	15	A	5	0.14	6	15
	SB L	B	11	0.21	10	85	B	11	0.24	9	85
	SB T	A	9	0.06	4	>100	A	9	0.07	4	>100
	SB R	A	4	0.10	2	20	A	4	0.09	2	20
Highway 29 and Jackfish Lake Road	*WB L/R*	A	9	0.07	2	>100	B	10	0.12	3	>100
	NB T	A	0	0.01	0	>100	A	0	0.03	0	>100
	NB R	A	0	0.07	0	20	A	0	0.04	0	20
	SB L	A	7	0.01	0	40	A	8	0.00	0	40
	SB T	A	0	0.02	0	>100	A	0	0.07	0	>100
Highway 97 and Old Fort Road / 100 Avenue	*EB L*	C	23	0.13	7	40	C	26	0.39	23	40
	EB T/R	B	18	0.35	28	65	B	18	0.34	32	65
	WB L	C	23	0.30	21	50	C	22	0.32	27	50
	WB T/R	C	27	0.75	51	95	C	23	0.64	61	95
	NB L	B	10	0.24	11	160	B	12	0.36	16	160
	NB T	C	27	0.68	46	>200	C	29	0.66	37	>200
	NB R	A	6	0.20	9	90	A	6	0.21	8	90
	SB L	B	13	0.57	29	145	B	15	0.57	34	145
	SB T	B	18	0.35	32	>200	C	24	0.53	35	>200
	SB R	A	0	0.04	0	90	A	6	0.24	1	90
Old Fort Road and 85 Avenue	*WB L/R*	A	9	0.07	2	>200	B	11	0.13	3	>200
	NB T/R	A	0	0.05	0	>200	A	0	0.05	0	>200
	SB L/T	A	3	0.02	0	>200	A	1	0.02	0	>200

Note: NB = Northbound, etc.; NBT = Northbound through, etc.; NBT/R = Northbound through and right, etc.
LOS = Level of Service; v/c Ratio = volume to capacity ratio; Queue = 95th percentile queue in metres

Table 6 | Operational Analysis Result – 2024 (PM)

Location	Movement	Background 2024 PM Peak Hour					Total 2024 PM Peak Hour				
		LOS	Delay (s)	V/C Ratio	Queue (m)[1]	Storage (m)	LOS	Delay (s)	V/C Ratio	Queue (m)[1]	Storage (m)
Learmonth Street / Beattie Drive and Canyon Drive	*EB L/T/R*	A	2	0.02	0	90	A	2	0.02	0	90
	WB L/T/R	A	6	0.04	1	80	A	6	0.05	1	80
	NB L/T	B	11	0.05	1	>100	B	11	0.09	2	>100
	NB T/R	A	9	0.07	2	>100	A	10	0.11	3	>100
	SB L/T/R	B	11	0.04	1	>100	B	11	0.05	1	>100
Canyon Drive and Clarke Avenue	*WB L/R*	A	10	0.03	1	>100	A	9	0.02	1	>100
	NB T/R	A	0	0.06	0	>100	A	0	0.05	0	>100
	SB L/T	A	0	0.00	0	>100	A	1	0.01	0	>100
Highway 29 / 50th Street and Highway 97	*EB L*	B	11	0.12	7	75	A	9	0.10	7	75
	EB T	B	11	0.21	17	>100	A	9	0.27	32	>100
	EB R	A	4	0.06	3	70	A	4	0.05	3	70
	WB L	B	10	0.10	6	35	A	9	0.05	6	35
	WB T	B	11	0.15	14	>100	A	9	0.25	28	>100
	WB R	A	4	0.22	7	80	A	3	0.13	7	80
	NB L	A	9	0.11	6	40	A	10	0.12	8	40
	NB T/R	A	7	0.22	8	15	A	5	0.17	7	15
	SB L	B	16	0.53	26	85	B	12	0.30	17	85
	SB T	A	9	0.11	9	>100	A	9	0.07	6	>100
	SB R	A	4	0.13	4	20	A	2	0.05	2	20
Highway 29 and Jackfish Lake Road	*WB L/R*	B	11	0.24	7	>100	B	11	0.17	5	>100
	NB T	A	0	0.02	0	>100	A	0	0.02	0	>100
	NB R	A	0	0.04	0	20	A	0	0.05	0	20
	SB L	A	7	0.01	0	40	A	7	0.01	0	40
	SB T	A	0	0.04	0	>100	A	0	0.07	0	>100
Highway 97 and Old Fort Road / 100 Avenue	*EB L*	C	26	0.27	11	40	D	42	0.65	40	40
	EB T/R	C	21	0.58	42	65	C	28	0.65	**87** [39]	65
	WB L	C	30	0.50	28	50	C	30	0.40	27	50
	WB T/R	C	22	0.71	39	95	C	25	0.64	76	95
	NB L	A	9	0.25	11	160	B	13	0.41	17	160
	NB T	C	24	0.64	49	>200	C	31	0.75	52	>200
	NB R	A	6	0.21	8	90	A	6	0.23	9	90
	SB L	B	11	0.49	28	145	B	17	0.67	28	145
	SB T	B	18	0.43	40	>200	C	27	0.73	52	>200
	SB R	A	0	0.04	0	90	A	3	0.12	5	90
	WB L/R	A	9	0.06	2	>200	B	10	0.07	2	>200

Old Fort Road and 85 Avenue	*NB T/R*	A	0	0.05	0	>200	A	0	0.14	0	>200
	SB L/T	A	3	0.02	0	>200	A	1	0.01	0	>200

Note: NB = Northbound, etc.; NBT = Northbound through, etc.; NBT/R = Northbound through and right, etc.
LOS = Level of Service; v/c Ratio = volume to capacity ratio; Queue = 95th percentile queue in metres
Level of service higher than LOS D or queues exceeding storage lengths have been highlighted in red.
[1]For movements where the 95th percentile queue exceeds the storage length, the 50th percentile queue has been reported in paranthesis.

SUMMARY AND CONCLUSION

Traffic Volumes

- Traffic volumes were not able to be counted in Fort St. John in Year 9 at the interections of Highway 97 and 100 Street, Highway 97 and 85 Avenue, and 85 Avenue and 100 Street due to unknown persons tampering with the cameras.
- There was an increase between 10-35% in traffic volumes in Chetwynd's study intersections in the both the AM and PM peak when compared to the baseline.
- In Hudsons Hope, the Beattie Drive and Canyon Drive intersection has higher volumes in Year 9 (25% to 40%) compared to the baseline than the Canyon Drive and Clarke Avenue intersection (-6% to 15%).
- In Fort St. John, the Old Fort Road and 85 Avenue intersection had higher traffic volumes compared to the baseline in Year 9 (84% to 116%) than the Highway 97, Old Fort Road and 100 Avenue intersection (9% to 24%).
- Although the Old Fort Road intersection had higher volumes compared to the baseline in Year 9 than all other intersections, the traffic volumes in Year 9 were lower than those measured at the intersection in Year 8 in both peak hours (-23% to -41%).
- The measured traffic volumes at the intersection of Highway 97 and Old Fort Road in Fort St. John are higher in Year 9 than at any other point in the project, with 1,871 vph in the AM peak and 2,399 vph in the PM peak.

Hudson's Hope Intersections |

- When compared to the baseline, there was a general increase (15%-40%) in the traffic volumes at both study intersections in Year 9 Construction during both peak hours, except at Canyon Drive and Clarke Avenue which had a decrease of -6% during the AM peak.
- Traffic volumes decreased during the AM peak, and remained similar (±5%) in the PM peak when comparing Year 8 to Year 9 Construction.

Chetwynd Intersections |

- When compared to the baseline, there was a general increase in the traffic volumes at both study intersections in Year 9 Construction during both peak hours.
- The peak for Year 9 Construction at all intersections decreased from Year 8 volumes, except Highway 29 and Jackfish Lake Road increased 16% from Year 8 in the AM Peak.

Fort St. John Intersections |

- Traffic volumes at the study intersections saw a general increase during both AM and PM peak hours when comparing the Year 9 Construction to the baseline.
- When compared to Year 8 Construction, the Year 9 Construction volumes experienced minor changes (0% to 9%) at Old Fort Road / 100 Avenue, and a somewhat significant decrease at the 85 Avenue and Old Fort Road intersection (-23% to -41%).
- The intersection of 85 Avenue and Old Fort Road experienced large increases in Year 9 Construction traffic compared to the baseline, in the order of 84% in the AM Peak and 116% in the PM peak.

Study Intersection Peak Hours

AM Peak Hour |

- It was identified that the construction traffic peaked at a different time compared to typical commuter traffic during the AM peak period for most study intersections. Commuter traffic volumes at the study intersections peaked between 7:45 AM and 8:45 AM or 7:15 AM to 8:15 AM while construction activities recorded at Gate B and Gate D (269 Road entrance) peaked earlier, between 6:15 AM and 7:30 AM.
- The peak hour timing at 85 Avenue and Old Fort Road in Fort St. John aligned with the Gate Peak hours at 6:15-7:13 AM.
- Highway 97 and Old Fort Road in Fort St. John peaked later than the gates, between 7:45-8:45 AM.
- Intersections in Hudsons Hope peaked earlier than Fort St. John and Chetwynd, with Canyon Drive, Highway 29 and Beattie Drive peaking at 7:15-8:15 AM. Although Highway 29 and Clarke Avenue shows a higher traffic volume at this time, the morning peak is still 7:45-8:45 AM.
- Intersections in Chetwynd peaked later, from 7:45-9:00 AM.

PM Peak Hour |

- Construction volumes at Gate B and Gate D (269 Road entrance) peak activities did not coincide with commuter traffic peak traffic volumes, except for 85 Avenue and Old Fort Road.

Traffic Operational Analysis

Key findings of the Year 9 traffic operational analysis include:

- All movements operate at LOS C or better during the AM peak hour for Year 9 Construction.
- All movements operate at LOS C or better during the PM peak hour for Year 9 Construction, except for the eastbound left turn movement at the intersection of Highway 97 and Old Fort Road / 100 Avenue which operates at LOS D and experiences a one LOS degradation compared to background conditions. Therefore, it would not constitute an operational deficiency.
- For all movements, 95th percentile queue lengths do not exceed the available storage during the AM peak hour for Year 9 Construction. During the PM peak hour, the 95th percentile queue length exceeds the storage length only for the shared eastbound through-right movement at the intersection of Highway 97 and Old Fort Road / 100 Avenue. However, the average queue length for this movement does not exceed the available storage length.

Therefore, based on the traffic operational analysis, no LOS deficiency can be observed during Year 9 Construction conditions. Though the forecasted 95th percentile queue length exceeds the available storage length for a movement at one of the study intersections (during the PM peak hour only), the average queue length for this movement does not exceed the storage length.

* * * * *

We trust that this review has been completed to your satisfaction. If you have any questions, please contact me at selby.thannikary@wsp.com or 403-973-1054.

Yours sincerely,

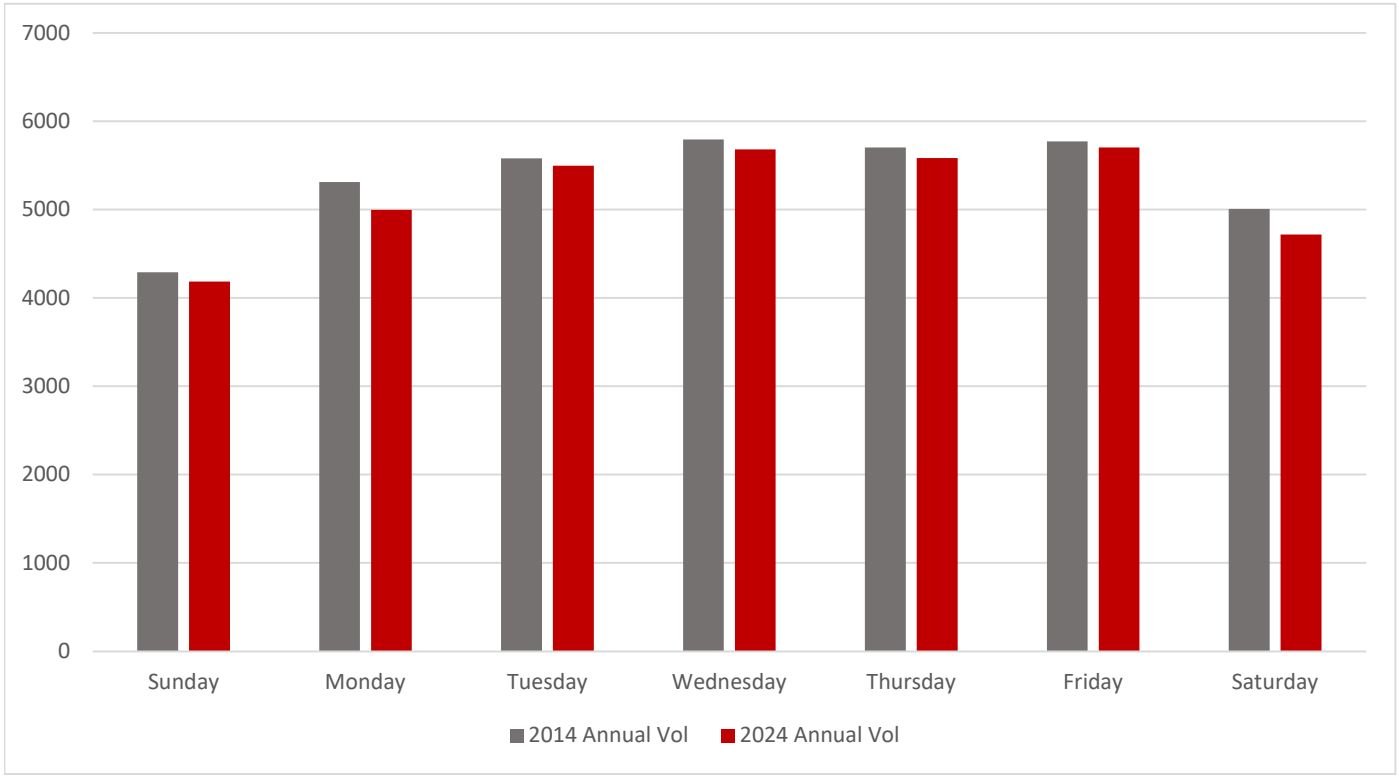
Selby Thannikary, PE (FL, VA), P.Eng. (BC, AB, SK, YT)
Director, Transportation Planning (Canada West)

APPENDIX

A 2014 vs 2024 ANNUAL AVERAGE DAILY TRAFFIC COMPARISONS

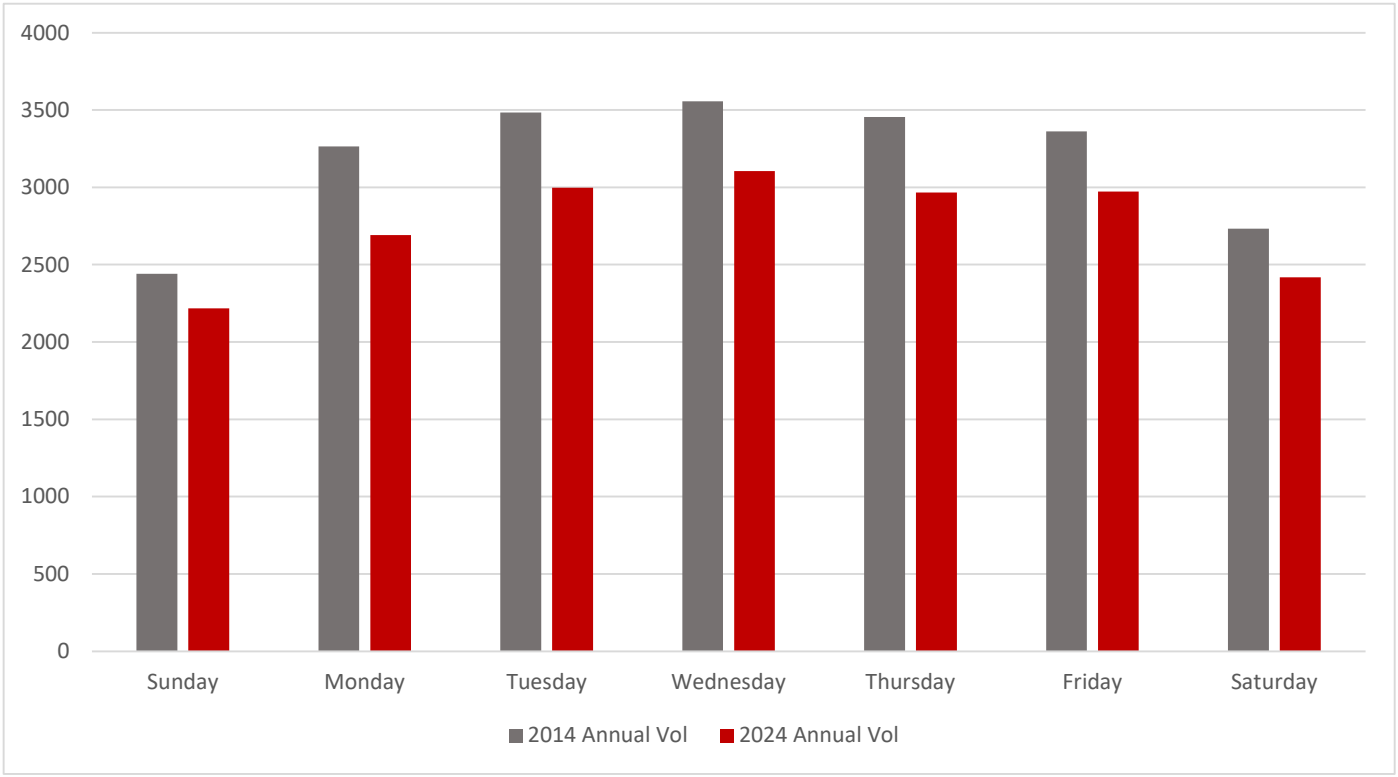
Annual Day of Week Traffic Volumes Comparison
Year: 2014 vs. 2024
Station: Farmington P-43-3NS-NY
Location: Route 97, north of 237 Road Dawson Creek
Appendix A: 2014 vs 2024 Annual Average Daily Traffic Comparisons

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
2014 Annual Vol	4288	5312	5578	5795	5703	5772	5008	5,692
2024 Annual Vol	4184	4997	5495	5681	5583	5703	4716	5,586
%CHANGE	**-2%**	**-6%**	**-1%**	**-2%**	**-2%**	**-1%**	**-6%**	**-2%**



Annual Day of Week Traffic Volumes Comparison
Year: 2014 vs. 2024
Station: Inga Lake P-44-1NS-NY
Location: Route 97, 2.4 km south of Inga Lake Compressor Road, south of Wonowon
Appendix A: 2014 vs 2024 Annual Average Daily Traffic Comparisons

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
2014 Annual Vol	2441	3265	3485	3557	3456	3363	2733	3,499
2024 Annual Vol	2218	2691	2997	3105	2967	2972	2419	3,023
%CHANGE	**-9%**	**-18%**	**-14%**	**-13%**	**-14%**	**-12%**	**-11%**	**-14%**



APPENDIX

B TRAFFIC MOVEMENT DIAGRAMS

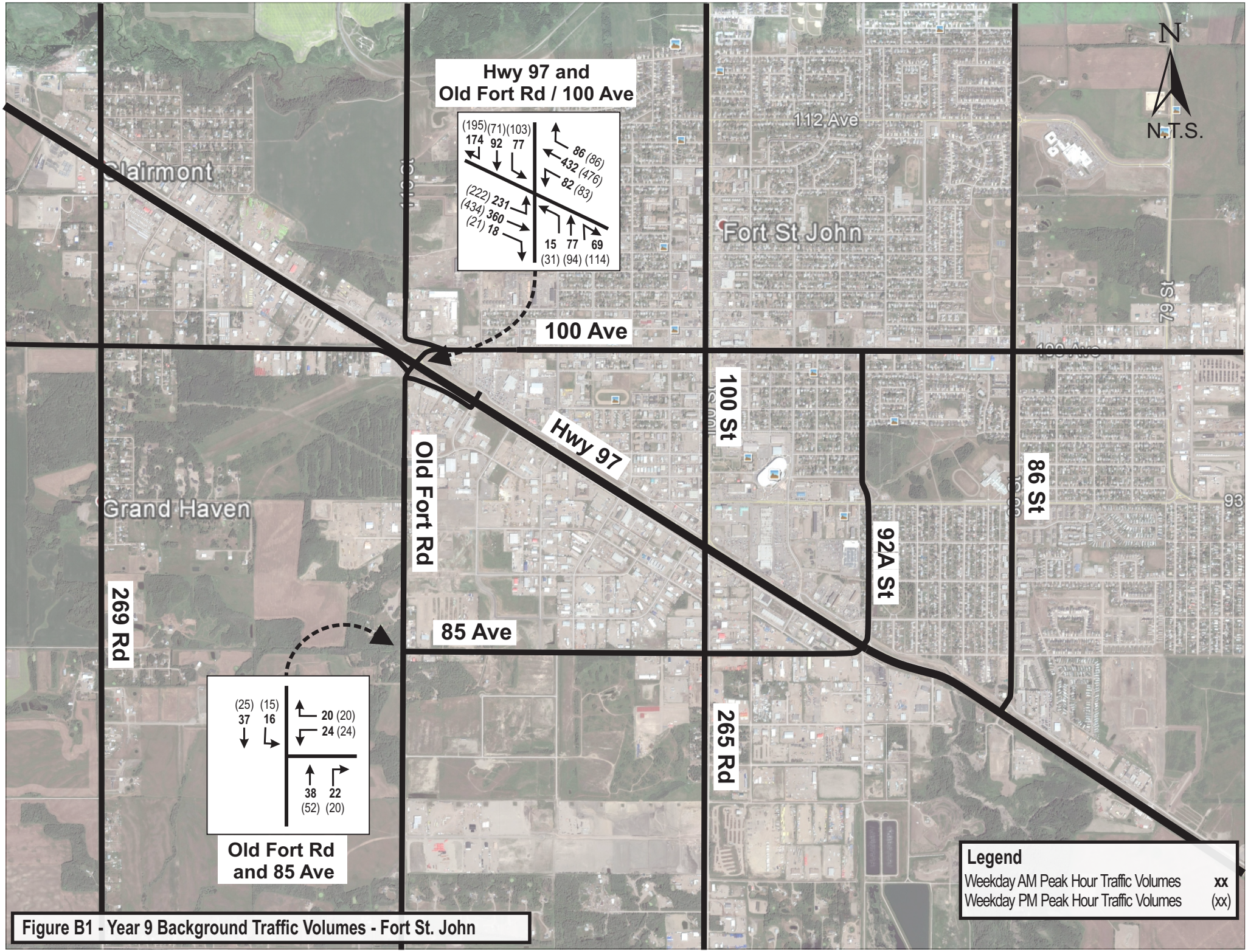


Figure B1 - Year 9 Background Traffic Volumes - Fort St. John

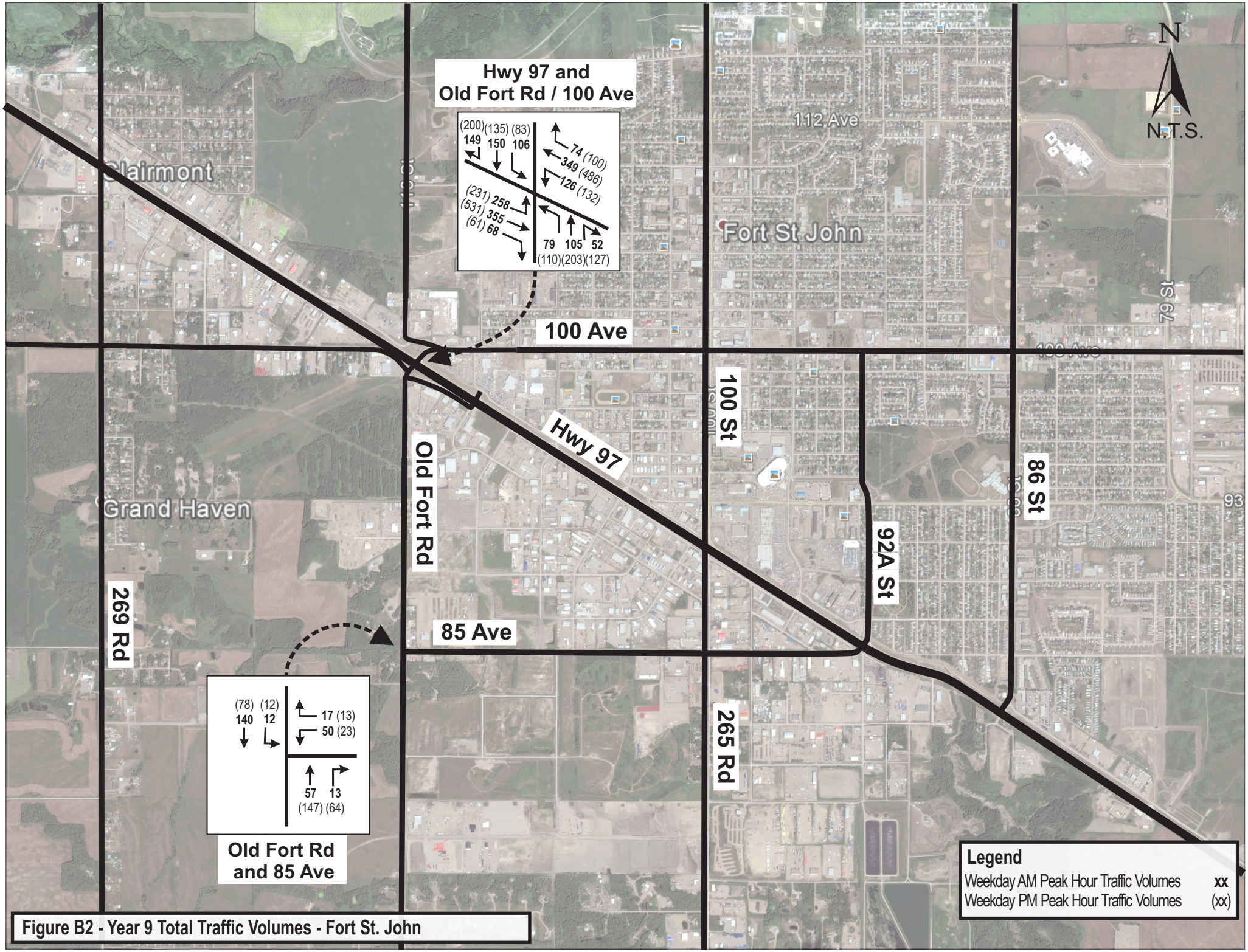


Figure B2 - Year 9 Total Traffic Volumes - Fort St. John

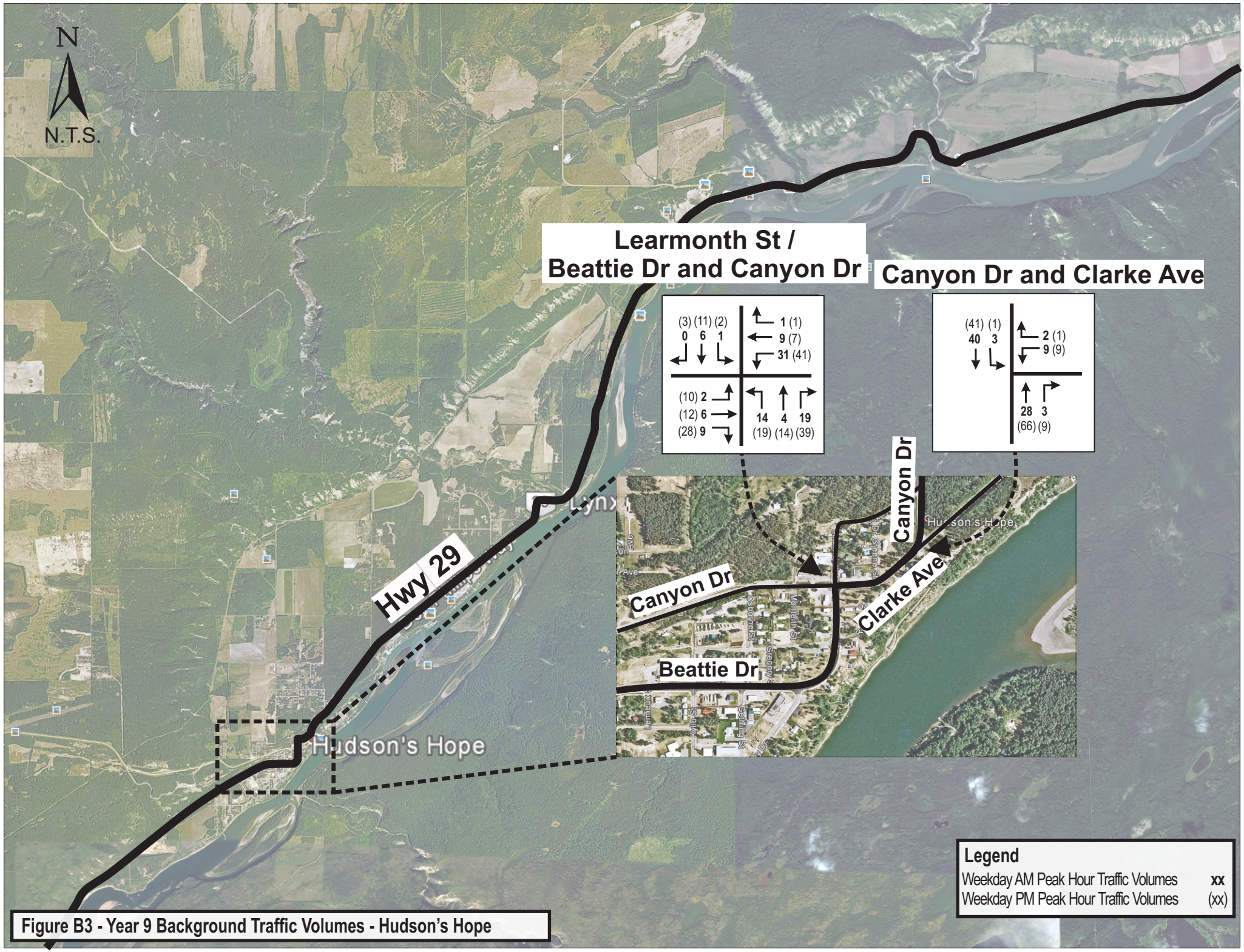


Figure B3 - Year 9 Background Traffic Volumes - Hudson's Hope

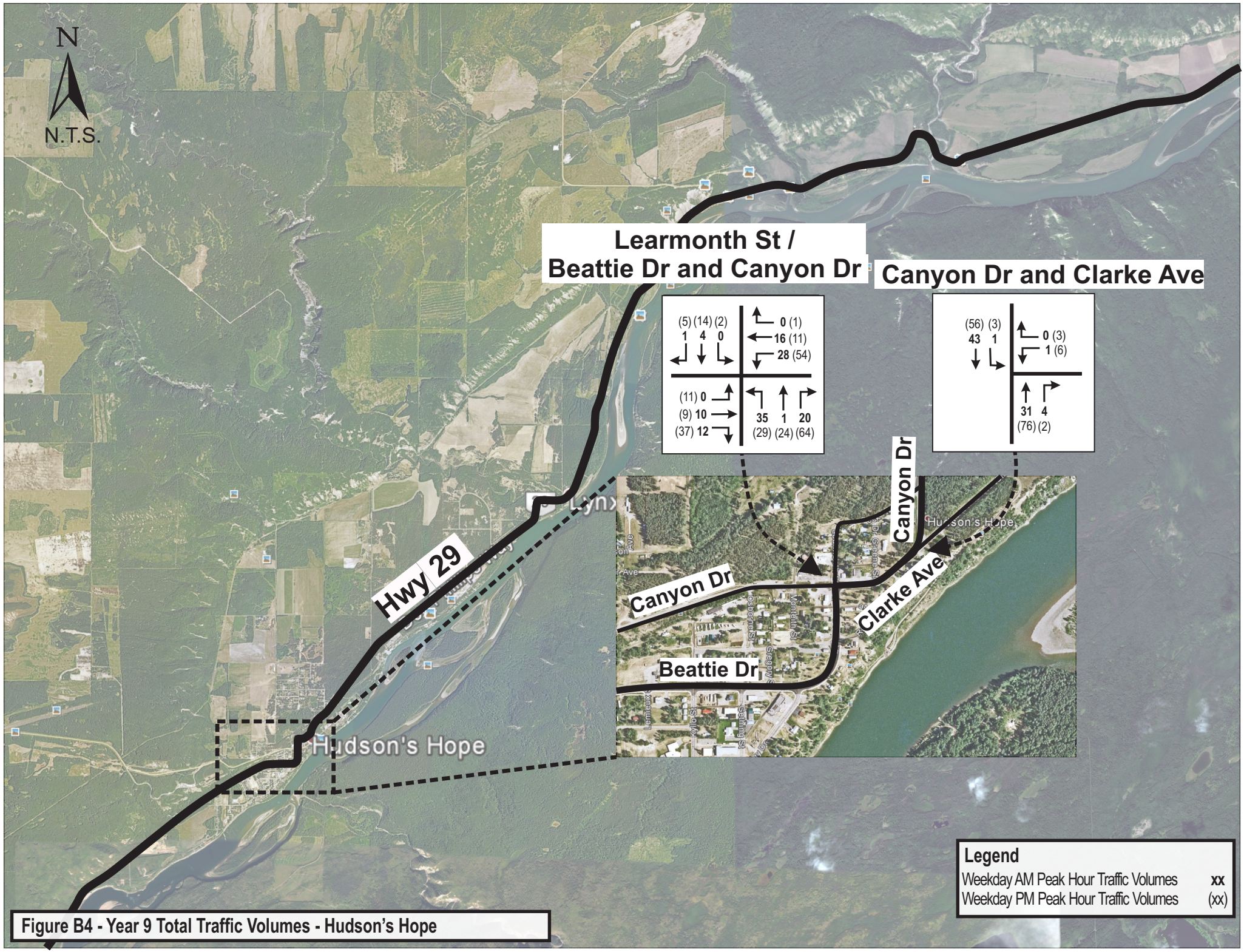


Figure B4 - Year 9 Total Traffic Volumes - Hudson's Hope

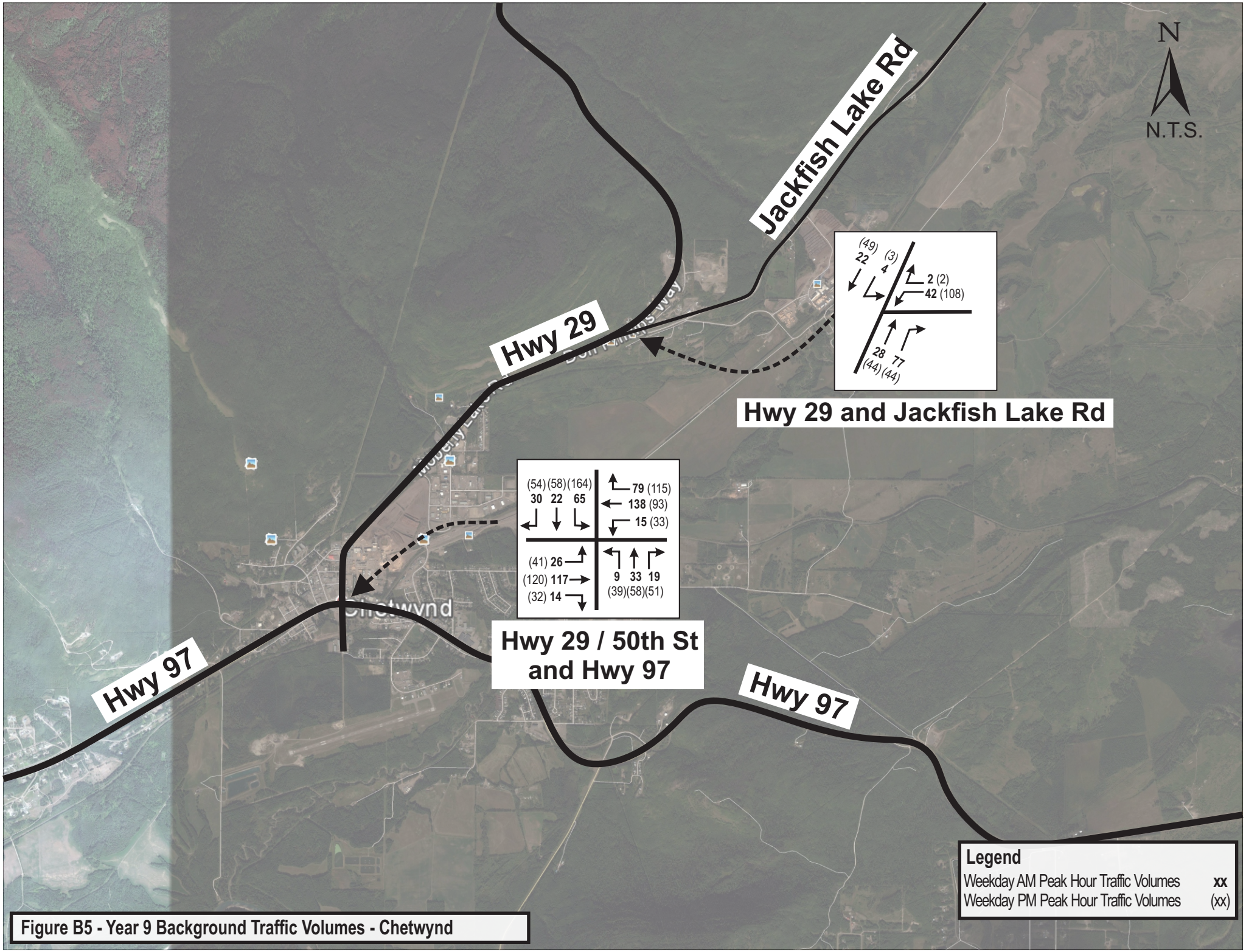


Figure B5 - Year 9 Background Traffic Volumes - Chetwynd

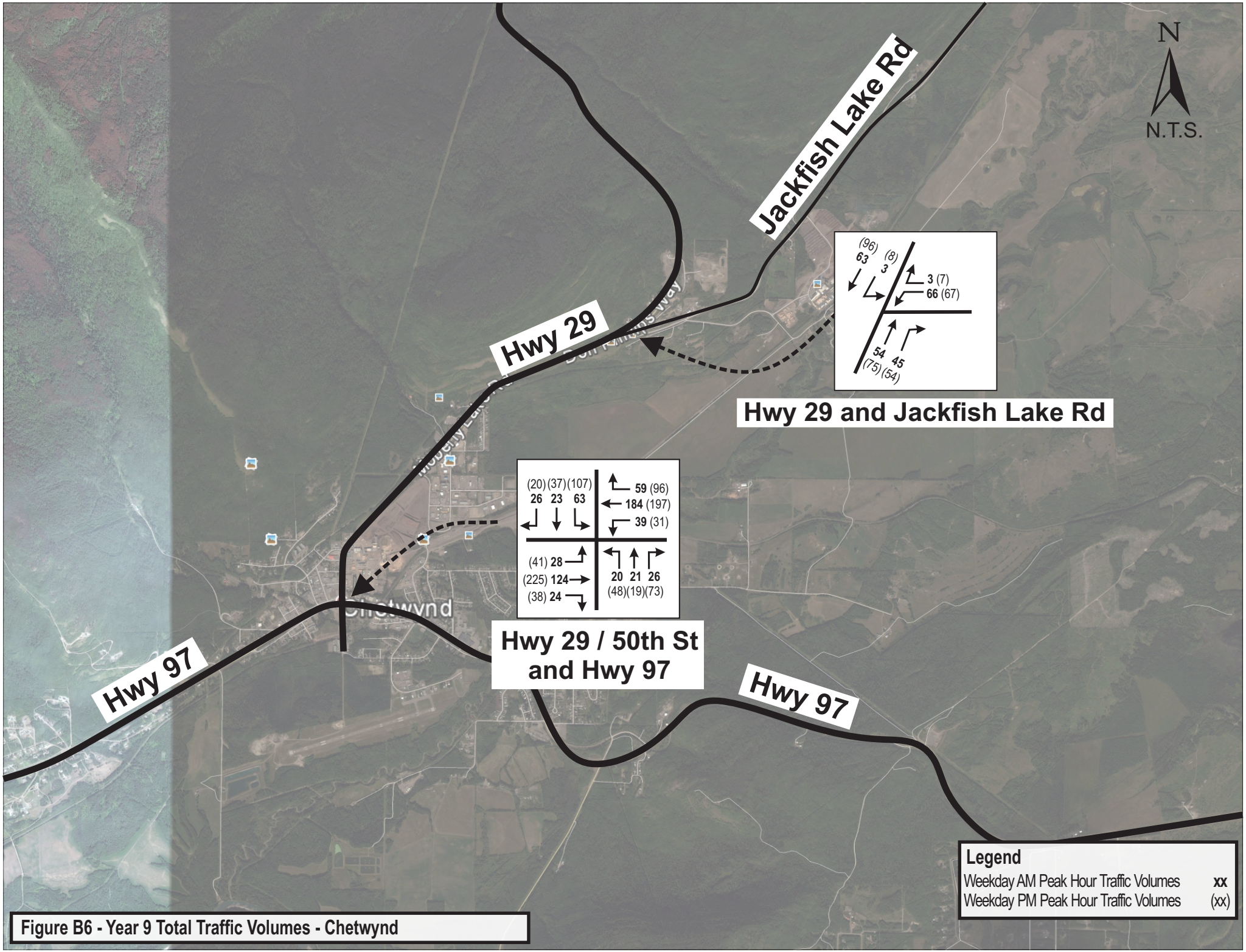


Figure B6 - Year 9 Total Traffic Volumes - Chetwynd

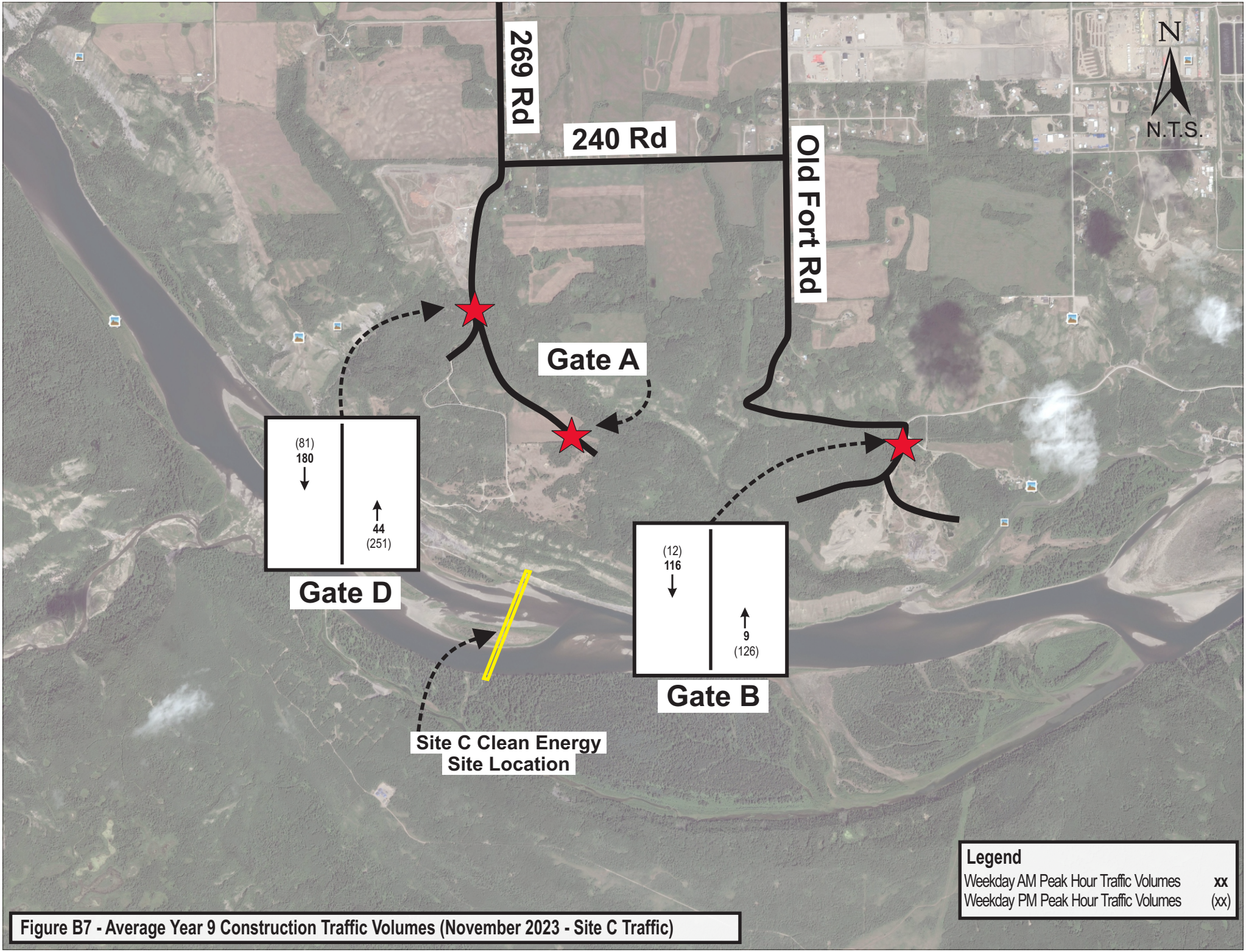


Figure B7 - Average Year 9 Construction Traffic Volumes (November 2023 - Site C Traffic)

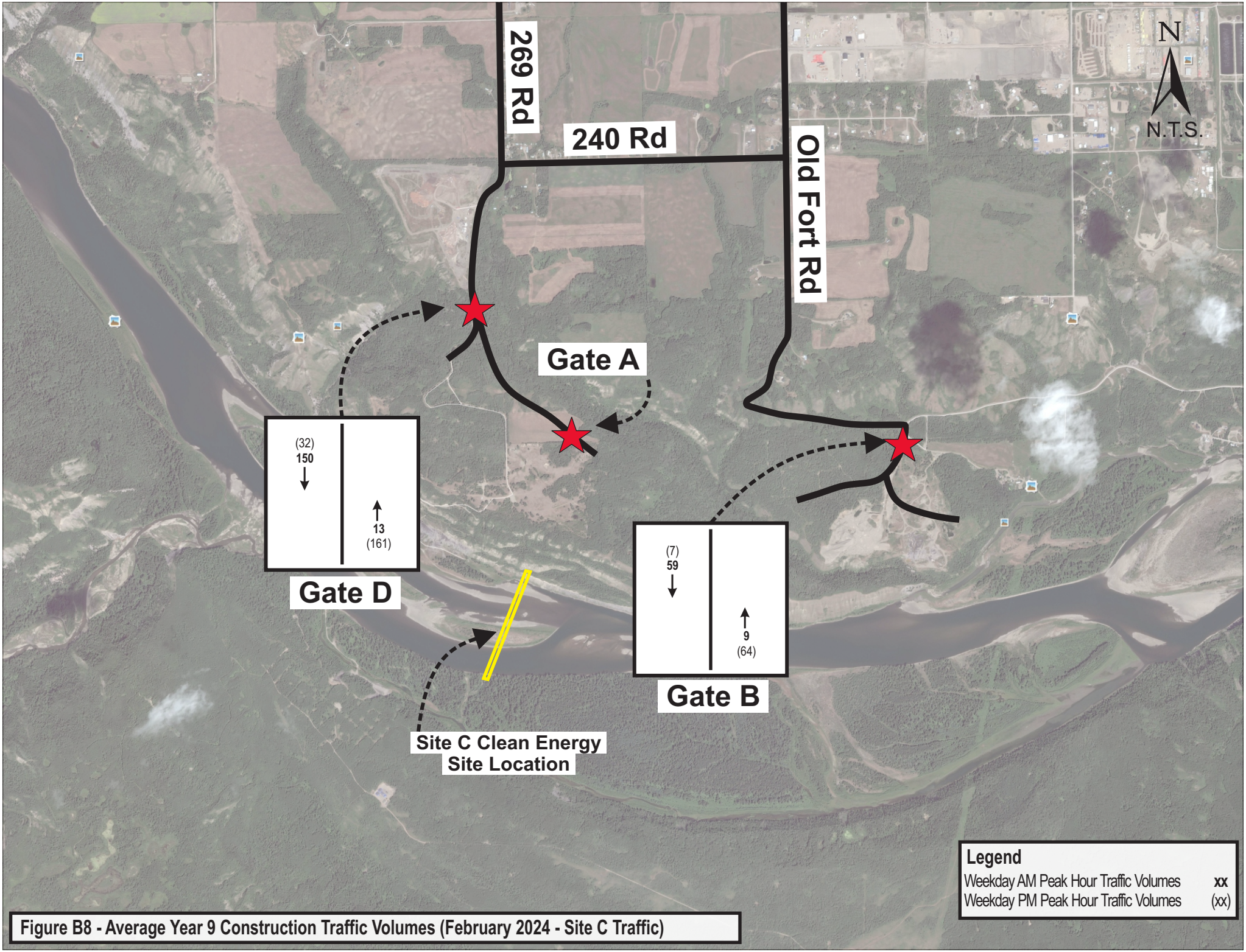


Figure B8 - Average Year 9 Construction Traffic Volumes (February 2024 - Site C Traffic)

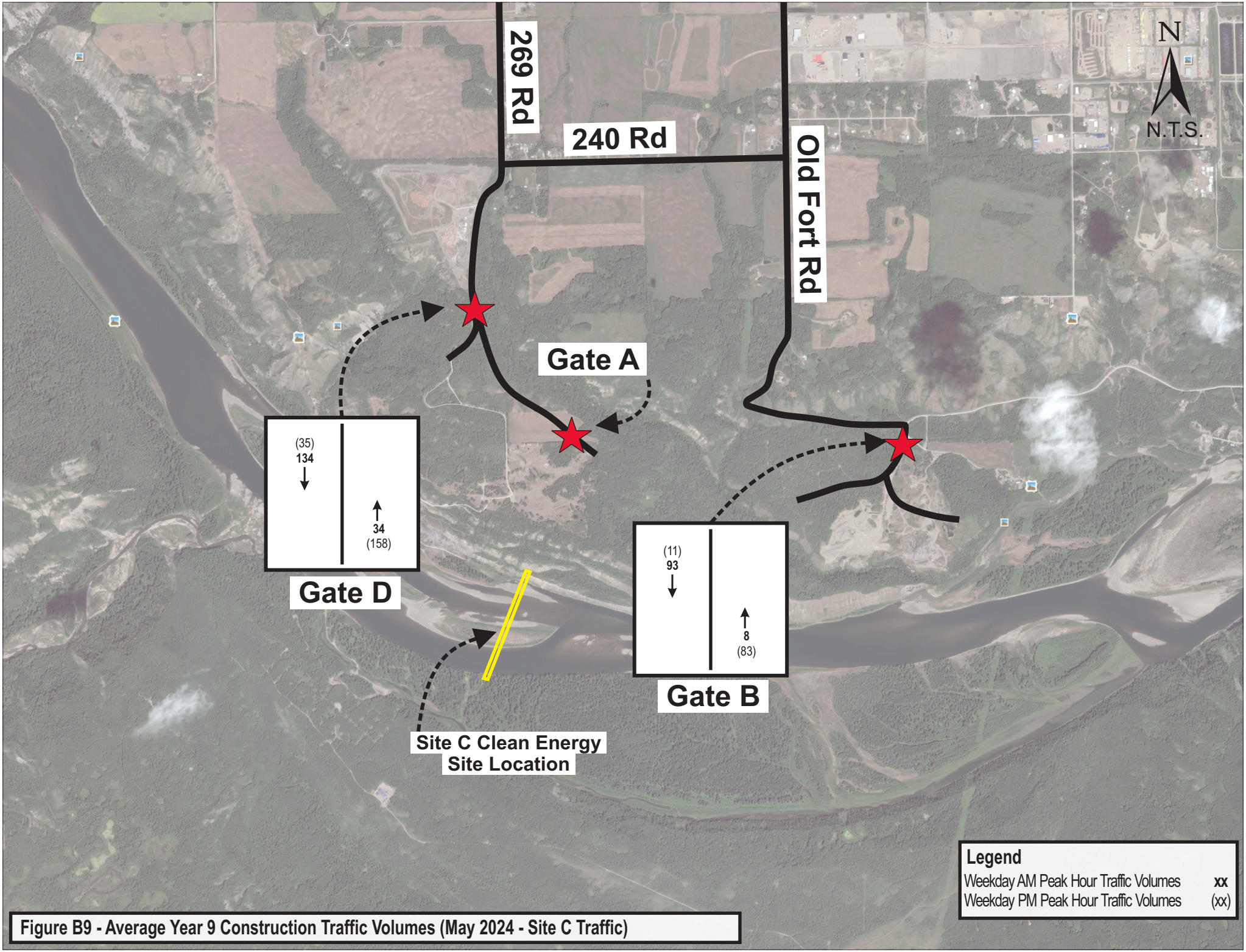


Figure B9 - Average Year 9 Construction Traffic Volumes (May 2024 - Site C Traffic)

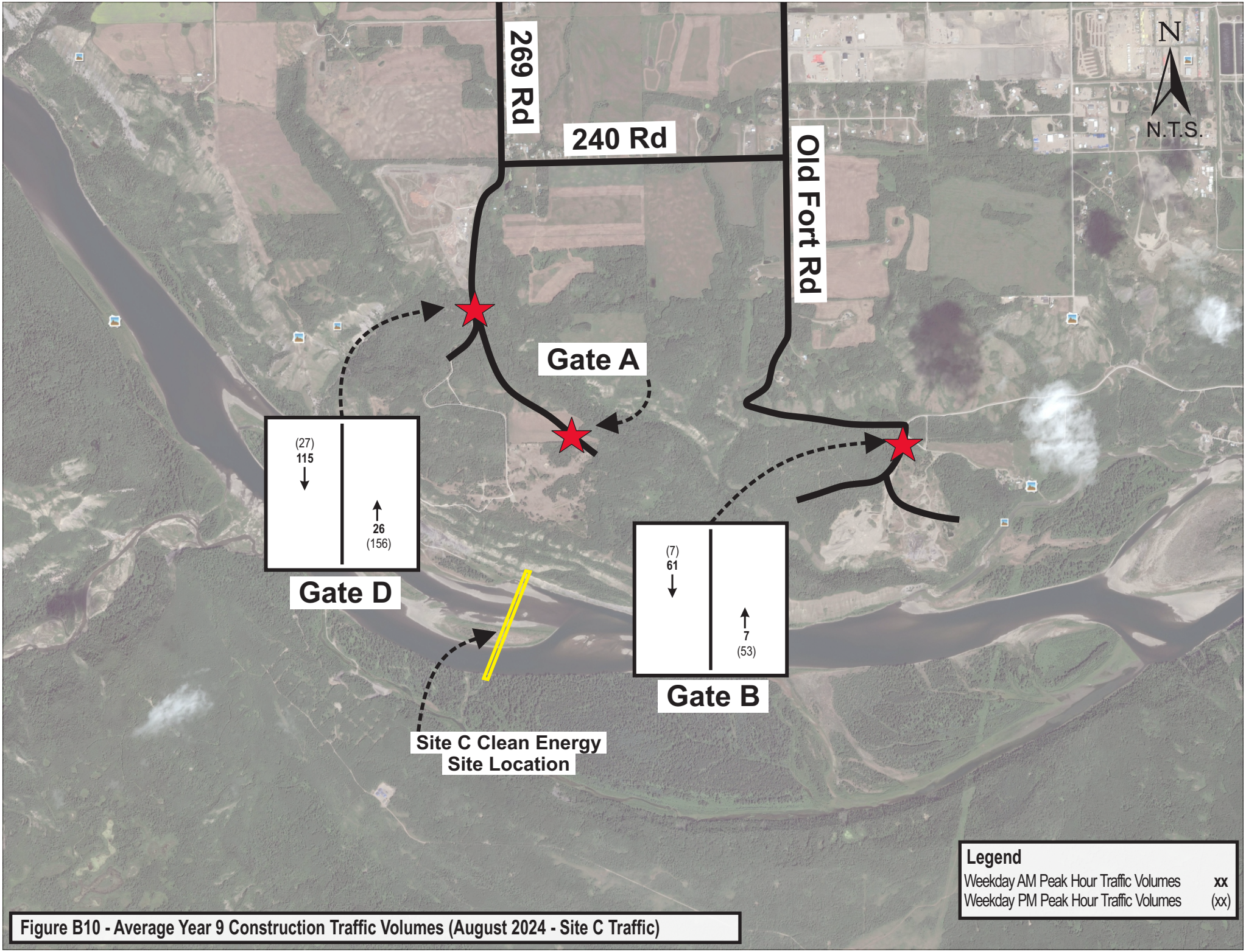


Figure B10 - Average Year 9 Construction Traffic Volumes (August 2024 - Site C Traffic)

Appendix B. Year 9 Road Safety Monitoring Program

2025-03-26

Mr. Ben Rauscher, Project Manager – Community and Social Mitigation Manager

BC Hydro & Power Authority
Site C Clean Energy Project

Subject: Site C Clean Energy Project – Fort St. John, BC: Year 9 Road Safety Monitoring Program – Final

Dear Mr. Rauscher:

WSP Canada Group Limited (WSP) is pleased to provide the following letter report outlining the results and findings for the Year 9 (2024) Road Safety Monitoring Program, which is part of BC Hydro's overall Construction Traffic Monitoring Program for the Site C Clean Energy Project (the Project). Construction started in July 2015 and is expected to be completed in 2024.

1 INTRODUCTION

As part of the Site C Clean Energy Project's Environmental Impact Statement (EIS), BC Hydro developed a Traffic Monitoring and Mitigation Plan (TMMP) that forms the framework for studying the potential effects that the forecasted increase in vehicle traffic during construction on the regional road network may have on traffic operations and road safety.

As such, BC Hydro is committed to providing on-going road safety monitoring efforts at defined intersections in Fort St. John and the Peace River Regional District (PRRD) at regular periods throughout Project construction. A review of the collision statistics at the study intersections are to be undertaken annually. Quarterly reviews may be proposed for periods when construction traffic and baseline traffic are both anticipated to be high such as during the peak year of construction.

This letter report summarizes the results of the Year 9 Construction Traffic Monitoring Program, which identifies collision frequency and potential concerns at the study intersections between August 1, 2023, and July 31, 2024 (Year 9A). Collision data has also been provided for the three months spanning 1 August 2024 to October 31 2024, with reporting on this period included and referred to as Year 9B. Year 9A is the typical monitoring period, while Year 9B represents a 3-month extension to the typical monitoring period to reflect the reservoir filling process (August 25 to November 7, 2024) and achieving the first unit in power (October 28, 2024). It is noted that Year 9B is up to October 31, 2024 instead of November 7, 2024 due to the availability of collision data.

2 METHODOLOGY

To satisfy BC Hydro's road safety monitoring requirements for both Year 9A and Year 9B, WSP completed the following work program which is consistent with the work program followed in the previous construction years:

- Confirm study parameters:
  - Construction Year 9A collision review from August 1, 2023, to July 31, 2024;
  - Construction Year 9B collision review from August 1, 2024, to October 31 2024; and
  - Previous collision history for the pre-construction period from August 1, 2010, to July 31, 2015.
- Year 9A and 9B study intersections in Fort St. John:

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Winnipeg, MB, Canada
R3T 6B8
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F: +1 604 683-8655
wsp.com

- 85 Avenue and Old Fort Road;
- Highway 97 and Old Fort Road;
- Highway 97 and 100 Street;
- Highway 97 and 85 Avenue; and
- 85 Avenue and 100 Street.

It is noted the intersection of Highway 97 and 269 Road was not in the original TMMP; however, this intersection was analyzed in Year 1 of the Project because of the road works on 240 Road and Old Fort Road, which may have transferred Project traffic to 269 Road. This intersection was not included in the Year 2 through Year 9A and Year 9B analyses. Figure 1 below shows the location of the study area intersections that are part of the collision monitoring program for Construction Years 9A and 9B of the Project in Fort St. John.

Figure 1 | Study Area Intersections Included in the Road Safety Monitoring Program (Image Source: Google Earth).

- Review the claims-based collision data received from the Insurance Corporation of British Columbia (ICBC) for:
- Collision frequency at each intersection including:
  - Total collisions, which is the sum of property damage only (PDO) collisions and severe collisions; and
  - Severe collisions, which are collisions that involve at least one person with an injury or fatal injury.
- Unlike the traffic-volume monitoring program for the Project, the TMMP does not prescribe explicit thresholds at which road safety improvements are required. Instead, the TMMP says that:

  "Additional mitigation and improvements, with the view to improving road safety, would be implemented by BC Hydro if the road safety performance monitoring at a location reaches a level when BC Hydro, MOTI, the PRRD and/or the City determine that improvements are necessary. This deterioration in safety performance must be due, substantively, to Project traffic. Other road authorities

may also, independent of BC Hydro, undertake road upgrades on monitored routes based on their own planning and requirements."[1]

3 COLLISION REVIEW

The Years 9A and 9B Dataset consists of claims-based collision data obtained from ICBC for the period from August 1, 2023, to October 31, 2024. People involved in a collision have two years from the date of the collision to report their claim to ICBC. The Years 9A and 9B Dataset was generated on November 8, 2024, and was current as of October 31, 2024. As such, the number of collisions reported in this report from October 31 2022 (two years before the date of the current warehouse data source date) to October 31 2024, may change if a future collision review of the project is prepared, as more people may come forward to submit their claims within their two-year time limit. It has been estimated by ICBC that roughly 75% of people submit their claims to ICBC within three months of the collision.[2] It is expected that most of the collision claims for the period of August 1, 2023, to July 31, 2024, were already made by the date of our collision data report, October 31, 2024 for Year 9A; however, it is likely that data in Year 9B would change if a future report is prepared. It is not possible to estimate the extent of change that could be expected.

Collision data was obtained from ICBC for the intersections in Fort St. John noted below:

- Old Fort Road at 85 Avenue;
- Highway 97 at Old Fort Road;
- Highway 97 at 100 Street;
- Highway 97 at 85 Avenue; and
- 85 Avenue at 100 Street.

At each intersection, the following analysis has been undertaken to determine whether construction traffic has had an impact on road safety:

1. A pre-construction collision frequency review was undertaken to determine how closely the Construction Year collision frequency compared to the collision frequency in previous years. This review is described in the subsequent sections of the report.

2. For each intersection, a Construction Period analysis has been undertaken for Years 9A and 9B compared to the pre-construction period using a dashboard developed from the ICBC data, including:

    a. collision frequency of all collisions
    b. collision frequency of severe collisions
    c. collision configuration proportions
    d. time distribution of collisions on weekdays
    e. time distribution of collisions by month

3. In the TMMP, it was stated that collision frequency during construction was expected to increase in the order of ten percent over the pre-construction collision frequencies. We have developed our data analysis to show the measured collision data in each year against the benchmark pre-construction + 10% in graphs A (all collisions) and B (severe collisions), with any data above the benchmarks flagged in the report body in **bold text**. Where intersections exceed the 10% threshold and show a change in any of their configuration proportions, time distribution on weekdays or over the year, construction traffic or Winter road conditions

[1] BC Hydro, *Traffic Monitoring and Mitigation Plan – Fort St. John and North Bank Area Roads*, October 29, 2015, pg. 13

[2] Laurel Richl's telephone communication with Paul de Leur, August 2016

may have contributed to increases in collision frequencies may have contributed to a road safety issue at that intersection. Further discussion on this is provided in the next report sections.

3.1 PRE-CONSTRUCTION PERIOD COLLISION REVIEW

Table 1 shows the collision frequency each year, the total five-year collision frequency, and the average collision frequency at each intersection location in the five-year preconstruction period. This table was generated using the data provided by ICBC from the Year 2 Road Safety Review. As noted in the Year 3 Road Safety Monitoring Program report, the Year 2 Dataset is the most up-to-date collision data that is available for the pre-construction period and will be used for subsequent construction frequency reviews. Furthermore, the Year 2 Dataset is considered the final pre-construction period collision frequencies as it is not subject to changes because the period to file a claim with ICBC has expired.

For Year 9B when collision data is only available for the months August to October 2024, the quarterly average for the pre-construction years used to develop the quarterly benchmark is based on all 12 months of the year rather than the quarterly average based on the specific months we have data for in Year 9B. This is due to the rare and random nature of collisions and the low number of collisions per month.

Table 1 | Pre-Construction Period Collision Frequency Final Dataset.

Intersection	2010 - 2011		2011 - 2012		2012 - 2013		2013 - 2014		2014 - 2015		Five Year Collision Frequency (col / 5 year)		Average Collision Frequency (col / year)		Average Collision Frequency (col / quarter)	
	Severe	Total	Severe	Total	Severe	Total	Severe	Total	Severe	Total	Severe	Total	Severe	Total	Severe	Total
Old Fort Road / 85 Avenue	0	0	0	1	0	1	0	0	0	0	0	2	0.0	0.4	0.0	0.1
Highway 97 / Old Fort Road	4	11	8	16	7	21	7	19	11	29	37	96	7.4	19.2	1.9	4.8
Highway 97 / 100 Street	5	14	4	20	3	9	4	17	9	28	25	88	5.0	17.6	1.3	4.4
Highway 97 / 85 Avenue	1	3	0	1	0	5	2	3	3	13	6	25	1.2	5.0	0.3	1.3
85 Avenue / 100 Street	0	0	1	1	0	1	1	3	1	1	3	6	0.6	1.2	0.2	0.3

Source: Year 2 Dataset received from ICBC on August 2, 2018

Note: Collision data noted for each year are for collisions that occurred between August 1 to July 31 of the subsequent year.

The information shown in Table 1 indicates that collision frequency can vary significantly at the same intersection from year to year. At some locations, the difference in collision frequency could be as much as a factor of three. For example, the total collision frequency at Highway 97 and 100 Street varied from a low of nine collisions per year to a high of 28 collisions per year in the five-year period before the beginning of the Project. Collision frequency variation can be due to several factors including:

- The rare and random nature of collisions;
- Changes in traffic volumes;
- Changes to road construction and maintenance locations; and
- Year to year differences in weather and road conditions.

These variations are why collision data representing a brief period can be less reliable and why it is preferable to have several years of collision data prior to determining whether a location is collision prone.

3.2 INTERSECTION CONSTRUCTION PERIOD ANALYSIS

3.2.1 85 AVENUE AT OLD FORT ROAD

The intersection analysis of Old Fort Road at 85 Avenue is shown in **Figure 2**. From the analysis, we can make the following observations:

A – All collisions annual frequency

- There were zero collisions at this intersection in both Year 9A and in Year 9B.
- The total number of collisions in both Year 9A and Year 9B was below the benchmark (pre-construction annual average + 10%) of 0.4 collisions per year.
- The annual average collision frequency over all construction years from Year 1 – Year 9A was 0.9 collisions per year, which exceeds the benchmark (pre-construction annual average + 10%) of 0.4 collisions per year.

B – Severe collisions annual frequency

- There were no severe collisions at this intersection in either the pre-construction period or during construction.

C – Collision configuration proportions

- Prior to construction, collision configuration proportions were 50% single vehicle and 50% conflicted.
- During construction, the collision proportions were 12.5% undetermined and 87.5% single vehicle.
- No collisions were reported in Year 9A or Year 9B.

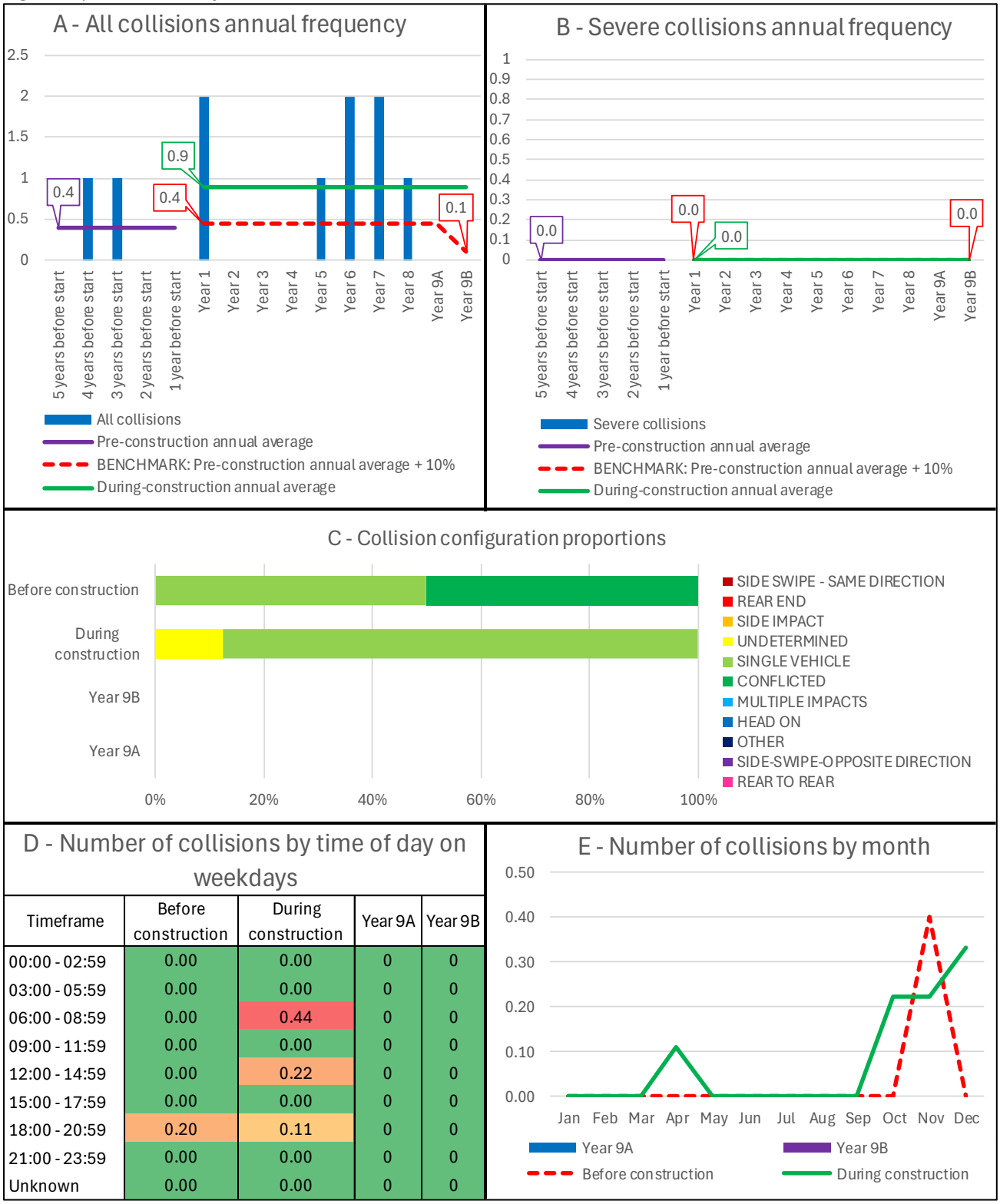
D – Number of collisions by time of day on weekdays

- Before construction, there were on average 0.2 collisions per year between 6:00-8:59 PM, with no other collisions recorded in any other period.
- During construction, there was on average 0.4 collisions per year between 6:00-8:59 AM, with lower peaks of 0.2 collisions per year between 12:00-2:59 PM and 0.1 collisions per year between 6:00-8:59 PM.
- No collisions were reported in Year 9A or Year 9B.

E – Number of collisions by month

- Before construction, there were on average 0.4 collisions per year in November, and no collisions at any other time of year.
- During construction, there were on average 0.1 collisions per year in March, 0.2 collisions per year in each of October and November, and 0.3 collisions per year in December.
- No collisions were reported in Year 9A or Year 9B.

Figure 2 | Collision analysis at Old Fort Road and 85 Avenue.



D - Number of collisions by time of day on weekdays

Timeframe	Before construction	During construction	Year 9A	Year 9B
00:00 - 02:59	0.00	0.00	0	0
03:00 - 05:59	0.00	0.00	0	0
06:00 - 08:59	0.00	0.44	0	0
09:00 - 11:59	0.00	0.00	0	0
12:00 - 14:59	0.00	0.22	0	0
15:00 - 17:59	0.00	0.00	0	0
18:00 - 20:59	0.20	0.11	0	0
21:00 - 23:59	0.00	0.00	0	0
Unknown	0.00	0.00	0	0

Traffic volume considerations

Table 2 below is an extract from the Year 9 Traffic Monitoring Report, prepared by WSP in March 2025. It shows the total traffic volume entering the intersection during the AM and PM peak hours at Old Fort Road and 85 Avenue each year compared to the background traffic volumes for that year as a percentage. The percentages for each year are calculated by subtracting the background volume from the measured volume for that year, then dividing by the background volume. From the table below we can observe:

- Year 9A had moderate peak hour volumes compared to other years during construction, but lower volumes than recent Years 7 and 8.
- Year 9A had higher peak hour volumes compared to the background traffic, with about 84% more in the AM peak and 116% more in the PM peak.
- The moderate traffic volumes at this intersection in Year 9A compared to other years align with or show improved road safety with the lower number of total collisions at the intersection in Year 9A.

Table 2 | Year 9A peak hour traffic comparisons against background at the Old Fort Road and 85 Avenue study intersection.

Peak Hour	2024	2015	2016	2016	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Background	Y1Q1	Y1Q2	Y1Q3	Y1Q4	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9A
		Nov	Feb	Apr	Jul	May	May	Peak	Peak	May	May	Jun	Jun
	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)
AM	157	168	119	111	197	285	182	230	217	226	318	378	289
		28%	-9%	-15%	50%	118%	39%	76%	66%	73%	152%	152%	84%
PM	156	209	181	178	187	266	231	297	354	267	338	420	337
		61%	39%	37%	44%	105%	78%	128%	172%	105%	149%	182%	116%

Discussion of observations

The intersection of 85 Avenue and Old Fort Road has a small number of collisions, such that it is difficult to draw meaningful conclusions from the analysis, especially considering the rare and random nature of crashes. For instance, the benchmark of the pre-construction annual average collision frequency + 10% is set at 0.4 total crashes per year, such that even one collision per year would exceed the benchmark and comparing the collision configuration proportions from one year to the next and against the pre-construction period is far less meaningful when there is only about one crash each year.

However, two key patterns can be observed from the analysis nonetheless:

- There were no severe collisions at all during the construction period, which is consistent with the pre-construction period. This is important, as severe collisions are those where people are injured, while the total collisions also include property damage only crashes. As such, no collisions at this intersection during the study period resulted in injuries.
- The time of year pattern with more collisions in October-December months during construction is consistent with the pre-construction period, showing that this pattern is likely due to other factors aside from the increased traffic volumes in some years. Several other likely explanations for increased collisions during these months are the change in weather conditions from Fall to Winter resulting in increased ice on the road in relation to the

timing at which drivers install Winter tires on their vehicles, and the change in natural lighting conditions with more travel in the dark.

3.2.2 HIGHWAY 97 AT OLD FORT ROAD

The intersection analysis of Highway 97 at Old Fort Road is shown in **Figure 3.** From the analysis, we can make the following observations:

A – All collisions annual frequency

- There were 22 collisions at this intersection in Year 9A and 4 collisions in Year 9B.
- The total number of collisions in **Year 9A exceeded the benchmark of 21.1 collisions per year**. In Year 9B total collisions were below the benchmark of 5.3 collisions per quarter.
- The annual average collision frequency over all construction years from Year 1 – Year 9A was 14.6 collisions per year, which is below the benchmark (pre-construction annual average + 10%) of 21.1 collisions per year.

B – Severe collisions annual frequency

- There were eight severe collisions at this intersection in Year 9A and two in Year 9B.
- The severe collisions in both Years 9A and 9B was below the benchmark of 8.1 severe collisions per year.
- The during-construction average over all years was 4.7 severe collisions per year, which is also below the benchmark of 8.1 collisions per year.

C – Collision configuration proportions

- Prior to construction, the dominant collision configurations were rear end (48%) and conflicted (25%).
- During construction, the dominant collision configuration proportions were rear end (53%) and single vehicle (16%).
- In Year 9A the dominant collisions configuration proportions were rear end (41%), side impact (23%) and single vehicle (18%).
- In Year 9B the dominant configuration proportions were rear end (50%), undetermined (25%) and side impact (25%).

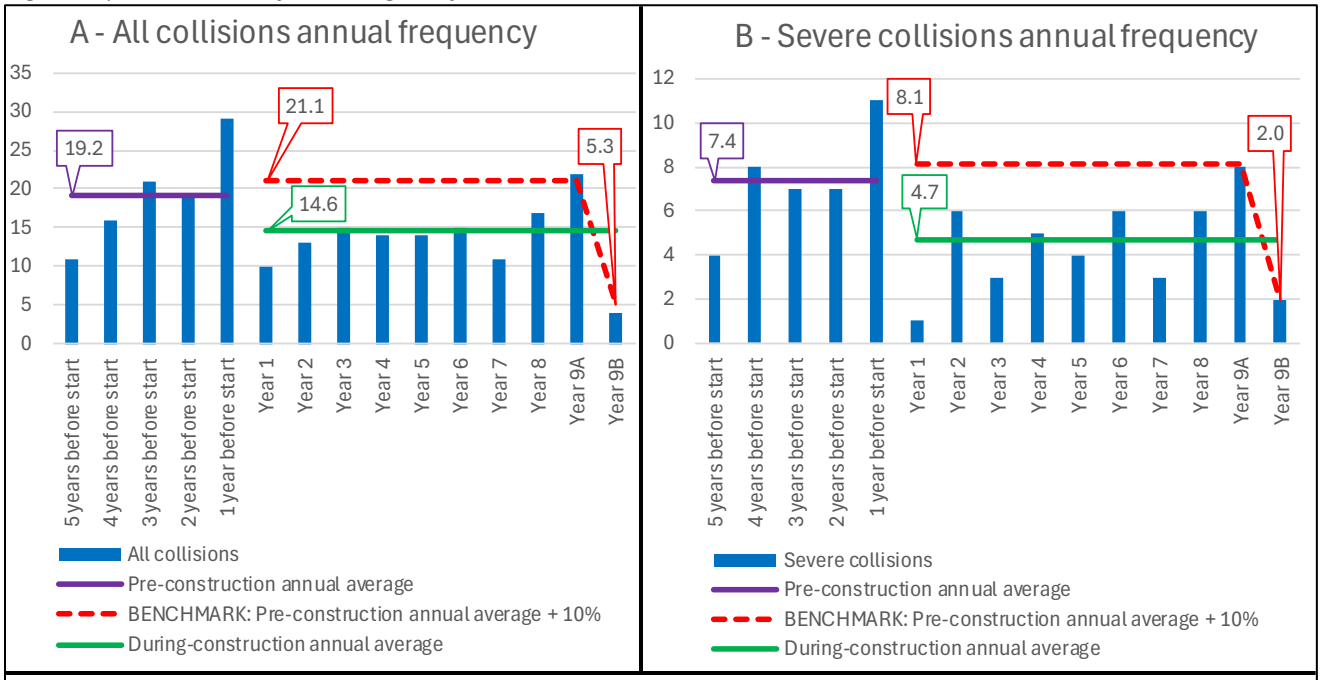
D – Number of collisions by time of day on weekdays

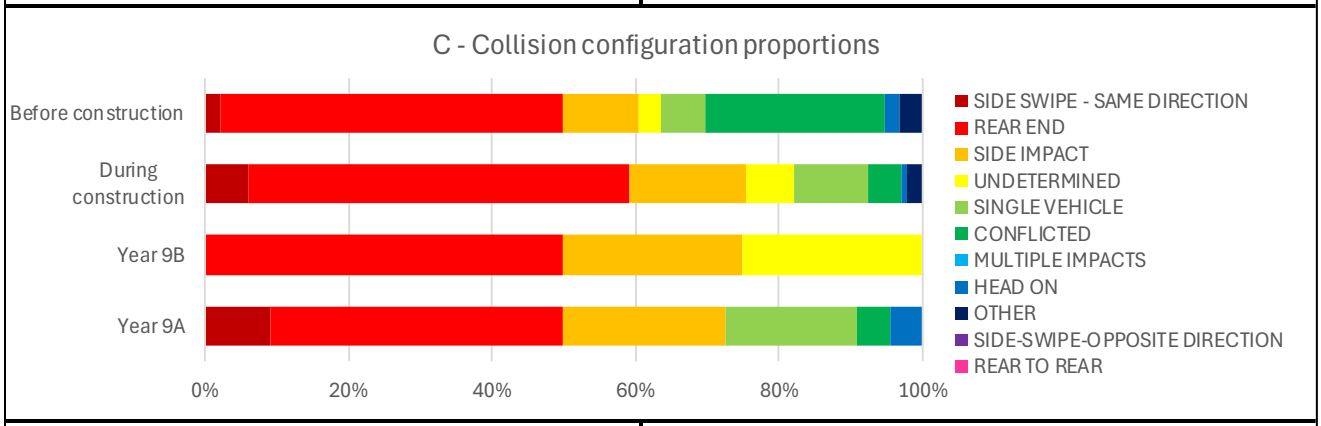
- Before construction, there were consistent collision frequencies per year of around 2.4 collisions per three-hour period between 3:00AM – 2:59PM, with a peak up to 4 collisions per three-hour period between 3:00PM – 5:59PM.
- During construction, lower collision average rates of around 1.5 collisions per three-hour period over the year were observed during daylight hours, with a less pronounced peak of around 3 collisions per three-hour period between 12:00PM – 5:59PM.
- In Year 9A, collision patterns over the day reflected the before construction patterns, with a peak of 3 collisions over the year in the 3:00PM-5:59PM period. There was also a lower peak of 2 collisions between 12:00AM – 2:59AM in Year 9A.
- In Year 9B, there was a peak in the morning, with 2 collisions between 9:00AM-11:59AM over the quarter.

E – Number of collisions by month

- Before construction, there were peaks in the annual average collision frequency per month in January (2.6 collisions per year), June (2.4 collisions per year) and November (3.4 collisions per year).
- During construction, there were not obvious peaks at any time of year, with an average monthly collision frequency between 0.4 collisions per month in May and 1.7 collisions per month in August and November.
- In Year 9A there were 22 collisions, with peaks in January, June and November.
- In Year 9B there was between one and two collisions each month over the quarter.

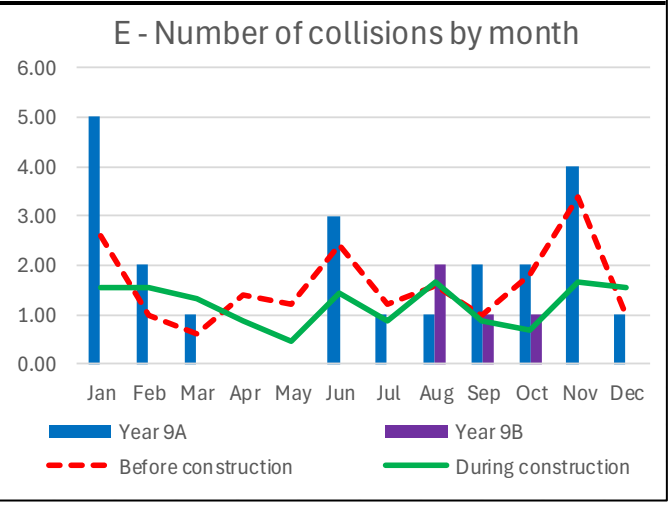
Figure 3 | Collision analysis at Highway 97 and Old Fort Road.





D - Number of collisions by time of day on weekdays

Timeframe	Before construction	During construction	Year 9A	Year 9B
00:00 - 02:59	0.80	0.22	2	0
03:00 - 05:59	2.20	0.78	1	0
06:00 - 08:59	2.60	1.44	0	0
09:00 - 11:59	2.20	1.89	3	2
12:00 - 14:59	2.40	3.11	4	1
15:00 - 17:59	4.00	3.11	5	0
18:00 - 20:59	1.00	1.22	0	0
21:00 - 23:59	0.00	0.44	0	0
Unknown	0.00	0.00	0	0



Traffic volume considerations

Table 3 below is an extract from the Year 9 Traffic Monitoring Report, prepared by WSP in March 2025. It shows the total traffic volume entering the intersection during the AM and PM peak hours at Highway 97, Old Fort Road and 100 Avenue each year compared to the background traffic volumes for that year as a percentage. The percentages for each year are calculated by subtracting the background volume from the measured volume for that year, then dividing by the background volume. From the table below we can observe:

- Year 9A had similar or slightly higher peak hour volumes to other years of construction during both the AM and PM peaks.
- Year 9A had higher peak hour volumes by a factor of 24% in the PM peak compared to the background traffic. The AM peaks were similar to the background volumes.

Table 3 | Year 9 peak hour traffic comparisons against background at the Highway 97, Old Fort Road and 100 Avenue study intersection.

Peak Hour	2024	2015	2016	2016	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Background	Y1Q1	Y1Q2	Y1Q3	Y1Q4	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9A
		Nov	Feb	Apr	Jul	May	May	Peak	Peak	May	May	Jun	Jun
	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)
AM	1713	1804	1722	1701	1521	1728	1684	1780	1732	1728	1737	1717	1871
		26%	20%	19%	6%	21%	17%	24%	21%	21%	15%	5%	9%
PM	1930	2056	1857	1941	1958	2233	1805	2083	2130	2185	2275	2400	2399
		27%	15%	20%	21%	38%	12%	29%	32%	35%	33%	30%	24%

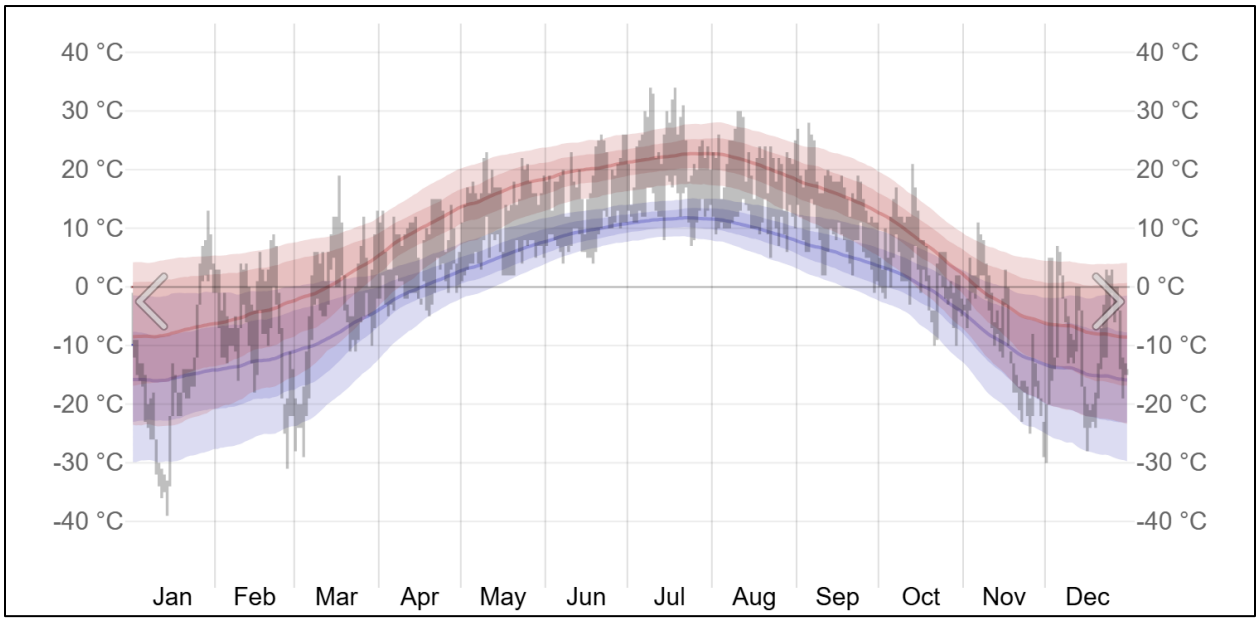
Discussion of observations

The intersection of Highway 97, Old Fort Road and 100 Avenue had markedly less collisions during most of the construction than in the pre-construction period, except in Year 9A, with Year 9A collision frequencies at or below the benchmarks. As such, the Site C project had no negative effects on road safety at this intersection.

Notable changes in Year 9A and Year 9B compared to other years in the time of day and month of year graphs include:

- Year 9B had a higher proportion of undetermined collision configurations (25%) than other years. However, there were only 4 collisions in Year 9B, so this only represents 1 collision.
- Year 9A had more collisions in the 12:00PM – 17:59PM period than pre-construction period. This could be due to slightly higher volumes at the intersection during the PM peak than in some other years.
- Year 9A had more collisions in January (5 total) than is typical. The graph in **Figure 4** shows much lower temperatures were recorded in Fort St. John in January 2024 than typical, so it is likely that severe Winter conditions may have resulted in an increased number of collisions at this intersection in Year 9A particularly in January.

Figure 4 | Fort St. John Airport temperature 2024 history from Weatherspark[3], showing a drop in typical temperatures in January. The daily range of reported temperatures (gray bars) placed over the daily average high (faint red line) and low (faint blue line) temperature, with 25th to 75th and 10th to 90th percentile bands.



3.2.3 HIGHWAY 97 AND 100 STREET

The intersection analysis of Highway 97 at 100 Street is shown in **Figure 5**. From the analysis, we can make the following observations:

A – All collisions annual frequency

- There were 10 collisions at this intersection in Year 9A and 2 collisions in Year 9B.
- The total number of collisions in both Year 9A and Year 9B was below the benchmark (pre-construction average + 10%) of 19.4 and 4.8 collisions per year respectively.
- The annual average collision frequency over all construction years from Year 1 – Year 9A was 15.7 collisions per year, which is below the benchmark (pre-construction annual average + 10%) of 19.4 collisions per year.

B – Severe collisions annual frequency

- There were two severe collisions at this intersection in Year 9A and one in Year 9B.
- The number of severe collisions in both Years 9A and 9B was below the benchmark of 5.5 or 1.4 collisions per year or quarter.
- The during-construction average over all years was 5.6 severe collisions per year, which is similar but slightly above the benchmark of 5.5 collisions per year.

C – Collision configuration proportions

- Prior to construction, the dominant collision configurations were rear end (38%), side impact (15%) and conflicted (22%).
- During construction, the dominant collision configuration proportions were rear end (38%), side impact (21%), single vehicle (11%) and conflicted (13%). Conflicted collisions are when multiple or differing collision configurations are reported to ICBC.

[3] https://weatherspark.com/h/y/1425/2024/Historical-Weather-during-2024-in-Fort-St.-John-British-Columbia-Canada

- In Year 9A the dominant proportions were rear end (20%), side impact (30%) and undetermined (20%).
- In Year 9B the dominant configuration proportions were rear end (50%) and undetermined (50%).

D – Number of collisions by time of day on weekdays

- Before construction, there was a peak of around 4 collisions between 6:00AM – 8:59AM, with consistent collision frequencies per year of around 2-3 collisions per three-hour period during daylight hours.
- During construction, collision frequencies were typically between 2.1-3.3 collisions per three-hour period during daylight hours on average over each year.
- In Year 9A, collision patterns over the day were lower than before construction, with a peak between 3:00PM and 5:59PM.
- In Year 9B, collision numbers were low with collisions only occurring in the late afternoon and evening.

E – Number of collisions by month

- Before construction, there were peaks in the annual average collision frequency per month in January (2.6 collisions per year), May (2.0 collisions per year), August and December (each 2.2 collisions per year).
- During construction, there were peaks in from September to December each year with collisions ranging from 1.6 to 2.2 in this period.
- In Year 9A there were peaks of 2 collisions in May, September and October with other months following pre-construction patterns.
- In Year 9B the collision pattern generally followed or was below the pre-construction pattern.

Traffic volume considerations

Year 9A traffic counts were not provided for the Highway 97 and 100 Street intersection due to tampering with the cameras during traffic data collection in 2024. As such, **Table 4** below provides an extract from the Years 7 and 8 Traffic Monitoring Report, prepared by WSP in January 2025, alongside the Year 9A background traffic volumes calculated in the Year 9 Traffic Monitoring Report prepared in March 2025. It shows the total traffic volume entering the intersection during the AM and PM peak hours at Highway 97 and 100 Street each year compared to the background traffic volumes for that year as a percentage. The percentages for each year are calculated by subtracting the background volume from the measured volume for that year, then dividing by the background volume. From the table below we can observe:

- Background traffic volumes from Year 7 to Year 9A appear to be growing such that higher traffic volumes than previous years may have been observed in Year 9A than previous periods had the counting equipment not been tampered with.

Table 4 | Year 7 and 8 peak hour traffic comparisons against background at the Highway 97 and 100 Street study intersection.

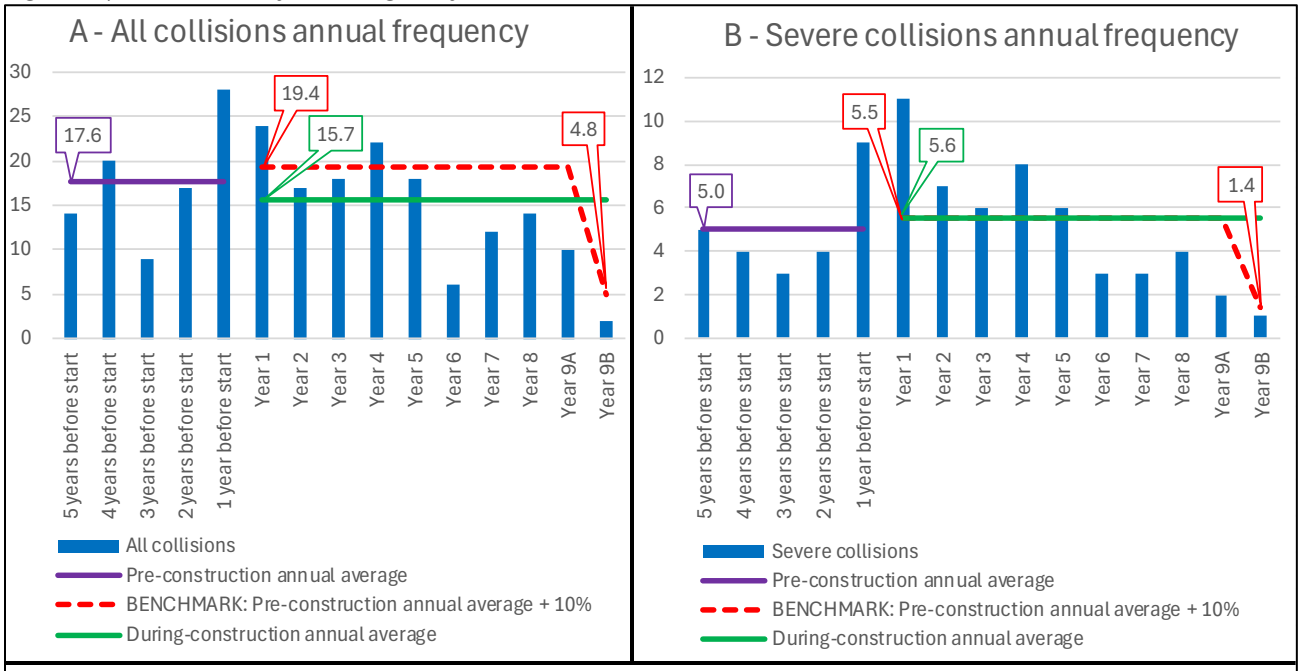
Peak Hour	2022	2023	2024	2015	2016	2016	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Background			Y1Q1	Y1Q2	Y1Q3	Y1Q4	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9A
				Nov	Feb	Apr	Jul	May	May	Peak	Peak	May	May	Jun	Jun
	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)
AM	1506	1624	1705	1766	1692	1629	1739	1739	1675	1677	1602	1538	1630	1662	-
				24%	18%	14%	22%	22%	17%	17%	12%	8%	8%	2%	-
PM	1945	2098	2201	2416	2040	2126	2190	2354	1984	2288	2302	2184	2398	2256	-
				31%	11%	15%	19%	28%	8%	24%	25%	19%	23%	8%	-

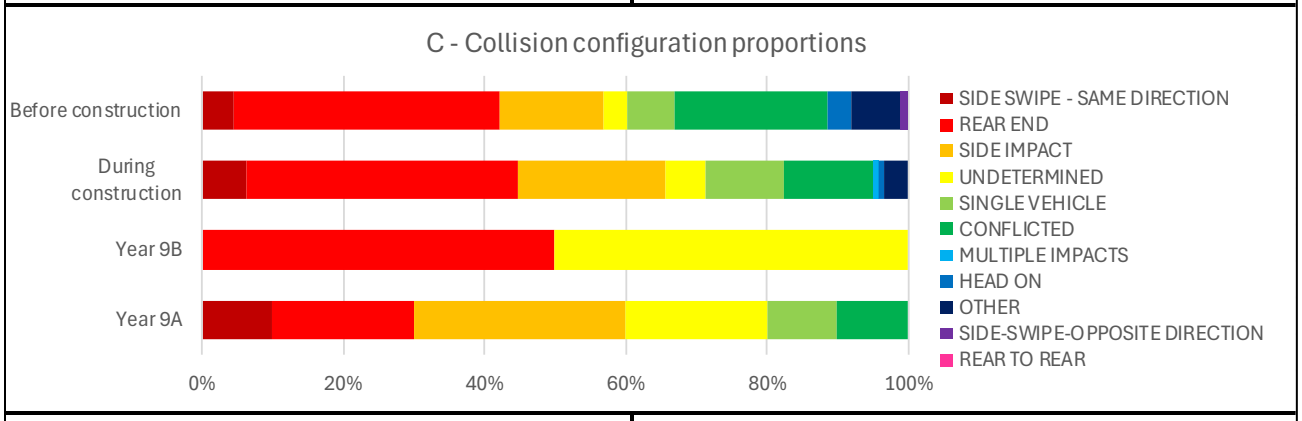
Discussion of observations

The intersection of Highway 97 and 100 Street had fewer total collisions per year (15.7) during construction compared to the benchmark pre-construction average + 10% (19.4), and similar quantities of severe collisions per year (5.6) than during pre-construction average + 10% (5.5). While the average annual severe collision frequency is higher during construction than the benchmark, this is not concerning as crashes are rare and random events and the difference between the benchmark and the during-construction average is not sufficiently different to conclude the construction influenced road safety at this intersection.

From the collision configuration proportions, Year 9A had a higher proportion of side impacts and fewer rear-end collisions; however, there were markedly less collisions overall in Year 9A such that a change in collision configuration proportions is not unexpected. From the time of day and time of year graphs, there are no unusual patterns in either Year 9A or Year 9B in comparison to previous years either before or during construction.

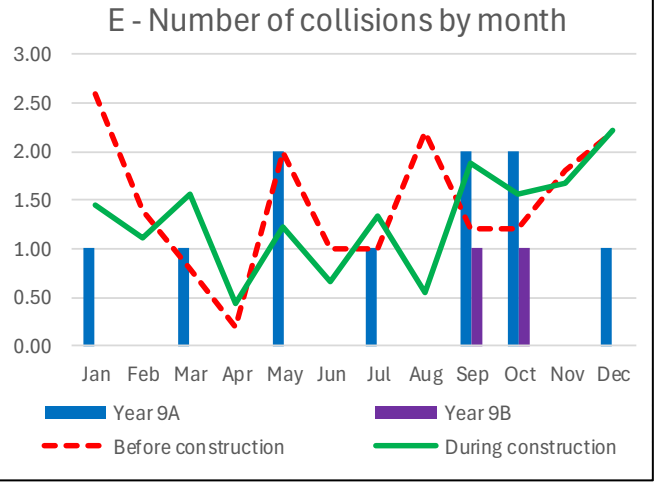
Figure 5 | Collision analysis at Highway 97 and 100 Street.





D - Number of collisions by time of day on weekdays

Timeframe	Before construction	During construction	Year 9A	Year 9B
00:00 - 02:59	0.60	0.44	0	0
03:00 - 05:59	3.00	0.78	0	0
06:00 - 08:59	4.40	2.78	1	0
09:00 - 11:59	2.00	2.11	0	0
12:00 - 14:59	3.00	3.33	1	0
15:00 - 17:59	2.20	3.00	3	1
18:00 - 20:59	1.20	1.00	1	0
21:00 - 23:59	0.20	0.33	1	1
Unknown	0.00	0.00	0	0



3.2.4 HIGHWAY 97 AND 85 AVENUE

The intersection analysis of Highway 97 at 85 Avenue is shown in **Figure 6**. From the analysis, we can make the following observations:

A – All collisions annual frequency

- There were 5 collisions at this intersection in Year 9A and 2 collisions in Year 9B.
- The total number of collisions in Year 9A was below the benchmark (pre-construction annual average + 10%) of 5.5 collisions per year; however, **Year 9B was above the benchmark of 1.4 collisions per quarter for all collisions**.
- The annual average collision frequency over all construction years from Year 1 – Year 9A was 4.7 collisions per year, which is below the benchmark (pre-construction annual average + 10%) of 5.5 collisions per year.

B – Severe collisions annual frequency

- There were two severe collisions at this intersection in Year 9A and zero in Year 9B.
- The number of severe collisions in **Year 9A exceeded the benchmark of 1.3 severe collisions per year**; however, Year 9B was below the benchmark of 0.3 severe collisions per quarter with zero collisions.
- The during-construction average over all years was 2.1 severe collisions per year, which also exceeds the benchmark of 1.3 severe collisions per year.

C – Collision configuration proportions

- Prior to construction, the dominant collision configurations were rear end (40%), side impact (16%), conflicted (20%) and other (20%).
- During construction, the dominant collision configuration proportions were rear end (32%), side impact (23%) and conflicted (20%).
- In Year 9A the dominant collisions configuration proportions were rear end (25%), undetermined (25%) and conflicted (50%).
- In Year 9B the dominant configuration proportions were rear end (50%) and side impact (50%).

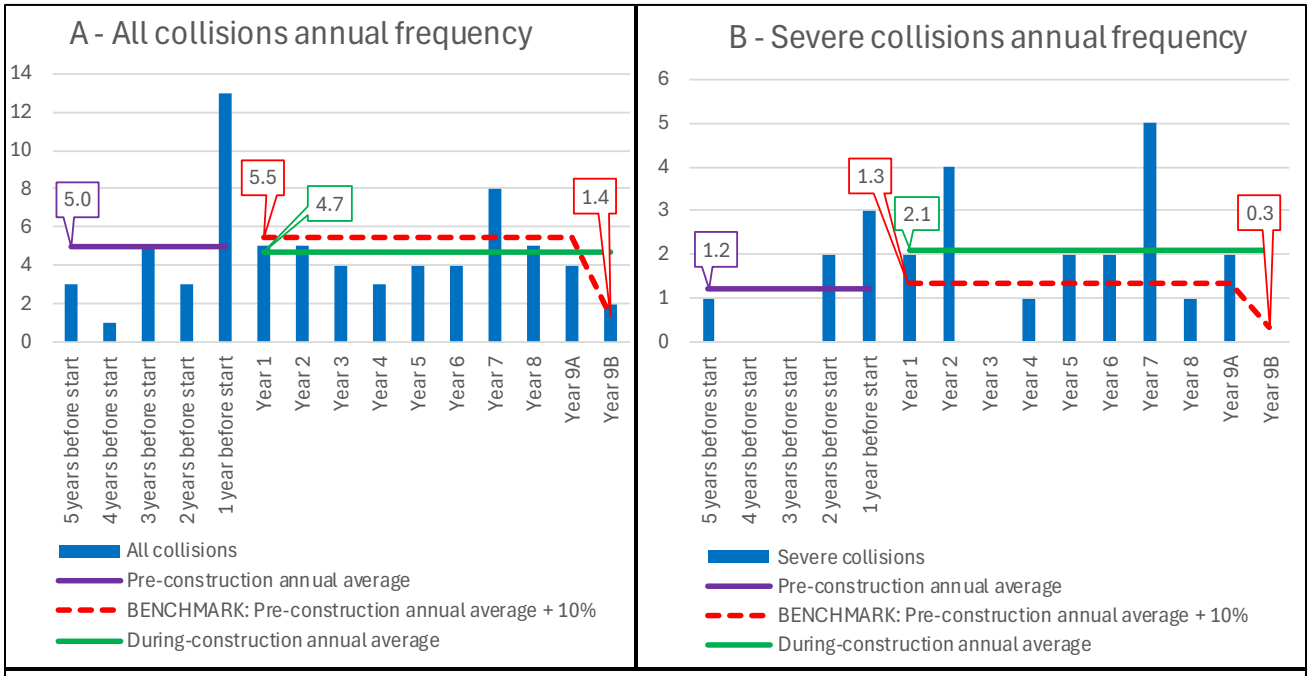
D – Number of collisions by time of day on weekdays

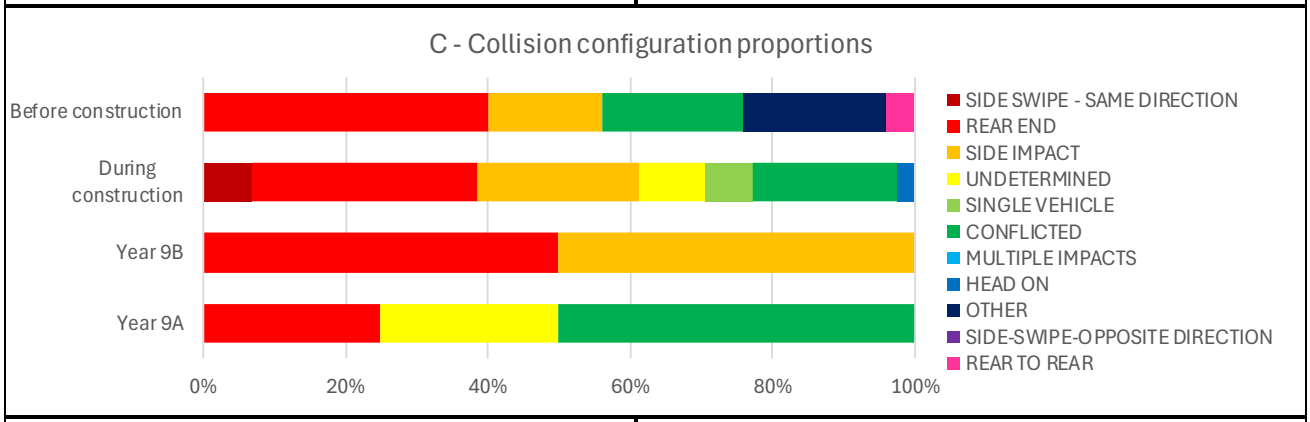
- Before construction, there were consistent collision frequencies per year of around 0.4-0.8 collisions per three-hour period between 12:00AM – 5:59PM, with a spike of 1.6 collisions per three-hour period between 6:00AM – 8:59AM.
- During construction, collision frequencies over three-hour periods were similar in quantity to pre-construction between 0.1-1.3 collisions per three-hour period; however there appears to be a shift in the time of day when collisions occur towards the afternoon and PM peak.
- In Year 9A, there was a peak of two collisions per three-hour period for 6:00PM – 8:59PM, which is unusual given the pre-construction collision patterns typically peak in the morning and had a collision frequency of 0.0 collisions per three-hour period during this period.
- In Year 9B, collision patterns typically followed the pre-construction patterns with a peak of 1 collision per three-hour period between 6:00AM – 11:59AM.

E – Number of collisions by month

- Before construction, collisions rates were consistent across the year between 0.2 – 0.8 collisions per month without any notable peaks.
- During construction, there were not obvious peaks at any time of year, with an average monthly collision frequency between 0.1 and 0.9 collisions per month.
- In Year 9A there were higher collision frequencies than typical in October at two collisions per month.
- In Year 9B there were higher collision frequencies than typical in August at two collisions per month.

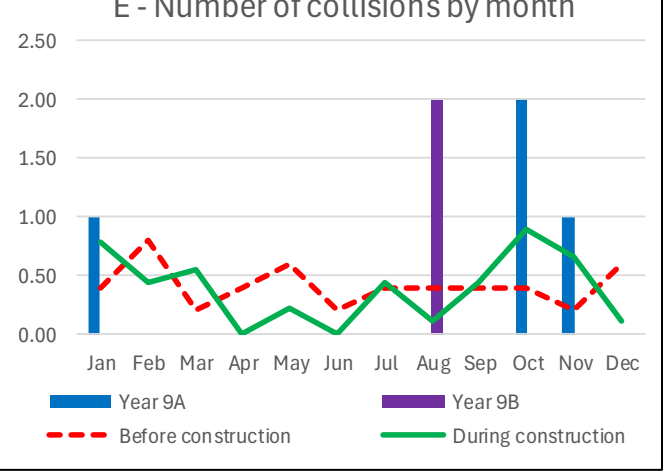
Figure 6 | Collision analysis at Highway 97 and 85 Avenue.





D - Number of collisions by time of day on weekdays

Timeframe	Before construction	During construction	Year 9A	Year 9B
00:00 - 02:59	0.40	0.11	0	0
03:00 - 05:59	0.80	0.00	0	0
06:00 - 08:59	1.60	1.22	1	1
09:00 - 11:59	0.60	0.33	1	1
12:00 - 14:59	0.40	0.67	0	0
15:00 - 17:59	0.60	0.67	0	0
18:00 - 20:59	0.00	0.56	2	0
21:00 - 23:59	0.00	0.22	0	0
Unknown	0.00	0.00	0	0



Traffic volume considerations

Year 9A traffic counts were not provided for the Highway 97 and 85 Avenue intersection due to tampering with the cameras during traffic data collection in 2024. As such, Background traffic volumes from Year 7 to Year 9A appear to be growing such that higher traffic volumes than previous years may have been observed in Year 9A than previous periods had the counting equipment not been tampered with.

Table 5 below is an extract from the Years 7 and 8 Traffic Monitoring Report prepared by WSP in January 2025, alongside the Year 9A background traffic volumes calculated in the Year 9 Traffic Monitoring Report prepared in March 2025. It shows the total traffic volume entering the intersection during the AM and PM peak hours at Highway 97 and 85 Avenue each year compared to the background traffic volumes for that year as a percentage. The percentages for each year are calculated by subtracting the background volume from the measured volume for that year, then dividing by the background volume. From the table below we can observe:

- Background traffic volumes from Year 7 to Year 9A appear to be growing such that higher traffic volumes than previous years may have been observed in Year 9A than previous periods had the counting equipment not been tampered with.

Table 5 | Year 7 and 8 peak hour traffic comparisons against background at the Highway 97 and 85 Avenue study intersection.

Peak Hour	2022	2023	2024	2015	2016	2016	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Background			Y1Q1	Y1Q2	Y1Q3	Y1Q4	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9A
				Nov	Feb	Apr	Jul	May	May	Peak	Peak	May	May	Jun	Jun
	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)
AM	1307	1410	1479	1629	1339	1338	1411	1506	1469	1521	1433	1321	1335	1382	-
				32%	8%	8%	14%	22%	19%	23%	16%	7%	2%	-2%	-
PM	1342	1447	1520	1779	1527	1530	1815	1903	1530	1848	1776	1640	1740	1802	-
				40%	20%	20%	43%	49%	20%	45%	40%	29%	30%	25%	-

Discussion of observations

For Year 9A the total collisions for the year were below the benchmark, but the severe collisions for the year were above the benchmark. The benchmark for severe collisions is set at 1.3 collisions per year, such that having two severe collisions in any one year would flag. However, this is a low number and it is more likely that the rare and random nature of collisions is driving the increase in Year 9A than a particular road safety issue. Additionally, the background volumes at this intersection appear to be increasing, which could contribute to an increase in collisions over time which is not captured in the setting of the performance benchmark.

For Year 9B, total collisions for the quarter were above the benchmark, which is also more likely to signify the rare and random nature of collisions than a particular safety issue as the benchmark is set at 1.4 collisions per quarter and two collisions occurred in Year 9B

Other notable trends include:

- In Year 9A, 50% of collision configurations were conflicted; however, this is when there are differing reports about the type of collision configuration to ICBC from parties involved in the collision.

- In Year 9A, there are two collisions in the period 6:00PM – 8:59PM, with neither the pre-construction nor other construction years showing this pattern. However, two collisions are a low number and does not indicate a trend.
- Year 9A had two collisions in October and Year 9B had two collisions in August, both of which were above the typical monthly collision frequencies. As per the previous point, two collisions are a low number and does not indicate a trend.

3.2.5 85 AVENUE AT 100 STREET

The intersection analysis of 85 Avenue and 100 Street is shown in **Figure 7**. From the analysis, we can make the following observations:

A – All collisions annual frequency

- There were three collisions at this intersection in Year 9A and zero collisions in Year 9B.
- The total number of collisions in **Year 9A exceeded the benchmark** (pre-construction annual average + 10%) of 1.3 collisions per year. Year 9B was below the benchmark of 0.3 collisions per quarter.
- The annual average collision frequency over all construction years from Year 1 – Year 9A was 2.0 collisions per year, which slightly exceeds the benchmark (pre-construction annual average + 10%) of 1.3 collisions per year.

B – Severe collisions annual frequency

- There were no severe collisions in either Year 9A or Year 9B.
- The total number of severe collisions in both years were below their respective benchmarks.
- The average annual severe collision frequency over all years of construction was 0.3 severe collisions per year, which is below the benchmark rate of 0.7 collisions per year.

C – Collision configuration proportions

- Prior to construction, the dominant collision configuration proportions were 50% side impact and 33% other.
- During construction, the dominant collision proportions were side impact (33%), undetermined (22%) and single vehicle (22%).
- In Year 9A 33% of collisions were side impact, 33% were rear end and 33% of collisions were single vehicle.
- In Year 9B no collisions occurred.

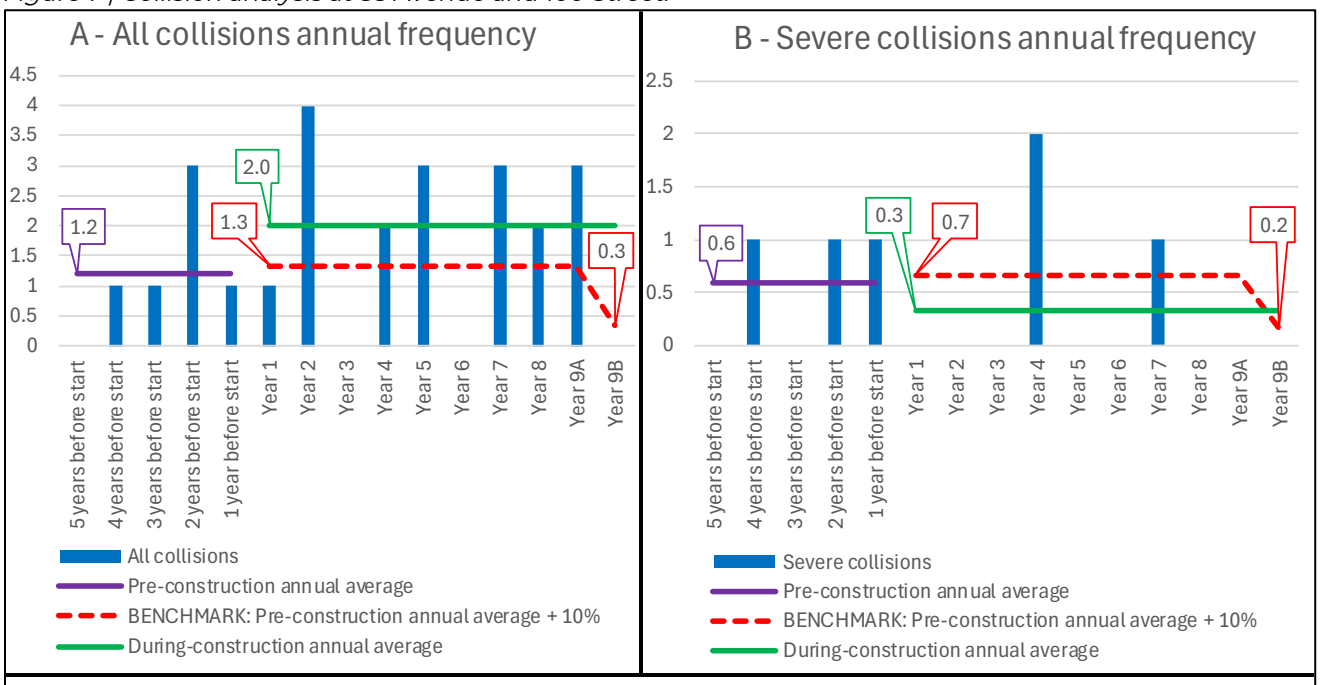
D – Number of collisions by time of day on weekdays

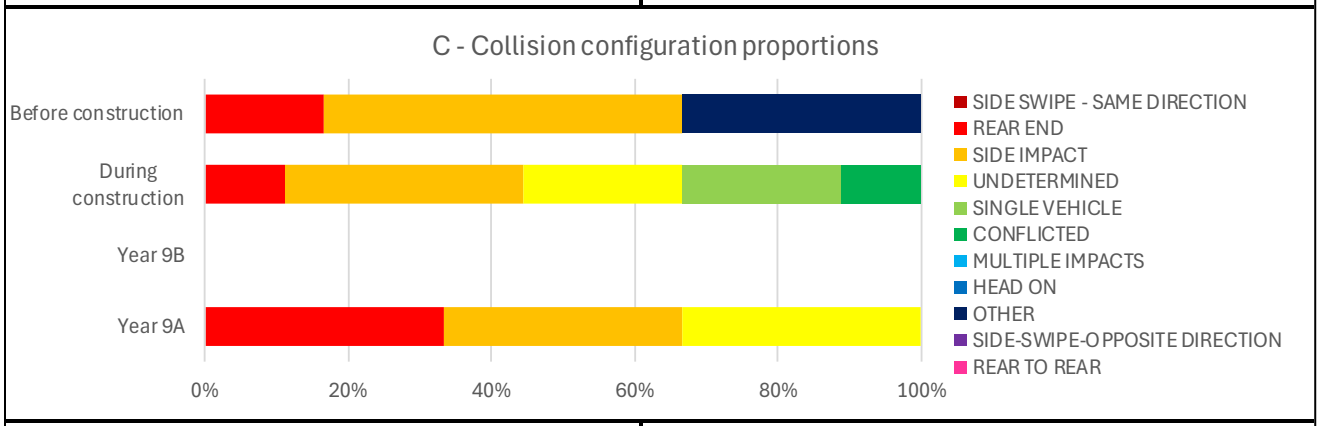
- Before construction, there were around 0.2 collisions per year during daylight hours, with a peak of 0.6 collisions per three-hour period between 6:00AM – 8:59AM.
- During construction, there was on average 0.4 collisions per year between 6:00AM-11:59 AM, with a peak of 0.9 collisions between 12:00PM – 2:59PM.
- In Year 9A, collisions followed the same pattern as the pre-construction and during-construction years, with a small number of collisions in the morning and early afternoon, and no collisions in the later afternoon or evening.
- In Year 9B no collisions occurred.

E – Number of collisions by month

- Before construction, there were on average 0 to 0.4 collisions per month spread across the year, without any obvious peaks.
- During construction, there were on average 0 to 0.3 collisions per month spread across the year, without any obvious peaks.
- In Year 9A there was one collision in each of August, September and October.
- In Year 9B no collisions occurred.

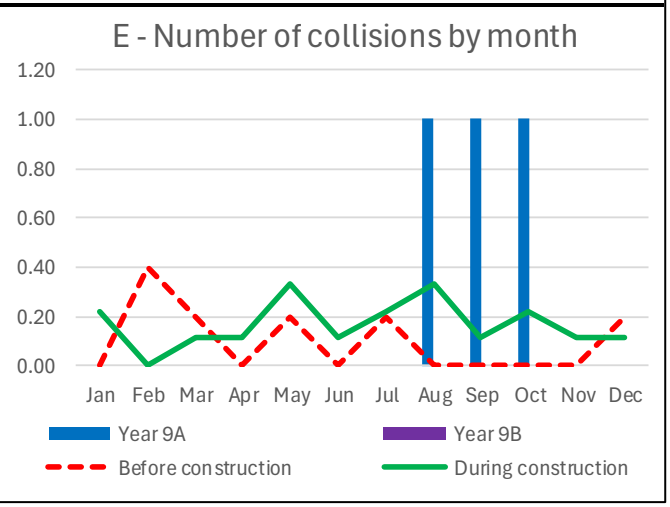
Figure 7 | Collision analysis at 85 Avenue and 100 Street.





D - Number of collisions by time of day on weekdays

Timeframe	Before construction	During construction	Year 9A	Year 9B
00:00 - 02:59	0.00	0.00	0	0
03:00 - 05:59	0.20	0.11	0	0
06:00 - 08:59	0.60	0.44	1	0
09:00 - 11:59	0.00	0.33	0	0
12:00 - 14:59	0.20	0.89	1	0
15:00 - 17:59	0.20	0.00	0	0
18:00 - 20:59	0.00	0.00	0	0
21:00 - 23:59	0.00	0.00	0	0
Unknown	0.00	0.00	0	0



Traffic volume considerations

Year 9A traffic counts were not provided for the 85 Avenue and 100 Street intersection due to tampering with the cameras during traffic data collection in 2024. As such, Background traffic volumes from Year 7 to Year 9A appear to be growing slightly such that slightly higher traffic volumes than previous years may have been observed in Year 9A than previous periods had the counting equipment not been tampered with.

Table 6 below is an extract from the Years 7 and 8 Traffic Monitoring Report prepared by WSP in January 2025, alongside the Year 9A background traffic volumes calculated in the Year 9 Traffic Monitoring Report prepared in March 2025. It shows the AM and PM peak hour volumes at 85 Avenue and 100 Street each year compared to the baseline traffic volumes for that year as a percentage. From the table below we can observe:

- Background traffic volumes from Year 7 to Year 9A appear to be growing slightly such that slightly higher traffic volumes than previous years may have been observed in Year 9A than previous periods had the counting equipment not been tampered with.

Table 6 | Year 7 and 8 peak hour traffic comparisons against background at the 85 Avenue and 100 Street study intersection.

Peak Hour	2022	2023	2024	2015	2016	2016	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Background			Y1Q1	Y1Q2	Y1Q3	Y1Q4	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9A
				Nov	Feb	Apr	Jul	May	May	Peak	Peak	May	May	Jun	Jun
	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)	(vph)
AM	259	279	293	350	267	263	253	359	276	325	364	339	382	362	-
				42%	9%	7%	3%	46%	12%	32%	48%	38%	47%	30%	-
PM	306	331	345	329	328	245	282	365	284	346	354	386	399	406	-
				13%	13%	-16%	-3%	26%	-2%	19%	27%	33%	30%	23%	-

Discussion of observations

The intersection of 85 Avenue and 100 Street has a small number of collisions, such that it is difficult to draw meaningful conclusions from the analysis, especially considering the rare and random nature of crashes. For instance, the benchmark of the pre-construction annual average severe collision frequency + 10% is set at 0.6 collisions per year, such that even one collision per year would exceed the benchmark. Additionally, comparing the collision configuration proportions from one year to the next and against the pre-construction period is far less meaningful when there are only about one or two collisions each year.

Given the low incidence of collisions at this intersection and the consistent patterns in terms of dominant collision configuration types, time of day, and month of year when comparing the pre-construction and construction periods, it appears that the Site C project has had no significant effects on road safety at this intersection.

4 SUMMARY

Table 7 below shows the pre-construction and benchmark annual average collision frequencies against the number of collisions in Years 9A and 9B for both total and severe collisions at each of the study intersections. Where collisions in Years 9A or 9B have exceeded the benchmark, these are emphasized in **bold text**. The sections following **Table 7** provide more context as to whether the Site C Project may have affected road safety at each of these intersections.

Table 7 | Comparisons at all study intersections between the safety benchmark and Years 9A and 9B collisions.

Intersection	Collision frequencies (per year or quarter)									
	Pre-construction average		BENCHMARK Y9A (pre-construction average + 10%		Year 9A		BENCHMARK Y9B (pre-construction average + 10%		Year 9B	
	Total	Severe	Total	Severe	Total	Severe	Total	Severe	Total	Severe
85 Avenue / Old Fort Road	0.4	0	0.4	0	0	0	0.1	0	0	0
Highway 97 / Old Fort Road	19.2	7.4	21.1	8.1	**22**	8	5.3	2.0	4	2
Highway 97 / 100 Street	17.6	5.0	19.4	5.5	10	2	4.8	1.4	2	1
Highway 97 / 85 Avenue	5.0	1.2	5.5	1.3	4	**2**	1.4	0.3	**2**	0
85 Avenue / 100 Street	1.2	0.6	1.3	0.7	**3**	0	0.3	0.2	0	0

4.1.1 85 AVENUE AND OLD FORT ROAD

The intersection of 85 Avenue and Old Fort Road has a small number of collisions, such that it is difficult to draw meaningful conclusions from the analysis, especially considering the rare and random nature of crashes. For instance, the benchmark of the pre-construction annual average collision frequency + 10% is set at 0.4 total crashes per year, such that even one collision per year would exceed the benchmark and comparing the collision configuration proportions from one year to the next and against the pre-construction period is far less meaningful when there is only about one crash each year. However, two key patterns can be observed from the analysis nonetheless:

- There were no severe collisions at all during the construction period, which is consistent with the pre-construction period. This is important, as severe collisions are those where people are injured, while the total collisions also include property damage only crashes. As such, no collisions at this intersection during the study period resulted in injuries.
- The time of year pattern with more collisions in October-December months during construction is consistent with the pre-construction period, showing that this pattern is likely due to other factors aside from the increased traffic volumes in some years. Several other likely explanations for increased collisions during these months are the change in weather conditions from Fall to Winter resulting in increased ice on the road in relation to the timing at which drivers install Winter tires on their vehicles, and the change in natural lighting conditions with more travel in the dark.

4.1.2 HIGHWAY 97 AND OLD FORT ROAD

The intersection of Highway 97, Old Fort Road and 100 Avenue had markedly less collisions during most of the construction than in the pre-construction period, except in Year 9A, with Year 9A collision frequencies similar to

the benchmarks (slightly higher for total collisions and slightly lower for severe collisions). As such, the Site C project had no significant negative effects on road safety at this intersection. Notable changes in Year 9A and Year 9B compared to other years in the time of day and month of year graphs include:

- Year 9B had a higher proportion of undetermined collision configurations (25%) than other years. However, there were only 4 collisions in Year 9B, so this only represents 1 collision.
- Year 9A had more collisions in the 12:00PM – 17:59PM period than pre-construction period. This could be due to slightly higher volumes at the intersection during the PM peak than in some other years.
- Year 9A had more collisions in January (5 total) than is typical. Much lower temperatures were recorded in Fort St. John in January 2024 than typical, so it is likely that severe Winter conditions may have resulted in an increased number of collisions at this intersection in Year 9A particularly in January.

4.1.3 HIGHWAY 97 AND 100 STREET

The intersection of Highway 97 and 100 Street had fewer total collisions per year (15.7) during construction compared to the benchmark pre-construction average + 10% (19.4), and similar quantities of severe collisions per year (5.6) than during pre-construction average + 10% (5.5). While the average annual severe collision frequency is higher during construction than the benchmark, this is not concerning as crashes are rare and random events and the difference between the benchmark and the during-construction average is not sufficiently different to conclude the construction influenced road safety at this intersection.

From the collision configuration proportions, Year 9A had a higher proportion of side impacts and fewer rear-end collisions; however, there were markedly less collisions overall in Year 9A such that a change in collision configuration proportions is not unexpected. From the time of day and time of year graphs, there are no unusual patterns in either Year 9A or Year 9B in comparison to previous years either before or during construction

4.1.4 HIGHWAY 97 AND 85 AVENUE

For Year 9A the total collisions for the year were below the benchmark, but the severe collisions for the year were slightly above the benchmark. The benchmark for severe collisions is set at 1.3 collisions per year, such that having two severe collisions in any one year would flag. However, this is a low number and it is more likely that the rare and random nature of collisions is driving the increase in Year 9A than any particular road safety issue. Additionally, the background volumes at this intersection appear to be increasing, which could contribute to an increase in collisions over time which is not captured in the setting of the performance benchmark.

For Year 9B, total collisions for the quarter were slightly above the benchmark, which is also more likely to signify the rare and random nature of collisions than a particular safety issue as the benchmark is set at 1.4 collisions per quarter and two collisions occurred in Year 9B. Other notable trends include:

- In Year 9A, there are two collisions in the period 6:00PM – 8:59PM, with neither the pre-construction nor other construction years showing this pattern. However, two collisions are a low number and this does not suggest any particular trend.
- Year 9A had two collisions in October and Year 9B had two collisions in August, both of which were above the typical monthly collision frequencies. As per the previous point, two collisions are a low number and do not suggest any particular trend.

4.1.5 85 AVENUE AND 100 STREET

The intersection of 85 Avenue and 100 Street has a small number of collisions, such that it is difficult to draw meaningful conclusions from the analysis, especially considering the rare and random nature of crashes. For instance, the benchmark of the pre-construction annual average severe collision frequency + 10% is set at 0.7 collisions per year, such that even one collision per year would exceed the benchmark. Additionally, comparing the

collision configuration proportions from one year to the next and against the pre-construction period is far less meaningful when there are only about one or two collisions each year.

Given the low incidence of collisions at this intersection and the consistent patterns in terms of dominant collision configuration types, time of day and month of year when comparing the pre-construction and construction periods, it appears that the Site C project has had no significant effects on road safety at this intersection.

5 CONCLUSIONS

There were three intersections where the collision frequency during Year 9A or Year 9B exceeded the benchmark; however, all three intersections have likely explanations outside of the Site C Project's control as to why the benchmark was exceeded:

- At the intersection of Highway 97 and Old Fort Road, 22 total collisions occurred in Year 9A with an annual benchmark of 21.1 collisions. The collision frequency is sufficiently close to the benchmark that the exceedance is not representative of a particular safety issue.
- At the intersection of Highway 97 and 85 Avenue, there were two total collisions in Year 9B with a quarterly benchmark collision frequency of 1.4 collisions, and two severe collisions in Year 9A with a benchmark of 1.3 severe collisions per year. Similarly, the difference between the observed collision frequency and the benchmark is not enough to indicate a safety issue.
- At 85 Avenue and 100 Street, there were 3 total collisions in Year 9A with a benchmark of 1.3 collisions per year. Both the total collisions and the benchmark at this intersection are low, such that one or two collisions in any year would exceed the benchmark. Given the rare and random nature of collisions, it is unlikely that a benchmark exceedance is reflective of any decrease or improvement in safety at this intersection.

Based on the reasons above for benchmarks being exceeded, we can conclude that the Site C project has not had any negative impacts on the road safety at any of the study intersections in Years 9A and 9B of the construction period. Given the Site C project construction has now finished, we have not made any recommendations for mitigation measures at any of the intersections.

If you have any questions regarding this report, please contact the undersigned.

Yours truly,

WSP Canada Group Limited

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