



Keeyask Generation Project Socio-Economic Monitoring Plan

Socio-Economic Monitoring Report SEMP-2017-01



KEEYASK GENERATION PROJECT

SOCIO-ECONOMIC MONITORING PLAN

REPORT #SEMP-2017-01

SOCIO-ECONOMIC MONITORING REPORT

APRIL 2016 TO MARCH 2017:

YEAR THREE CONSTRUCTION

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SUMMARY

The Keeyask Generation Project (KGP) Environmental Impact Statement (EIS), completed in June 2012, provides a description of the existing environment, summary of predicted effects and planned mitigation for the Project. Technical supporting information for the socio-economic environment, including a description of the existing environment, effects and mitigation, and a summary of proposed monitoring and follow-up programs is provided in the *Socio-economic, Environment, Resource Use and Heritage Resources Supporting Volume (SE SV)*.

The environmental assessment for the KGP used both technical science and Aboriginal Traditional Knowledge (ATK). Mitigation measures were carefully planned and designed to prevent or reduce (to the extent practical), adverse effects from the Project. However, there were uncertainties associated with predicted effects and the effectiveness of planned mitigation measures. To address these uncertainties, many of the predictions and mitigation measures identified in the KGP EIS are supported by monitoring to enable testing of the predictions and timely response when actual results differ from the predictions.

The KGP Socio-economic Monitoring Plan (SEMP) is a commitment made by the Keeyask Hydropower Limited Partnership (KHLP) in Chapter 8 of the KGP EIS. The SEMP is intended to monitor changes over time for certain socio-economic Valued Environmental Components (VECs). The SEMP focuses on key pathways of effect to, and components of, the socio-economic environment, including:

- Economy,
- Population, Infrastructure and Services, and
- Personal, Family and Community Life

This report focuses on SEMP monitoring activities for the Project to March 31, 2017. Key learning's of the SEMP Program over the 2016/17 period and next steps are presented below by monitoring topic area:

EMPLOYMENT AND TRAINING:

- Analysis in the KGP EIS provides estimates indicating that employment would vary by year and season depending upon the specific construction activities being undertaken, with peak quarterly workforce requirements being the highest in the middle years of construction.
- The KGP EIS predicted employment levels for the partner First Nations members at peak, as well as total person years for the entire construction period. To date, the employment for quarterly peak (i.e., the point within the quarter where the number of workers on site was anticipated to be greatest) positions has exceeded EIS predictions. While a full comparison of person year outcomes cannot be made until the end of construction, total person years of employment to date are within the range of what was predicted for the entire project.

- Since the start of KGP construction to the end of March, 2017, there were 7897 hires on the Project. Total Manitoba hires represented 5681 hires. Of this, 2854 hires represented northern Manitoba (Indigenous and non-Indigenous) hires (50% of total Manitoba hires).
- Since the start of the KGP construction to the end of March, 2017, the top five job classifications hired on the Project are Labourers (21%), Carpenters (14%), Caterers (13%), Equipment Operators (10%) and Teamsters (8%).
- Since the start of KGP construction to the end of March, 2017, the Project generated 2932 person years of employment in terms of a 3000 hour per year basis (4397 person years of employment in terms of a 2000 hour per year basis). Of this, 2128 (on a 3000 hour basis) represented Manitoba person years, and 909 represented total northern Manitoba (Indigenous and non-Indigenous) person years (43% of total Manitoba person years).
- Construction of the KGP has resulted in the establishment of full and part time positions in each of the partner First Nations. While these positions have experienced vacancies, overall this has included: six full time, one term and one part time position at FLCN; six full time positions at TCN; two full time positions at WLFN; and, eight full time positions at YFFN.
- Since the start of KGP construction to the end of March, 2017, the cumulative turnover rate for the Project is 31% of total hires, 44% of Indigenous hires and 20% of non-Indigenous hires. This has increased from what was reported for the period to the end of 2016: 26.4% of total hires, 36.2% for Indigenous hires and 16.5% for non-Indigenous hires. Since the start of the KGP construction to the end of March, 2017, a total of 776 individual workers who were discharged or resigned chose to return to work on the Project (this represents 33% of the total individuals who had previously resigned or been discharged).
- Over the reporting period the Keeyask Advisory Group on Employment (AGE) and Subcommittee continued as a forum for addressing employment-related issues associated with construction of the KGP. This included undertaking a number of measures to enhance the attraction, employment and training of partner First Nation members at Keeyask.
- Since the start of the Project, a total of 215 individuals have been employed in construction trades as trainees or apprentices. To date, 52 of these individuals have successfully advanced within their training or have achieved journeyman status. There have been a total of 415 employees training in the service trades of security, catering, janitorial and housekeeping positions. There are 7 employees training in the Fitness Leader Trainer program and 21 in the Red Seal Chef training program at this time.
- Monitoring of employment, income and training opportunities is ongoing, and efforts are made to address concerns as they arise.

BUSINESS OPPORTUNITIES:

- The KGP EIS predicted that Project construction would present direct and indirect business opportunities locally, regionally and across the province as a whole.

- Cumulatively, \$2,103.6 million has been spent on goods and services for the KGP. Of this, \$735.7 million were Manitoba purchases. Total northern Manitoba (Indigenous and non-Indigenous) purchases represent \$476.6 million or 65% of total Manitoba purchases.
- Monitoring of direct and indirect business opportunities will continue in the upcoming reporting period. It is anticipated that during the next reporting year efforts will be initiated to undertake Key Person Interviews (KPIs) in Thompson, Gillam and each of the partner First Nations to ascertain any indirect business opportunities that may have been generated as a result of the KGP.
- Going forward, KPIs will be undertaken with key participants involved in the management of the KGP Direct Negotiated Contracts (DNCs) to understand the role of partner First Nations' businesses in implementation of the DNCs and how they contribute to building partner First Nations' business capacity.

INCOME:

- Since the start of KGP construction to the end of March, 2017, total labour income earned as a result of the KGP was approximately \$424.0 million. Of this, northern Manitoba labour income represented \$101.3 million (24% of total labour income). Indigenous income represented \$143.6 million (34% of total labour income) and partner First Nations income represented \$47.7 million (11% of total labour income).
- Monitoring of income opportunities is ongoing, and efforts are made to address concerns as they arise.

POPULATION:

- The KPG EIS predicted that population change and the effect on physical infrastructure in the partner First Nations and Gillam would be minimal since workers would be hired through the Job Referral Service and cannot be hired at site. In addition, there is limited accommodation available in the region.
- Over this past reporting period, population increased modestly in each of the partner First Nations. Data for the communities dating back to 2003 shows periods of moderate population growth and decline across years. The increase from 2016 to 2017 is consistent with the overall trends observed over time. Average annual growth rates in select partner First Nations are higher during the construction period than during the pre-construction period. It should be noted, however, that additional monitoring will be needed to determine whether this increase is associated with the Project or represents a short term increase consistent with past variations across similar short time periods. It is also important to note that when looking at relatively small communities, the addition of a few families can result in what appears to be substantial changes in growth rates. Population change will be further considered as part of the Key Person Interview program in each partner First Nation regarding housing, infrastructure and services.

- Over this past reporting period, the population decreased modestly in the Town of Gillam. While the population of Gillam increased steadily between 2008 and 2011, a steady decline has been observed starting in 2013 up until the end of this reporting period (June, 2016).
- Population in the partner First Nations and Gillam will continue to be monitored in the upcoming reporting period.

WORKER INTERACTION:

- The KGP EIS anticipated that construction of the Project may result in adverse interactions between non-local construction workers and TCN and FLCN Members and Gillam residents.
- A Worker Interaction Subcommittee was established by Manitoba Hydro prior to the beginning of Keeyask construction. This subcommittee is part of a corporate-wide initiative to address anticipated increases in the Gillam area workforce resulting from Keeyask and other Manitoba Hydro projects being constructed in an overlapping timeframe, as well as from other Manitoba Hydro-related work in the area.
- In the period from April 1, 2016 to March 31, 2017, the Worker Interaction Subcommittee met four times. During the period, the subcommittee continued to implement its monitoring and consideration of areas of community interest regarding potential project impacts. This included maintaining an ongoing reporting and tracking process for specific community concerns and incidents identified by or to its members.
- Through this mechanism, as well as subcommittee meetings and ongoing communications between members, the subcommittee considered members' concerns related to public safety, community services and infrastructure, including: local road conditions and traffic safety (e.g., traffic speed and oversized loads on PR 280 and PR 290); use of Gillam services and facilities (e.g. the Gillam hospital, the Gillam airport and air service); the behaviour of non-local persons (e.g., at the Gillam airport and the Butnau Marina); and community concerns regarding the presence of drugs in Gillam.

HOUSING, INFRASTRUCTURE AND SERVICES:

- While the KGP EIS anticipated project induced population change would be minor, it acknowledged that any Project-related population change may be a driver of changes to infrastructure and services.
- One-time KPIs will take place during project construction to identify any apparent effects on housing or infrastructure and services in the partner First Nations. KPIs are in progress in both FLCN and YFFN. Outcomes of these interviews, and future interviews at TCN and WLFN will be reported in future reporting periods.

TRANSPORTATION INFRASTRUCTURE:

- Traffic analysis conducted for the KGP EIS predicted that the percentage increase in Project-related traffic on PR 290 was expected to be low, and the percentage increase in Project-related traffic on sections of PR 280 was expected to exceed 20% at peak times.

However, the total volume of traffic on PR 280 and PR 290 was predicted to be well below roadway design tolerances.

- Road conditions on PR 280 deteriorated significantly in the spring of 2016. Soft sub-grade conditions resulted in the road being nearly impassable at some locations.
- Traffic safety and road conditions have been a substantial concern expressed by the partner First Nations, and have been raised in a number of forums. In particular, concerns have been expressed on an ongoing basis regarding speeding, truck weights, convoys, road surface conditions (making travel difficult), vehicle damage and dust. These concerns were heightened in the spring of 2016, which resulted in a blockade of PR 280. As a result of the negotiations among partner First Nations, Manitoba Hydro and the province, a number of mitigation measures have been adopted to reduce the impact of project traffic on PR 280 including road reconstruction and increased maintenance efforts, pre-hauling of construction materials to site during winter months, night hauling, reductions in Manitoba Hydro truck traffic and reductions in truck weights during periods when the road has deteriorated substantially, operation of the Provincial Trunk Highway 6 weigh station near Thompson, and increased communications with staff, contractors, and other road users to provide an awareness of the initiatives Manitoba Hydro has undertaken to improve conditions and safety on PR 280.
- In the fall of 2014, the Province established the PR 280 Joint Advisory Committee. The committee is comprised of representatives from the Province of Manitoba, Manitoba Hydro, the Town of Gillam and the partner First Nations' communities to involve the latter directly in the planning of upgrades to PR 280. In the period between April 2016 and March 2017, the PR 280 Joint Advisory Committee met twice, in May and September of 2016.
- To better understand project impacts, Manitoba Hydro continues to monitor traffic volumes, speeds, and vehicle types on PR 280 and PR 290 using the five permanent traffic monitoring stations installed in 2015. While there is some variation across years, use of PR 280 and PR 290 has steadily increased since 2003. A more substantial increase in use has been observed since the start of construction on the KGP, as anticipated. Traffic volumes have more than doubled over the past ten years. The segment of PR 280 with the highest traffic volumes is between PR 391 and Split Lake where from April 2016 to March 2017, the average traffic counts were approximately 347 vehicles per day. Of the 347 vehicles per day, about 68 were large trucks (both directions combined).
- A direct correlation of this increase in traffic would be an increase in reported collisions (property damage, injury or fatality). There were a total of 88 collisions on PR 280 in the years prior to construction of the KGP (2005 to 2013); an average of 10 collisions per year. From the start of construction on the KGP to today (2014-2016) there have been a total of 91 collisions on PR 280; an average of 30 collisions per year. Although the average number of collisions has increased due to the increase in traffic, collision severity has decreased with fewer collisions resulting in injuries or fatalities over the same comparable time periods. In 2012, the collection and reporting of collision data transferred from the RCMP to MPI and

this change may have affected the number of collisions reported prior to construction and during construction. The collision rate for 2016 (1.20 incidents per million vehicle-kilometres of travel [MVKT]) remains below Manitoba Infrastructure's Standard threshold of 1.5 incidents per MVKT).

- Manitoba Hydro will continue to monitor traffic volumes, speeds, and vehicle types on PR 280 and PR 290 in the upcoming reporting period.

CULTURE AND SPIRITUALITY:

- The KGP EIS noted some uncertainty about how the employment experience of partner First Nations workers during the Project would affect workers, their families and the community. Processes and measures have been put in place to address the potential effects of Project construction and operation on Cree culture and spirituality, including being partners in the Project, the Adverse Effects Agreements negotiated and signed by each partner First Nation, and the Employee Retention and Support Services programming available on site.
- During this reporting period, between April 2016 and March 2017, there were two ceremonies held. One hundred thirteen Indigenous awareness training workshops were held over this same period. Counseling services were available to employees on site on a voluntary basis. These efforts will continue in the next reporting period.
- The Partnership will conduct a worker and family survey of a sample of partner First Nation workers employed during project construction and their families to assess their employment experience. Over this past year discussions occurred regarding the design and implementation of the Worker/Family Survey. It is anticipated that this work will continue into the next reporting period.

MERCURY AND HUMAN HEALTH:

- The KPG EIS predicted no effects of the Project during the construction phase in relation to mercury and human health. After impoundment of the reservoir, flooding of soils is expected to release mercury into the environment and food chain. Increased mercury levels, especially in jackfish and pickerel in Gull Lake and to a lesser extent in Stephens Lake, are estimated to peak about three to seven years after impoundment and then return to pre-impoundment levels over about 30 years.
- Because Project effects of mercury in the reservoir, and to a lesser extent in Stephen's Lake, will occur post- flooding, the majority of related monitoring will occur in the operation phase.
- The Partnership has prepared a Mercury and Human Health Risk Management Plan in consultation with provincial and federal regulators. Over this reporting period, the Mercury Human Health Implementation Group finalized plans to implement components of the Risk Management Plan including providing mercury information sessions in partner First Nations,

distributing communication products in coordination with local health programming and conducting voluntary hair monitoring and food surveys.

- The goals of future monitoring activities are to support discussion and build understanding around mercury and fish; to allow individuals and families to confidently assess and manage the benefits and risks associated with eating wild fish in the Project area; and to support and enhance local practices of fishing for sharing and eating wild fish at levels that are healthy for all community members.

Efforts will continue in the next reporting period to implement all monitoring activities identified under the SEMP.

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1.0 INTRODUCTION

Manitoba Hydro, on behalf of the Keeyask Hydropower Limited Partnership received regulatory approval to commence construction of the Keeyask Generation Project (“the Project” or “KGP”) in July 2014.

The KGP follows the Keeyask Infrastructure Project (KIP), which included a start-up camp and associated infrastructure, a 25 km all weather north-access road, and the first phase of the Keeyask Generation Project main camp.

The KGP Socio-economic Monitoring Plan (SEMP) is intended to monitor changes over time for certain Valued Environmental Components (VECs). The SEMP focuses on key pathways of effect to, and components of, the socio-economic environment including;

- Economy,
- Population, Infrastructure and Services, and
- Personal, Family and Community Life

The SEMP is part of an integrated and coordinated Environmental Protection Program that has been developed to facilitate an effective transition from planning and assessment to implementation of all aspects of the Keeyask Generation Project.

This report focuses on monitoring for the Project from the start of construction to March 31, 2017.

2.0 OVERVIEW OF PROJECT

The Keeyask Generation Project is a 695 megawatt (MW) hydroelectric generating station located approximately 180 km northeast of Thompson and 40 km southwest of Gillam at Gull Rapids on the lower Nelson River. The Project consists of four principal structures: a powerhouse complex, a spillway, dams, and dykes. A reservoir will be created upstream of the principal structures. Supporting infrastructure consists of temporary facilities required to construct the principal structures and permanent facilities required to construct and operate the Project. Temporary infrastructure consists of work areas, cofferdams, rock groins, and an ice boom. Permanent supporting infrastructure consists of north and south access roads, a transmission tower spur, communications tower, some borrow areas, excavated-material placement areas, boat launches, and a portage to enable river traffic to bypass the dam.

3.0 OVERALL OBJECTIVES AND APPROACH

The KGP Environmental Impact Statement (EIS) identified primary effects to the socio-economic VECs and defined the process, scope, methods, documentation and application of the socio-economic monitoring for the Project. Overall, the intent of Manitoba Hydro and the partner First Nations has been to reduce adverse effects of the Project and to enhance Project benefits to the extent feasible and practicable. Monitoring information has been intended to assist in this management task. The SEMP for the Project is intended to monitor changes over time for certain VECs in order to, where applicable:

- Test predicted effects in the EIS;
- Identify unanticipated effects related to the Project;
- Monitor the effectiveness of mitigation measures;
- Determine if adaptive management is required; and
- Confirm compliance with regulatory requirements, including terms and conditions in Project approvals.

The SEMP focuses on key pathways of effect to, and components of, the socio-economic environment including;

- Economy
 - Employment and Training Opportunities
 - Business Opportunities, and
 - Income
- Population, Infrastructure and Services
 - Population
 - Housing
 - Infrastructure and Services, and
 - Transportation Infrastructure
- Personal, Family and Community Life
 - Public Safety and Worker Interaction
 - Travel, Access and Safety
 - Culture and Spirituality, and
 - Mercury and Human Health

The SEMP builds on the assessment studies conducted for the EIS using established methods for data collection and analysis.

4.0 OVERALL SCHEDULE

The SEMP will be more extensive during construction of the Project, but will also occur during the operation phase. SEMP activities will occur as follows;

- Construction Phase – SEMP monitoring during construction is related to employment and training opportunities; business opportunities; income; population changes; housing; infrastructure and services; transportation infrastructure; public safety and worker interaction; travel, access and safety; and culture and spirituality.
- Operation Phase – SEMP monitoring during operation is more limited, and is related to population change in Gillam during the first five years of operation; water levels at Split Lake (re: transportation infrastructure/travel safety); and monitoring related to mercury and human health.

5.0 STUDY AREA

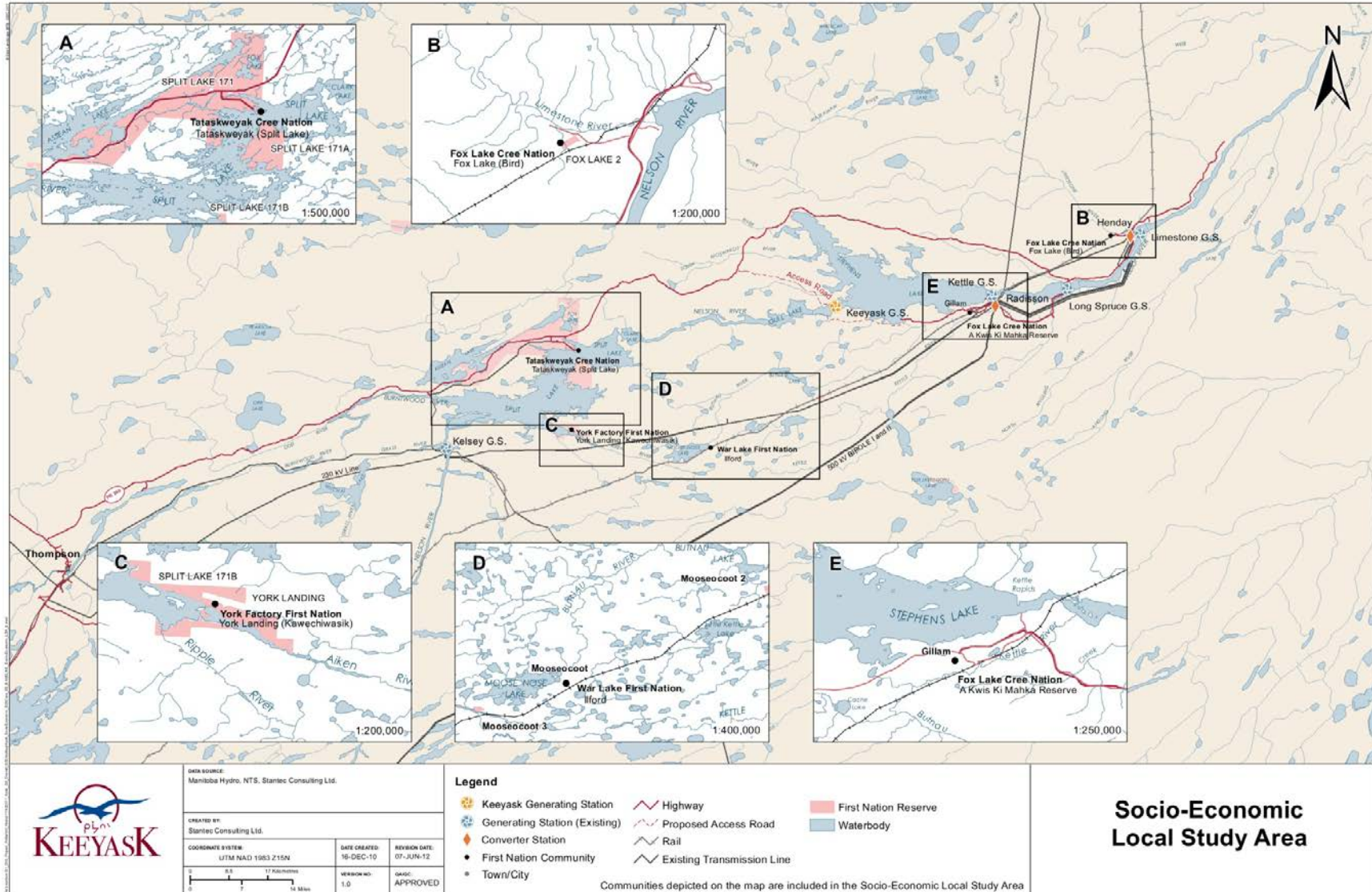
The Socio-Economic Local Study Area for the SEMP (see Map 1) incorporates the Project site, and includes the partner First Nation communities of Tataskweyak Cree Nation (TCN) at Split Lake, War Lake First Nation (WLFN) at Ilford, York Factory First Nation (YFFN) at York Landing and Fox Lake Cree Nation (FLCN) at Fox Lake/Gillam, which are affected by the Project through the following pathways of effect:

- Physical/biophysical changes to the way the landscape looks;
- Physical/biophysical effects on resource use/traditional use areas and heritage resources;
- Employment and business opportunities;
- Construction traffic;
- Interaction with non-local construction workers within the partner First Nations' home communities; and
- Investment income.

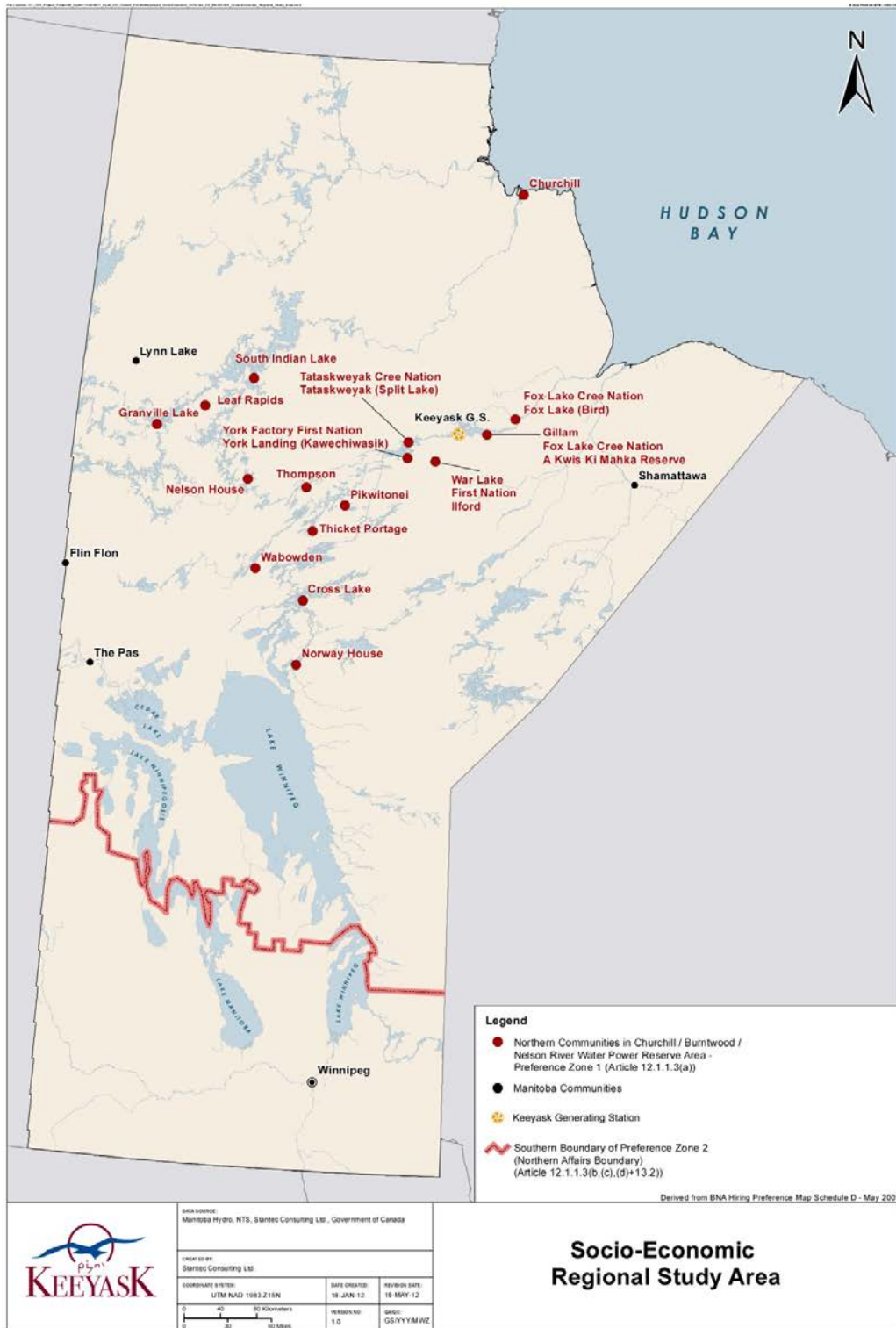
In addition to the partner First Nations' communities, the Town of Gillam and the City of Thompson are included in the Socio-Economic Local Study Area for the following reasons:

- The Town of Gillam is Manitoba Hydro's northern operations base and operational staff for the Project will be located there. Gillam is also home to FLCN Members living on-reserve and both FLCN and TCN Members living off-reserve;
- Some of the Project's workforce are likely to visit Gillam and Thompson during their leisure time;
- Transportation/traffic for construction equipment, materials and people will flow primarily through Thompson, and some also via Gillam; and
- The City of Thompson is the regional centre for the Project and, as such, can be expected to experience increased expenditures on retail goods and services due to re-spending of wages by the Project construction workforce. Some commercial and industrial services in Thompson could see increased demand (e.g., air and freight travel through Thompson). As well, Thompson could receive additional pressure on regional health and social services.

Certain Project effects, in particular preferential hiring of northern Indigenous and other northern workers for construction employment, will extend beyond the Socio-Economic Local Study Area to all of northern Manitoba. For this reason, the Socio-Economic Regional Study Area has been defined using the boundary identified under Schedule D of the Burntwood Nelson Agreement (BNA) (see Map 2) as the area pertaining to northern preference. This includes the Churchill-Burntwood-Nelson (CBN) communities identified in the BNA as part of hiring preference Zone 1.



Map 1: Socio-Economic Local Study Area



Map 2: Socio-Economic Regional Study Area

6.0 ECONOMIC MONITORING

Economic monitoring includes monitoring of all employment and training, business and income outcomes associated with the Project. Monitoring is conducted using a consistent method of approach Manitoba Hydro has used for other major capital projects.

All information regarding economic monitoring is provided from the start of Generating Station Project activities to the end of March 2017.

Economic impacts can be either direct, indirect or induced. Direct impacts result from project expenditures and include employment, purchases, and income generated by the Project. Indirect impacts refer to the employment, purchases and income created in other industries as the effects of project expenditures work their way through the economy. For example, there are indirect impacts on businesses supplying materials and equipment to companies in the direct impact segment. Induced impacts are created by the spending of additional income and profits earned by workers and company owners associated with the Project directly or indirectly. This includes additional spending on food, housing, entertainment, transportation, and all of the other expenses that make up a typical household budget. Adding up the direct, indirect and induced impacts, results in the total economic impact of the Project.

6.1 EMPLOYMENT AND TRAINING

The Project EIS analysed and provided employment estimates for partner First Nations, the Indigenous workforce in the CBN area and the Indigenous workforce in the Socio-Economic Study Area as a whole (see SE SV Section 3.4.1) for the construction phase of the Project. The EIS also predicted that there would be northern participation in the operating jobs required to operate the facility.

Monitoring of employment and training is being undertaken first, to determine the overall employment outcomes of the Project construction, with particular emphasis on Indigenous and northern resident participation, and second, to determine the extent to which recipients of pre-project training (PPT) participated in Keeyask construction jobs, and received on the job training. It was estimated that the levels of participation would be influenced by several factors, including timing of the opportunities and the level of interest by potential workers in pursuing those opportunities.

Monitoring of employment outcomes provides data on the success in attracting and retaining partner First Nation members, Indigenous persons and Manitobans during Project construction.

As noted within the SEMP, the Project has an established Advisory Group on Employment (AGE) that will continue to function throughout construction. This is a forum to address employment-related issues, in particular Indigenous employment, related to construction of the Project. The AGE is established to receive, review and find solutions to concerns and issues and

to monitor, report and make recommendations to the Project manager on employment-related matters, as required.

During construction, employment data is collected on site by contractors through an employee self-declaration form designed specifically for the Project. All completed forms are provided by on-site contractors to Manitoba Hydro, and stored in a central database for the Project. Contractors also provide information to Manitoba Hydro on hours worked and labour income to enable calculations for person years and income estimates during construction. Employment data is provided in the categories outlined below:

- Person years – When part-time and/or seasonal workers are used, it is useful to standardize the hires in terms of person years of employment. Person years of employment are defined as the amount of work that one worker could complete during twelve months of full-time employment. For construction planning purposes and to compare to the KGP EIS, the number of hours worked per year is approximately 3000 hours (assuming 60 regular hours weekly) in most trade categories. For economic comparison purposes, the number of hours worked per year is approximately 2000 hours (assuming 40-44 regular hours weekly). As this report can be used for various types of comparisons, the data has been presented in terms of 3000 and 2000 hours per year.
- Hires - Refers to the number of times people were hired on the Project site for any duration.
- Employees - Refers to the number of individuals hired. The variance between Hires and Employees can be attributed to an individual being hired to the Project more than once.
- Type (job classifications) of work available.

Training data is collected by Manitoba Hydro through established methods utilizing contractor on the job reporting, and the completion of an employee self declaration form. Hydro Northern Training and Employment (HNTEI) pre-project trainees (PPTs) are tracked by comparing self declared Employee Report information to the Manitoba Hydro HNTEI database.

6.1.1 PERSON YEARS OF EMPLOYMENT

Since the start of construction to the end of March, 2017 the Project generated 2932 person years of employment in terms of a 3000 hour per year basis (4397 person years in terms of a 2000 hour per year basis). See below for the breakdowns of person years of employment.

Table 1: Person Years of Employment (Start of Construction to end of March 2017)

	3,000 ¹ hours	2,000 ² hours	% of Total Person Years
CBN	572	858	20%
Indigenous	1198	1797	41%
Non-Indigenous	1734	2600	59%
Northern Manitoba Indigenous	819	1229	28%
Northern Manitoba Non-Indigenous	90	134	3%
Manitoba	2128	3192	73%
Non-Manitoba	803	1205	27%

6.1.2 HIRES

Since the start of construction to the end of March 2017 there were 7897 hires on the Project. See Table 2 below for the breakdown of total hires.

Table 2: Number of Hires (Start of Construction to end of March 2017)

	Hires	% of Total Hires
CBN	2022	26%
Indigenous	3651	46%
Non-Indigenous	4246	54%
Northern Manitoba Indigenous	2696	34%
Northern Manitoba Non-Indigenous	158	2%
Manitoba	5681	72%
Non-Manitoba	2216	28%

Note: Figures above are not additive.

6.1.3 INDIVIDUAL EMPLOYEES

Since the start of construction to the end of March 2017, a total of 5319 individual employees were hired on the Project. See Table 3 for the breakdown of employees.

¹ This number is used for construction planning purposes and to compare to the numbers in the EA Report.

² This number is used for economic comparison purposes.

Table 3: Total Individual Employees (Start of Construction to end of March 2017)

	Employees	% of Total Employees
CBN	1149	22%
Indigenous	2200	41%
Non-Indigenous	3119	59%
Northern Manitoba Indigenous	1543	29%
Northern Manitoba Non-Indigenous	119	2%
Manitoba	3623	68%
Non-Manitoba	1696	32%

Note: Figures above are not additive.

The total number of individual employees is less than the total number of hires because the same individual may have been hired more than once. For example, an individual may have moved to work on a different contract or moved to a different job classification to improve their position.

The number of individual employees to date does not reflect the number of employees on site at a given time. The number of employees on site at any given time varies depending on the work in progress and the time of year. The number of employees on site is usually highest during the period from late spring through early fall, which is typically the period with the highest level of construction activity and the largest workforce on site. The actual number of employees on site over the course of the year ultimately depends upon the work plans and schedules of the contractors for the various project components, in conjunction with the provisions of the Burntwood-Nelson Agreement, which is the collective bargaining agreement for the Project.

6.1.4 EMPLOYMENT IN THE PARTNER FIRST NATIONS

Construction of the KGP has resulted in the establishment of full and part time positions in each of the partner First Nations. While these positions have experienced vacancies, overall the number of new positions created as a result of construction of the KGP has included:

- Six full time, one term and one part time position at FLCN;
- Six full time positions at TCN;
- Two full time positions at WLFN; and
- Eight full time positions at YFFN.

These positions have been created on the basis of community specific work plans for the implementation of governance and other commitments in the JKDA.

6.1.5 TYPE OF WORK (JOB CLASSIFICATION) AVAILABLE

The total cumulative hires by job classification (to the end of March 2017) are provided in Table 4 below. For employee privacy and confidentiality reasons, the numbers of hires by community cannot be disclosed, as the numbers are low for some of the classifications listed.

Table 4: Total Hires by Job Classification (Start of Construction to end of March 2017)

Job Classification	Total Hires	% of Total Hires	CBN	Indigenous	Non-Indigenous	Northern MB	Other MB	Non-MB
Labourers	1636	21%	609	998	638	819	551	266
Security Guards	117	1%	12	46	71	34	83	<5
Crane Operators	122	2%	<5	18	104	7	87	28
Equipment Operators	757	10%	140	314	443	208	316	233
Teamsters	621	8%	227	395	226	320	249	52
Carpenters	1081	14%	55	270	811	112	321	648
Millwrights	9	<1%	<5	<5	8	<5	9	<5
Painters	6	<1%	<5	<5	5	<5	6	<5
Floor Covering Installers	9	<1%	<5	<5	9	<5	8	<5
Insulator Workers	66	1%	<5	10	56	<5	53	11
Lathing and Drywall Workers	42	1%	<5	8	34	<5	14	27
Cement Masons	68	1%	<5	16	52	<5	35	31
Sheet Metal Workers	10	<1%	<5	<5	8	<5	10	<5
Roofers	11	<1%	<5	<5	10	<5	10	<5
Sheeters, Deckers and Cladders	25	<1%	<5	7	18	<5	24	<5
Boilermakers	9	<1%	<5	<5	8	<5	7	<5
Iron Workers	340	4%	5	91	249	21	167	152
Rodmen	59	1%	<5	20	39	<5	21	36
Electrical Workers	205	3%	27	53	152	47	151	7
Plumbers and Pipefitters	85	1%	12	32	53	14	71	<5
Refrigeration Workers	13	<1%	<5	7	6	<5	8	<5
Sprinkler System Installers	<5	<1%	<5	<5	<5	<5	<5	<5
Office and Professional Employees	419	5%	93	169	250	136	150	133
Caterers	1058	13%	747	1020	38	997	38	23
Elevator Constructors	6	<1%	<5	<5	6	<5	6	<5
Other*	1122	14%	87	171	951	129	431	562
Total Hires	7897	100%	2022	3651	4246	2854	2827	2216

*The "Other" category refers to hires in job classifications not covered by the BNA, i.e. "out of scope" positions. This would include managerial and supervisory staff (both Contractor and Manitoba Hydro), other Manitoba Hydro on-site staff and certain technical staff (engineers and technicians).

6.1.6 RATES OF TURNOVER

There have been 2382 occurrences where employees were discharged (387 occurrences) or resigned (1995 occurrences). This represents a rate of turnover of 31% of total hires. The majority of turnover, 84%, is comprised of resignations as opposed to discharges.

Turnover is calculated as total incidents of discharges and resignations divided by total hires³ and does not include layoffs or transfers to other positions or contracts. Resignations represents all situations where an individual chooses to leave a job. Table 5 below outlines turnover rates

³ Turnover calculations exclude hires associated with Contract 016125 (Emergency Medical Services) and with environmental monitoring contracts as hiring and work scheduling practices for this contract are unique, and do not present true on-site turnover.

for specific segments of the Keeyask labour force, as well as the breakdown of discharges and resignations.

Table 5: Turnover⁴

	Total Discharges	Total Resignations	Total Separations	Rate of Turnover
CBN	164	860	1024	52%
Indigenous	259	1314	1573	44%
Non-Indigenous	128	681	809	20%
Northern Manitoba Indigenous	197	1090	1287	49%
Northern Manitoba Non-Indigenous	10	40	50	32%
Manitoba	338	1682	2021	37%
Non-Manitoba	49	312	361	16%

Note: Figures above are not additive

There have been instances where individuals have been discharged or resigned, but later returned to work on the Project. This occurred 776 times, approximately 33% of the total discharges and resignations.

It is also useful to look at the amount of turnover within certain time periods throughout the life of the project. When looking at a specific period within the life of the project, turnover is expressed as total incidents of separation (for discharges and resignations), divided by hires working on site within that specific time period. Since the start of construction, and as shown in Table 6 below, the amount of turnover within a given quarter has ranged from 6.6% to 15.7%. Of this, turnover among Indigenous employees has ranged from 13% to 23.2% and among non-Indigenous employees from 2.8% to 11%. While there has been variation in the amount of turnover across each quarter, overall the amount of turnover for the workforce in Q1, 2017 is lower than in Q3, 2014. Among Indigenous workers the amount of turnover is lower than the Q1 turnover in previous years.

Table 6: Quarterly Turnover⁴

Residency Or	2014		2015				2016				2017
Ancestry	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
CBN	13.2%	23.3%	18.9%	24.9%	20.7%	21.9%	21.5%	22.8%	28.2%	17.8%	17.9%
Indigenous	13.0%	19.2%	15.8%	21.3%	17.7%	18.3%	15.8%	18.4%	23.2%	13.6%	13.0%
Non-Indigenous	10.0%	10.6%	5.9%	7.0%	6.1%	5.5%	5.4%	7.2%	11.0%	4.2%	2.8%
Northern											
Manitoba	13.8%	23.6%	17.5%	23.1%	19.5%	20.8%	18.9%	20.1%	27.7%	16.2%	15.9%
Indigenous											
Northern											
Manitoba	21.7%	7.1%	12.0%	13.5%	1.8%	4.7%	12.8%	6.7%	13.0%	4.6%	7.1%
on-Indigenous											
Manitoba	12.6%	15.6%	11.7%	15.2%	12.5%	13.7%	12.1%	14.4%	19.4%	10.6%	9.2%
Non-Manitoba	5.3%	10.4%	4.9%	5.6%	6.7%	6.0%	5.3%	6.7%	9.5%	3.2%	2.3%
Total											
Quarterly TO	11.4%	14.6%	10.4%	13.2%	11.1%	11.8%	10.3%	12.1%	15.7%	7.7%	6.6%

Note: The table above represents the % turnover per Residency or Ancestry and not of total project

6.1.7 EMPLOYMENT MITIGATION

6.1.7.1 THE ADVISORY GROUP ON EMPLOYMENT

The Advisory Group on Employment (AGE) is a forum for addressing employment-related issues associated with construction of the Keeyask Project. In particular, an emphasis is placed on the employment and training of partner First Nations' members in both designated and non-designated trades. The AGE creates a collaborative environment for interaction between various committee members, including the Province of Manitoba, contractors, Manitoba Hydro, the Hydro Projects Management Association, Allied Hydro Council and the partner First Nations. The AGE Sub-Committee was established in 2015 and is a smaller subset of the AGE with a goal of further addressing issues related to employment and training at Keeyask. Several initiatives have been undertaken to get more partner First Nations' members hired on the Project and to progress in trade jobs.

Job Seeker Managers (JSMs) are based in each of the four partner First Nations. Each JSM is responsible for developing an annual community employment plan. All four plans are unique, but also have common goals including improving the ability for employers to make contact with members and ensuring that members' qualification profiles are up to date. The JSMs provide several employment support services to community members. A backup JSM, use of the KCN site reps to help contact job seekers, assistance with job profile updates and other required

⁴ Turnover calculations exclude hires associated with Contract 016125 (Emergency Medical Services) and with environmental monitoring contracts as hiring and work scheduling practices for this contract are unique, and do not present true on-site turnover.

tasks, have been provided to the JSMs to ensure they are able to maintain the required level of service within their communities. Additionally, as part of employment ramp down in Fall of 2016, representatives from the provinces Job Referral Service (JRS) team attended the Keeyask Project site to update job seeker profiles in early November. This was very well received and a key contributing factor in ensuring a smooth employment ramp up in the spring of 2017.

Community engagement sessions were held in the four partner First Nation communities from November 2016 to February 2017. Over 50 potential job seekers attended the sessions, where they were able to learn about employment and training opportunities at Keeyask and speak with various contractor representatives. Job seekers who had not previously worked at Keeyask were given the opportunity to attend a two-day site orientation session from February 21-22, 2017. The site orientation session provided individuals with the chance to experience the Project first-hand, learn more about training and employment opportunities from the contractors, and to experience camp life for a couple of days. Eight potential job seekers and two JSMs attended.

KCN members have been given the opportunity to sign up to the Keeyask Engagement Project (KEP) Referral List. Maintained by Workplace Education Manitoba, the KEP Referral List identifies an individual's current trade and level or what trade an individual would like to be in. The KEP Referral List is distributed on a regular basis and contractors can use the referral list to direct hire individuals into training and apprenticeship programs without having to post a job order through the Job Referral Service. The initiative of this intake process for the KEP Referral List has received positive reviews from both contractors and job seekers and has proven to be successful in identifying and filling training and apprentice positions in an expeditious manner.

In August 2016, the Keeyask Workplace Essential Skills Training Centre (KWEST) was established onsite by the AGE and Workplace Education Manitoba. The goal of KWEST is to provide new and existing workers access to skill development support, to enhance their capacity to participate in on-the-job training, carry out workplace tasks effectively and efficiently, and to prepare for advanced training and employment opportunities. Participants are assessed for the essential skills required for the trade they are in or are interested in. Opportunities to address skill gaps through tutorial and small group sessions are provided. Since its inception in August 2016 until March 31, 2017, KWEST has provided approximately 50 individuals skill development support and has led to numerous success stories.

6.1.7.2 KEEYASK WORKPLACE CULTURE

The KHLF is committed to creating a respectful workplace culture for all at the Keeyask site. A Respectful Workplace Standard exists for the Keeyask Project. It describes a strong vision for a workplace free from discrimination and harassment, and respectful of different cultures. Achieving this goal is the responsibility of everyone involved in the Keeyask Project.

Through the course of the 2016 construction season, the KHLF Board became concerned that this goal was not being realized for everyone at the project site. To better understand concerns that had come forward, and to create a better work environment going forward, a number of

measures were undertaken during 2016/17. This included contracting an independent third party to assess current workplace culture at the Keeyask site, and to develop recommendations for improving the work environment going forward.

The consultant conducted their review during late fall and early winter. The final report is still pending. Initial findings and recommendations are already being implemented at site. These include:

- Standardizing policies and procedures at site for all contractors, including the reporting and investigation of workplace complaints;
- Improving training for managers, supervisors and others involved in addressing workplace complaints; and
- Enhancing the supports available at site for employees.

A committee has been established at site to continue efforts to create a positive work environment on a go forward basis. This committee includes representation from Manitoba Hydro, each of the partner First Nations and contractors on site.

The KHLB Board will continue to work together to monitor and support the Project Management team to ensure the successful implementation of report recommendations.

6.1.8 TRAINING

Since the start of the Project, a total of 215 individuals have been employed in construction trades as trainees or apprentices. Apprentices have gained employment in the trade classifications of crane operators, carpenters, millwrights, insulator workers, cement masons, sheet metal workers, iron workers, rodmen, electrical workers, plumbers, sprinkler installers and heavy duty mechanics. Trainees have gained employment in the following trade classifications of equipment operators, teamsters, clerks, survey assistants, safety officers, emergency responder and primary care paramedic cadets. To date, 52 of these individuals have successfully advanced within their training or have achieved journeyman status. Of the total 215 trainees and apprentices, 57 remain as active trainees, apprentices or employees on the Project.

There have been a total of 415 employees training in the service trades of security, catering, janitorial and housekeeping positions. There are 7 employees training in the Fitness Leader Trainer program and 21 in the Red Seal Chef training program at this time.

In addition to trainees and apprentices, 354 individuals employed on the Project site were participants of the past HNTEI PPT Program. HNTEI PPT Program trainees have gained employment in craft trade positions as labourers, security guards, crane and equipment operators, teamsters, carpenters, rodmen, electrical workers, plumbers and pipefitters, office and professional employees, and caterers. Trainees have also gained employment in out-of-scope positions such as safety and environmental staff, employee retention and support staff

and as trade supervisors. Of the 354 HNTEI PPT trainees employed, 103 remain active on the Project.

6.2 BUSINESS OPPORTUNITIES

Project construction presents business opportunities locally, regionally and across the Province. Business outcomes are measured using data on the direct expenditures of the Project of goods and services, with a focus on purchases from Indigenous and northern Manitoba businesses. Additional data will be collected to understand indirect business opportunities generated as a result of Project-related expenditures in Gillam, Thompson and the partner First Nation communities. Data on Project related business opportunities are collected through the following mechanisms:

- Existing Project data collection processes tracking direct project expenditures
- Indirect business opportunities survey
- Direct Partnership business opportunities survey

6.2.1 DIRECT PROJECT EXPENDITURES

There was \$2,103.6 million spent on goods and services for the Project. Of this, \$735.7 million were Manitoba purchases. Total northern Manitoba (Indigenous and non-Indigenous) purchases represent \$476.6 million or 64% of total Manitoba purchases. The information provided represents direct purchases of the Project for contractors and services. Indirect purchases made by a contractor, in turn, would include purchases of goods and services from Manitoba based businesses.

Table 7 below summarized the breakdown of total purchases to date.

Table 7: Direct Purchases

	\$ (Millions)	% of Total
Manitoba	735.7	35.0%
Northern Manitoba Indigenous	465.8	
Other Northern Manitoba	10.8	
Other Manitoba	259.1	
Outside of Manitoba	1,367.7	65.0%
Other	0.2	<0.1%
Total	2,103.6	

6.2.2 INDIRECT BUSINESS OPPORTUNITIES SURVEY

With respect to indirect business effects, the KGP SEMP indicates that KPIs in Thompson, Gillam and each of the partner First Nation communities will be undertaken to ascertain any indirect business opportunities that may be generated as a result of the Project.

This KPI program will be undertaken at the peak of the General Civil Contract activities estimated to occur in year 3 or 4 of the construction phase.

6.2.3 DIRECT PARTNERSHIP BUSINESS OPPORTUNITIES SURVEY

As part of the JKDA, Manitoba Hydro and the partner First Nations committed to a series of business opportunities for the Project to negotiate as Direct Negotiated Contracts (DNCs) with partner First Nation businesses.

As noted within the Project SEMP, a KPI program of key participants involved in management of the DNCs will be undertaken to understand the role of partner First Nation businesses in implementation of the DNCs and how they contribute to building partner First Nation business capacity.

This KPI program is planned to be implemented in Year 4 and 8 of the construction phase and results will be reported thereafter directly to the Partnership.

6.3 INCOME

The results of income monitoring include estimates of labour income. This is viewed as an important indicator of the direct economic impact of the Project. Income levels affect the general standard of living of individuals and families.

6.3.1 LABOUR INCOME

The estimate of labour income reflects the direct income earned by workers from employment on the Project. It is the sum of wages and salaries associated with direct person years of employment⁵. Total labour income earned since Project inception is approximately \$424.0 million. Table 8 lists the breakdown of labour income earned on the Project.

⁵ Labour income is calculated based on information provided by contractors and Manitoba Hydro.

Table 8: Labour Income

	Labour Income (Millions)	% of Total
Partner First Nations	\$47.7	11%
CBN	\$61.8	15%
Indigenous	\$143.6	34%
Non-Indigenous	\$280.4	66%
Northern Manitoba	\$ 101.3	24%
Other Manitoba	\$ 182.5	43%
Non-Manitoba	\$140.2	33%

Note: Figures above are not additive.

7.0 SOCIAL MONITORING

7.1 POPULATION

The KGP EIS predicted that the Project would not result in notable changes to the number of people in the partner First Nation communities and that there would not be many people moving into the communities because of Project construction. Similarly, Gillam was not predicted to see any substantial population growth as a result of Project-related construction and Thompson was also not expected to see any major construction-related population change.

However, accurately identifying the precise levels of in- and out-migration is difficult and the partner First Nations have noted that any in-migration to their communities could stress services already at capacity. Population is being monitored to confirm the extent of Project-induced migration in the partner First Nations communities and Gillam.

7.1.1 PARTNER FIRST NATION COMMUNITIES

The partnership has monitored the total on-reserve and on-own-Crown land⁶ populations of each of the partner First Nations. The total on-reserve and on-own-Crown land population of the partner First Nations represents the population assumed to be most likely to access housing, infrastructure and services on reserve.

Population monitoring is based on data from Indigenous and Northern Affairs Canada, from December 31, 2003 to December 31, 2016. Absolute population change and the growth rate in the pre- (2003–2014) and post-construction (2014–2016) periods are reported in Table 9 below to show change that has occurred since the Project began.

Over this past reporting period, population increased modestly in each of the partner First Nations. Data for the communities dating back to 2003 shows periods of moderate population growth and decline across years. The increase from 2016 to 2017 is consistent with the overall trends observed over time. Average annual growth rates in TCN, YFFN and FLCN are higher during the construction period than during the pre-construction period. It should be noted, however, that additional monitoring will be needed to determine whether this increase is associated with the Project or represents a short term increase consistent with past variations across similar short time periods. It is also important to note that when looking at relatively small communities, the addition of a few families can result in what appears to be substantial changes

⁶ On-Own-Crown lands are those lands not classified as reserve lands but Crown Lands that have been assigned to a particular Band. Indigenous and Northern Affairs Canada tracks First Nations populations data for a number of categories including on-reserve, off-reserve, on-own-Crown land, on no Band Crown land, and on another Band Crown Land.

in growth rates. This is why absolute change is tracked in conjunction with average growth rates. Population change in the partner First Nations will be further considered as part of the Key Person Interview program in each partner First Nation regarding housing, infrastructure and services.

Table 9: Partner First Nation Population

	TCN	WLFN	YFFN	FLCN
Total Population Increase				
Between 2003 & 2016	478	15	32	10
Between 2015 & 2016	81	7	60	29
Average Annual Growth Rate				
Between 2003 & 2016	1.70%	0.90%	0.60%	0.30%
Between 2003 and 2014	1.50%	1.10%	-0.90%	-0.90%

A comparison of partner First Nations' on-reserve and on own Crown land populations from 2003 to 2016 is demonstrated in the graph below (all population statistics reported as of December 31, 2016).

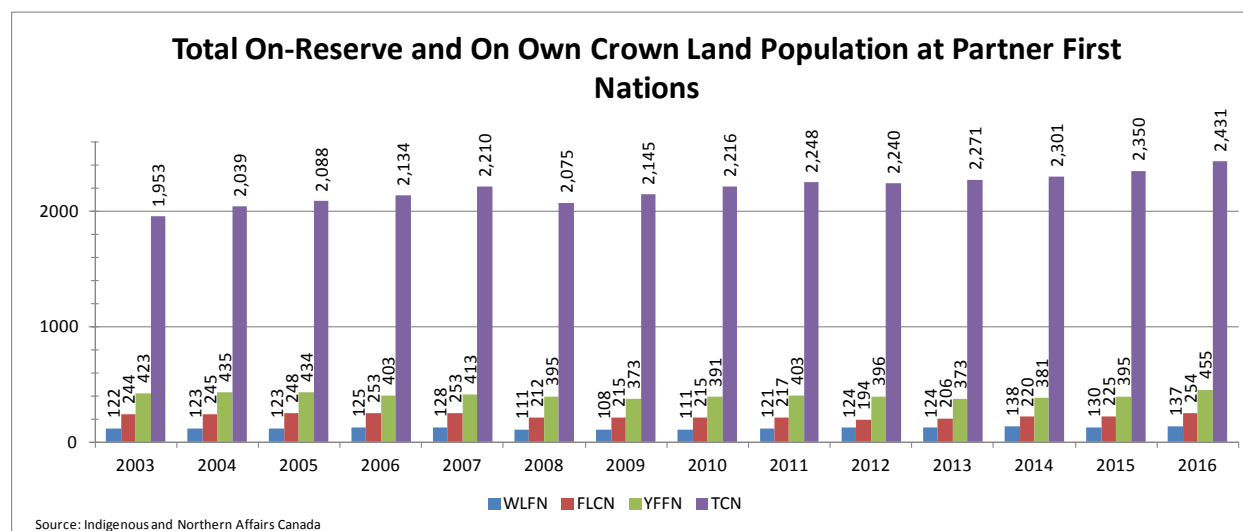


Figure 1: Total On-Reserve and On-Own-Crown Land Population at Partner First Nations (2003-2016)

7.1.2 TOWN OF GILLAM

Based on data from Manitoba Health's annual health statistics, the total population at Gillam increased from 1,171 to 1,247, an increase of 76 people, between June 1, 2008 and June 1,

2016. This represents an average annual growth rate of 0.8% over the period. Over this past reporting period, the population decreased modestly in the Town of Gillam (by 58 people). While the population of Gillam increased steadily between 2008 and 2011, a steady decline has been observed starting in 2013 up until the end of this reporting period (June, 2016). In the pre- and post-construction periods, the average annual changes were 2.3 % and -3.5 %, respectively.

A comparison of the Gillam population from 2008 to 2016 (as of June 1) is demonstrated in the graph below.

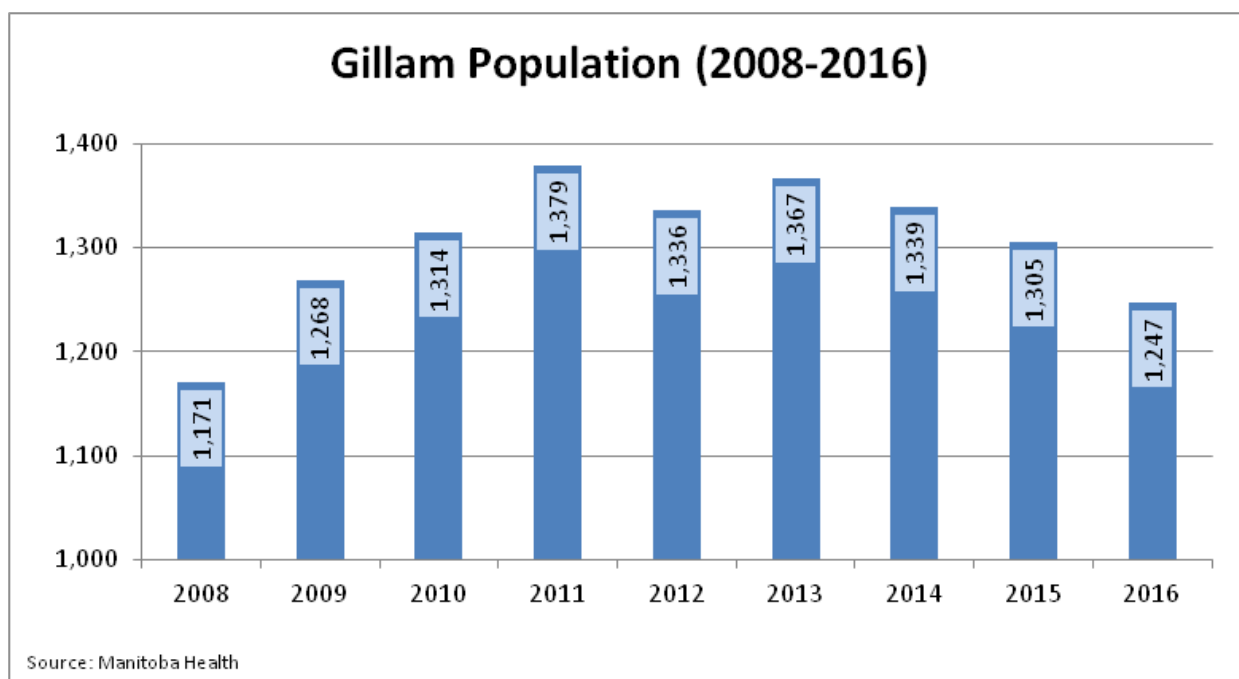


Figure 2: Gillam Population (2008-2016)

7.2 WORKER INTERACTION

A Worker Interaction Subcommittee was established by Manitoba Hydro prior to the beginning of Keeyask construction. This subcommittee is part of a corporate-wide initiative to address anticipated increases in the Gillam area workforce resulting from Keeyask and other Manitoba Hydro projects being constructed in an overlapping timeframe, as well as from other Manitoba Hydro-related work in the area.

The subcommittee is intended as a forum for information sharing and communication for early identification of potential worker interaction concerns, prevention of issues to the extent possible, and identification of ways to work cooperatively to address issues as they arise including any related increases in the demand for services and accommodation in Gillam. Subcommittee members during 2016-17 included Manitoba Hydro, Fox Lake Cree Nation, the

Town of Gillam, the RCMP (Gillam Detachment), the Gillam Hospital, and the Gillam School. Other stakeholder members may be identified by the subcommittee on an as needed basis.

In the period between from April 1, 2016 to March 31, 2017, the subcommittee met four times, in April, June and September of 2016, as well as in January of 2017.

During the period, the subcommittee continued to monitor and consider areas of community interest regarding potential Project impacts. This included maintaining an ongoing reporting and tracking process for specific community concerns and incidents identified by or to its members. Through this mechanism, as well as subcommittee meetings and ongoing communications between members, the subcommittee considered members' concerns related to public safety, community services and infrastructure, including:

- Local road conditions and traffic safety (e.g., traffic speed and oversized loads on PR 280 and PR 290);
- Use of Gillam services and facilities (e.g., the Gillam hospital, the Gillam airport and air service);
- The behaviour of non-local persons (e.g., at the Gillam airport and the Butnau Marina); and
- Community concerns regarding the presence of drugs in Gillam.

In addition, the subcommittee continued to monitor updates provided by the Gillam Hospital related to demands for health services (e.g., "out of town" visits to the Gillam hospital), and by the Gillam RCMP related to demands on policing (e.g., RCMP calls). Given privacy requirements in data collection, as well as the various developments taking place in the area over the period, it was not always possible to link concerns or demands for services to specific projects.

Examples of activities undertaken during 2016/2017 in relation to concerns and topics discussed at the subcommittee include: providing a hospital services information sheet developed by the Gillam Hospital (regarding hospital facilities, doctor availability, and related hours) to Keeyask and Keewatinohk workers; providing instructions to Keeyask and Keewatinohk buses/shuttles to park in a designated area away from the airport doors to reduce traffic congestion; communicating with contractors regarding concerns about workers' behavior in public; communicating subcommittee members' perspectives to forums responsible for implementing traffic and road safety measures; and implementing cultural awareness training by FLCN for short-term contractors.

The information provided by subcommittee members will continue to be used to assist in identifying potential adaptive measures to reduce any negative impacts of hydroelectric development in the region.

7.3 HOUSING, INFRASTRUCTURE AND SERVICES

The KGP EIS anticipated little new demand for housing in the partner First Nation communities and in Gillam during Project construction. Minimal effects on infrastructure and services in the partner First Nations were also expected.

One-time KPIs will take place during Project construction to identify any apparent Project effects on housing or infrastructure and services in the partner First Nations' communities. Manitoba Hydro and the partner First Nations have initiated discussions regarding the design and implementation of the KPIs. Interviews are in progress in both FLCN and YFFN.

Information related to the effects of non-local construction workers on the demand for infrastructure and services in Gillam is also available and discussed at the Gillam Worker Interaction Subcommittee.

7.4 TRANSPORTATION INFRASTRUCTURE, TRAVEL, ACCESS AND SAFETY

During construction, project effects on road-based travel are anticipated to stem from increased vehicular traffic associated with the transport of people (construction personnel and service providers), equipment and materials on roads in the area, particularly PR 280. While the KGP EIS predicted that existing transportation networks and plans for PR 280 upgrades would be able to accommodate the changes in road use associated with Project construction, community concerns remain regarding traffic safety and road conditions.

In the fall of 2014, the Province established the PR 280 Joint Advisory Committee. The committee is comprised of representatives from the Province of Manitoba, Manitoba Hydro, the Town of Gillam and the partner First Nations' communities to involve the latter directly in the planning of upgrades to PR 280. In the period between April 2016 and March 2017, the PR 280 Joint Advisory Committee met twice, in May and September of 2016.

Road conditions on PR 280 deteriorated significantly in the spring of 2016. Soft subgrade conditions resulted in the road being nearly impassable at some locations. Traffic safety and road conditions have been a substantial concern expressed by the partner First Nations, in a number of forums including the PR280 Joint Advisory Committee, Construction Advisory Committee and the Monitoring Advisory Committee. In particular, concerns have been expressed on an ongoing basis regarding speeding, truck weights, convoys, road surface conditions (making travel difficult), vehicle damage and dust. These concerns were heightened in the spring of 2016, which resulted in a blockade of PR 280. As a result of the negotiations among partner First Nations, Manitoba Hydro and the province, a number of mitigation measures have been adopted to reduce the impact of project traffic on PR 280 including road reconstruction and increased maintenance efforts, operation of the Provincial Trunk Highway

(PTH) 6 weigh station near Thompson, and communicating driver expectations to contractors in an effort to promote appropriate driving behaviour on PR 280.

Manitoba Hydro developed a comprehensive transportation management plan in the fall of 2016 to reduce the impacts of project traffic on PR 280. The plan includes the following strategies:

- Pre-hauling construction materials to site during the winter months;
- Night hauling of some materials when the weather is cold at night and warm in the daytime;
- Reductions in Manitoba Hydro truck traffic and reductions in truck weights during periods when the road has deteriorated significantly; and,
- Increased communications with staff, contractors, and other road users to provide an awareness of the initiatives Manitoba Hydro has undertaken to improve conditions and safety on PR 280.

The plan will help reduce wear and tear on the road and allow Manitoba Infrastructure (MI) to focus on areas requiring increased maintenance. MI is responsible for the existing provincial highway system, including the maintenance and upgrade of PR 280. Monitoring efforts are being undertaken in collaboration with MI, Manitoba Public Insurance (MPI), and the RCMP to assess EIS predictions and respond to community concerns.

7.4.1 TRAFFIC VOLUMES

Traffic volume information has been obtained from the Manitoba Highway Traffic Information System (MHTIS) website for the years 2005, 2007, 2009, 2011, 2013 and 2015. This information is based on data collected by MI for PR 280 and PR 290 on a biennial basis, and includes estimates of annual average daily traffic (AADT), which is the number of vehicles passing a point on an average day of the year.

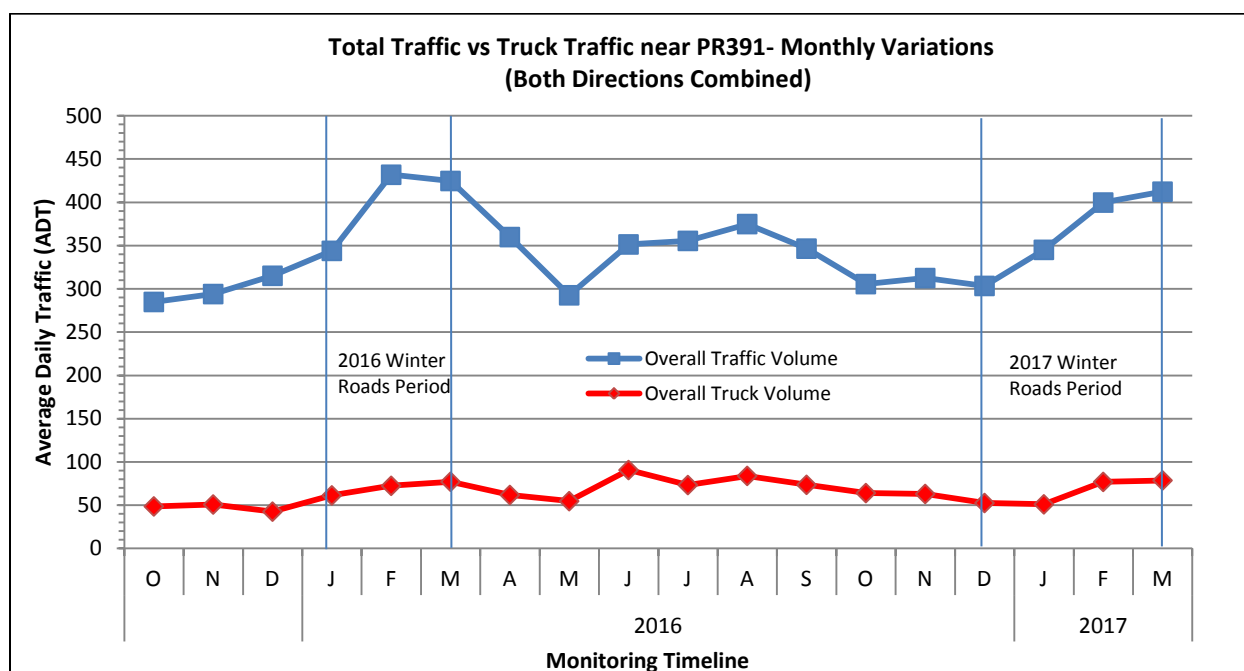
Traffic data from the MHTIS for PR 280 between PR 391 and the PR 280/PR 290 intersection is divided into two segments; PR 391 to Split Lake and Split Lake to the PR 280/PR 290 intersection. A third section of PR 280 is from the PR 280/PR 290 intersection to Gillam. A summary of the AADT for these segments of PR 280 for past years is as follows in the following table (combined for northbound and southbound traffic rounded to the nearest five). While there is some variation across years, use of PR 280 and PR 290 has steadily increased since 2003. A more substantial increase in use has been observed since the start of construction on the KGP, as anticipated. Traffic volumes have more than doubled over the past ten years. The segment of PR 280 with the highest traffic volumes is between PR 391 and Split Lake where from April 2016 to March 2017, the average traffic counts were approximately 347 vehicles per day. Of the 347 vehicles per day, about 68 were large trucks.

Further details on traffic volumes are provided in Manitoba Hydro's Northern Road Traffic Monitoring Quarterly Data Collection Summary (Attachment 1).

Table 10: Summary of AADT for Segments of PR 280 from 2003 to 2015

Highway	Segment	Annual Average Daily Traffic (AADT)						
		2003	2005	2007	2009	2011	2013	2015
PR 280	PR 391 to Split Lake	230	155	135	175	210	270	340
	Split Lake to PR 280/290	115	95	95	120	140	160	230
	PR 280/290 to Gillam	205	210	235	225	255	375	450

Based on data collected since 2015, trends in traffic volumes appear to be cyclical with peaks occurring during the winter months from January to March. Traffic volumes tend to decrease later in the spring and then flatten out over the summer months. However, it should be noted that there is very little difference in truck traffic counts throughout the year as shown in the graph below. There is a slight increase in truck traffic during the winter months, but the main driver of the increase in traffic during winter is small vehicles (i.e. cars, pick-up trucks, vans). This increase may be attributed to a few factors, including pre-hauling of construction materials to site, an increase in the number of trips from communities while the winter road system is in operation, and traffic related to Bipole III Transmission Line construction which occurs mainly during the winter months. As Bipole III construction winds down in 2018, it is expected that the traffic counts over the winter months will decrease.

**Figure 3: Monthly Variations: Overall Traffic Versus Truck Traffic**

7.4.2 COLLISION DATA

A direct correlation of this increase in traffic would be an increase in reported collisions (property damage⁷, injury or fatality). There were a total of 88 collisions on PR 280 in the years prior to construction of the KGP (2005 to 2013); an average of 10 collisions per year. From the start of construction on the KGP to today (2014 to 2016) there have been a total of 91 collisions on PR 280; an average of 30 collisions per year. Although the average number of collisions has increased due to the increase in traffic, collision severity has decreased with fewer collisions resulting in injuries or fatalities over the same comparable time periods. In 2012, the collection and reporting of collision data transferred from the RCMP to MPI and this change may have affected the number of collisions reported prior to and during construction. The collision rate for 2016 (1.20 incidents per million vehicle-kilometres of travel [MVKT]) remains below MI's standard threshold of 1.5 incidents per MVKT.

Collisions during the spring (March, April, May) and fall (September, October, November) months were most frequent, accounting for 58% of all collisions over the twelve-year period. Single vehicle collisions were most frequent, accounting for approximately 90% of all collisions during the analysis period. Further details on collisions are provided in Manitoba Hydro's Northern Road Traffic Monitoring Quarterly Data Collection Summary (Attachment 1).

7.4.3 KEEYASK SITE ACCESS

The Keeyask North Access Road connects PR 280 to the construction site. It is a private road with restricted access, which is controlled by means of a security gate near the PR 280/North Access Road intersection. The gate office is staffed 24 hours per day, 7 days per week and security staff document all authorized vehicles entering and exiting the road. Monitoring of traffic volumes on the access road takes place through the gate's records and through security reports from patrols.

Comparing traffic counts from the monitoring station located at Site 2 (closest station to the Keeyask North Access Road) with gate counts at site allows construction related traffic to be quantified with regards to overall traffic on PR 280. Over the past year, these two sets of traffic counts indicate that Keeyask related construction traffic accounts for 40%-50% of all traffic on PR 280 near the PR 280/Keeyask North Access Road intersection.

Tables 11 and 12 below provide a summary of traffic use on the North Access Road from January 1, 2016 to March 31, 2017. On average, 119 vehicles per day used the road during the

⁷ Property damage can be attributed to collisions with wildlife, running off the road into a fixed object, head on or side swipe collisions with other vehicles, overturned vehicles, damage to vehicles as a result of hitting potholes/ruts, etc. Property damage does not include cracked or chipped windshields resulting from any rocks/gravel being kicked up by vehicles travelling along the road.

reporting period. In 2016, on average, personnel vehicles accounted for 87% of all traffic⁸, delivery vehicles accounted for approximately 10% of traffic, with the remainder of traffic being attributed to visitors. These numbers provide information to measure and identify changes that may be related to the Project.

Table 11: 2016 North Access Road Gate Count Records for the Keeyask Generation Project

Month	Site Personnel	Suppliers/ Deliveries	Visitors/ Guests	Vehicle Totals	Daily Vehicle Average
Jan	8,332	799	188	4,973	160
Feb	10,641	807	419	6,113	218
Mar	11,648	966	312	6,337	204
Apr	6,282	893	331	3,332	111
May	5,848	767	318	2,549	82
June	7,396	1,056	164	3,141	105
July	7,730	1,031	245	3,105	100
Aug	8,607	1,059	252	3,296	106
Sep	8,550	977	430	3,234	108
Oct	7,974	832	212	2,806	91
Nov	7,963	822	328	2,785	93
Dec	5,194	506	93	2,097	68
Summary	87%	10%	3%	43,768	120

Table 12: 2017 North Access Road Gate Count Records for the Keeyask Generation Project

Month	Site Personnel	Suppliers/ Deliveries	Visitors/ Guests	Vehicle Totals	Daily Vehicle Average
Jan	6,543	359	196	3,036	98
Feb	5,585	521	199	2,570	92
Mar	9,546	852	311	4,608	149
Summary	90%	7%	3%	10,214	113

⁸ Site personnel vehicles include all contractors and Manitoba Hydro employees entering and exiting the site using the Keeyask North Access Road. This vehicle classification includes the shuttle buses that are used to transport workers to and from the site. The majority of workers lodge in the Keeyask camp and would not be driving to site each day.

7.5 CULTURE AND SPIRITUALITY

Measures were in effect during the reporting period to support the retention of northern and Indigenous employees at the job site and to ensure that sensitivity and respect for local culture is established throughout construction of the Project. These measures include on-site Indigenous awareness activities and retention support programs, orientation programming, Indigenous awareness training for employees, voluntary counseling services and cultural ceremonies prior to many key construction activities. A Worker/Family Survey will also be completed to assess the experiences of partner First Nation workers employed on project construction and their families.

7.5.1 INDIGENOUS AWARENESS ACTIVITIES AND RETENTION SUPPORT PROGRAMS

Since the start of construction, various measures were put in place to support the retention of northern and Indigenous employees at the job site, and to ensure that sensitivity and respect for local culture is demonstrated throughout construction of the Project. These measures include establishing the Employment Retention and Support (ERS) Services contract where scope was developed jointly with the Fox and York Keeyask Joint Venture who endeavored to include all partner First Nations' interests. The ERS contractor began delivery of services during the Keeyask Infrastructure Project and continued into the Generating Station Project. Services include orientation sessions for partner First Nation Members, on-site Indigenous awareness training for employees, voluntary counseling services, and cultural ceremonies marking key construction activities.

7.5.1.1 PARTNER FIRST NATION MEMBERS ORIENTATION

The purpose of these orientation sessions, delivered in the communities, is to prepare partner First Nation Members for the camp construction experience and enhance their prospects of achieving benefits from employment on the Keeyask Project. The focus is on key factors that affect the economy, culture and social conditions of each partner First Nation. This includes the historical and ongoing effects of hydro development and relationships with Manitoba Hydro. In 2015/2016, seven sessions were held, with at least one session in each of the partner First Nations. No sessions were held in 2016/2017.

7.5.1.2 INDIGENOUS AWARENESS TRAINING

On-site training workshops are provided for staff working at the Keeyask site. One hundred thirteen training workshops were held in the past fiscal year. The purposes of training workshops are to:

- Increase understanding and appreciation of the cultural differences, beliefs and values of individuals within the various parties/communities working at the site;
- Enhance comfort in living, working and/or doing business in a culturally diverse environment;
- Identify barriers and issues between the various parties working at the site;
- Identify common goals;
- Develop strategies and an action plan for addressing issues/barriers, reaching common goals and developing and maintaining long-term harmonious relationships;
- Increase participants' understanding of contemporary issues facing Indigenous peoples;
- Challenge participants to re-think their assumptions and personal biases about Indigenous peoples; and
- Provide participants with information that will promote understanding and respect of Indigenous cultures, enabling participants to work effectively with Indigenous peoples.

Training is a requirement for all staff working at the Keeyask Site.

7.5.1.3 ON-SITE COUNSELING

On-site counseling is available to help all employees, on a voluntary basis, to deal with any issues experienced while working on the Project. This could include, for example, work adjustment problems, vocational/ career issues, cultural adjustments, family stresses and money management. The intent is to reduce attrition for all project workers, but particularly for Northern Indigenous workers of Cree heritage, by assisting them in dealing with problems directly affecting their work performance.

7.5.1.4 CULTURAL SITE CEREMONIES

Site ceremonies are held at key construction milestones to help mitigate the effect of the Project on partner First Nations' culture, and to demonstrate respect for the land and all that is supported by the land. Ceremonies are organized by the Fox and York Keeyask Joint Venture, and attendance, both welcome and voluntary, consists of various partner First Nation Members at large, and staff of the contractor and Manitoba Hydro. In this reporting period, between April 2016 and March 2017, there were two ceremonies held.

8.0 MERCURY AND HUMAN HEALTH

Mercury is a metal found naturally in small amounts in rock, soil, water, living organisms, as well as in synthetic products. Flooding of forested lands with soils with high organic content, or flooding of wetlands, commonly results in a temporary increase in mercury (in the form of methylmercury) in the water, and subsequently in the organisms that live and use those environments. The vast majority of mercury exposure to people occurs through the consumption of fish. When fish high in mercury are eaten, particularly large and long-lived predatory fish, there is a potential for a negative effect on human health. There is also a potential for a negative effect on health and wellness if people substantively limit their consumption of healthy fish due to a fear of mercury.

Because Project effects of mercury in the reservoir, and to a lesser extent in Stephen's Lake, will occur post- flooding, the majority of related monitoring will occur in the operation phase. Mercury levels in fish from Gull Lake are expected to peak three to seven years after impoundment and then to decline over the next 20 to 30 years until they reach pre-Project levels or stable concentrations.

The Partnership has prepared a Mercury and Human Health Risk Management Plan in consultation with provincial and federal regulators. The plan includes:

- Monitoring of mercury in fish, wildlife, plants;
- Voluntary hair sampling and wild foods survey of First Nation community members;
- Human health risk assessments; and
- A communication strategy for partner First Nation communities, Gillam, and other users of fish in affected water bodies.

The goals of future monitoring activities are to support discussion and build understanding around mercury and fish; to allow individuals and families to confidently assess and manage the benefits and risks associated with eating wild fish in the Project area; to support and enhance local practices of fishing for sharing and eating wild fish at levels that are healthy for all community members. The Mercury Human Health Implementation Group (composed of the partner First Nations, Manitoba Hydro, and provincial and federal health specialists) has finalized plans to implement the Risk Management Plan.

**APPENDIX 1:
NORTHERN ROAD TRAFFIC MONITORING
QUARTERLY DATA COLLECTION SUMMARY
MARCH 2017**

NORTHERN ROAD TRAFFIC MONITORING QUARTERLY DATA COLLECTION SUMMARY MARCH 2017



Traffic Monitoring Site 11 – Looking West

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Executive Summary

Construction-related activities associated with the development of the Keeyask Project and Bipole III Transmission Project (BPIII) has generated additional traffic on various segments of the Provincial Road (PR) network, in particular, on PR 280 and PR 290. Three types of traffic are being realized – local traffic, workforce traffic, and shipping of materials and equipment for both local and site specific needs.

While the Environmental Impact Statements (EIS) for both the Keeyask and BPIII Projects predicted that existing transportation networks and plans for PR 280 upgrades would be able to accommodate the changes associated with Project construction, community concerns remain regarding traffic safety and road conditions. Manitoba Infrastructure (MI) is responsible for the existing provincial highway system, including maintenance and upgrades to PR 280 and PR 290. Monitoring efforts are being undertaken with information from MI, Manitoba Public Insurance (MPI), and the Keeyask and Keewatinohk site access gates to assess EIS predictions and respond to community concerns.

Traffic monitoring stations have been installed at five locations on PR 280 and PR 290. MI installed the stations in 2015 and is maintaining the equipment with funding provided by Manitoba Hydro (MH). MI collects the data from the stations and submits the information on a monthly basis to MH. Traffic data collected to date shows an increase in traffic volumes at all monitoring stations, however, these additional traffic volumes still remain within the roadway design tolerances.

Background

Traffic Study

The Environmental Impact Statements (EIS) for both the Keeyask Project and the Bipole III Transmission Project (BP3) contain requirements for continual traffic monitoring throughout the lifespan of these projects. In addition, concerns from local communities have increased the need for a comprehensive traffic monitoring program.

Based on the monitoring requirements for the Projects, MH developed a comprehensive traffic monitoring program which includes five traffic counters on PR 280 and PR 290 as shown on the Traffic Monitoring Locations Map in **Appendix D**. These traffic counters along with the data from the Keeyask and Keewatinohk Converter Station site access gates will help provide an understanding of traffic patterns in the area. PR 280 and PR 290 are Provincial Roads that fall under MI jurisdiction. The Conawapa Access Road, which begins at the east end of PR 290 near the Limestone Generating Station, is a MH privately owned roadway. A security gatehouse has been installed along the Conawapa Access Road to limit access to construction traffic only during the construction of the Keewatinohk Converter Station.

The anticipated increase in traffic volumes on PR 280 and PR 290 will not exceed the current design rating for these roads. Localized upgrades were recommended to address safety concerns and improve reliability. Continuous monitoring of traffic volumes on these roads was recommended by two separate engineering studies.

Traffic Monitoring Stations

Typically, traffic volumes on Provincial Roads (PR) are monitored through the Manitoba Highway Traffic Information System (MHTIS) which is a partnership between MI and the University of Manitoba Transport Information Group (UMTIG). PR 280 and PR 290 are monitored biennially using temporary coverage traffic count stations. Coverage count stations (CCS) are short-term traffic count stations where sites are surveyed on a three-year cycle (a two-year cycle was used for PR 280 and PR 290).

MH has worked closely with MI to acquire detailed traffic information on these roads during construction of the BP3 and Keeyask Projects. During the summer of 2015, MI installed permanent traffic monitoring stations at Sites 1, 2 and 3 (see **Figure 1**). The installation of the permanent monitoring stations at Sites 10 and 11 was delayed until the fall of 2015 as there was ongoing road work underway in the area.

To create efficiencies and to have consistent monitoring and data outputs, all five monitoring locations were consolidated in late 2015 to have monitoring data compiled by MI on a monthly basis. Data from all five sites has been consistently collected since the fall of 2015. Please refer to **Appendix D** for a map of the traffic monitoring station locations.

Data Collection Processes

Traffic Volume Data

Monitoring Stations

On-going compilation of data from the five permanent monitoring stations is completed monthly by MI personnel. The data is reviewed and formatted then forwarded to MH. The induction loops are able to differentiate various vehicle types based upon axle count and spacing. Vehicle classifications have been grouped into small, medium and large vehicles as shown in **Figure 2**.



Figure 1 – Site 1 Traffic Monitoring Station

Site Gates

In addition to the physical traffic monitoring stations described above, security gates on the North Access Road and South Access Road into Keeyask and on the Conawapa Access Road into Keewatinohk are collecting data on all vehicles entering the sites. Security personnel located at the gates track the type (see **Figure 2**) and number of vehicles that enter and leave the sites.




Vehicle Category		Vehicle Description	
Small			
Medium			
Large			
Bin 1	Class 1	Small	Cars, truck and vans
Bin 2	Class 2, 3, 4	Medium	Buses, single dual & tandem dual trucks, dual steering with tandem drive
Bin 3	Class 5 and 6	Large	Trucks 5 axles and up

Figure 2 - Vehicle Classification

Speed Data

The Royal Canadian Mounted Police (RCMP) detachment in Gillam does periodic speed enforcement on PR 280 and PR 290. Data collected from these activities are obtained annually.

Speed is also calculated using the permanent traffic monitoring stations. The induction loops that are buried within the roadway are spaced at a given interval. The time it takes for the front axle and rear axle to cross the loops gives an indication of the speed of the vehicle within an accuracy range of +/- 5 km/h. This information is reflective of vehicle speed tendencies at the traffic monitoring station location. The specific location of the traffic monitoring station may impact the speed tendencies dependent upon road geometry in each direction.

Small vehicles are categorized as all passenger cars, trucks and vans. Medium vehicles are categorized as all buses and dual or tandem axle trucks. Large vehicles are categorized as all vehicles with five axles and more.

Collision Data

Reported collision data is tracked by MPI. MPI is only able to log collisions that are reported and the details are limited to what is provided. In addition, the local RCMP detachment provides information on reported collisions. Collisions are defined as any reported accident that resulted in property damage or injury.

The collision data is compiled by MH annually and summarized in a following section.

Data Collection Results

Historic Data

Temporary Traffic Monitoring Stations

MI collects data on PR 280 and PR 290 on a biennial basis. Traffic counts are typically conducted for 48 hours each time via a pneumatic (compressed air) road tube-counter which counts vehicle axles. Traffic volume information was obtained from the MHTIS website for the years 2003, 2005, 2007, 2009, 2011, 2013 and 2015.

The data is used to estimate the annual average daily traffic (AADT) which is the number of vehicles passing a point on an average day of the year. **Figure 3** shows the historical traffic volumes on PR 280 and PR 290.

Traffic data from the MHTIS for PR 280 between PR 391 and the PR 280/PR 290 intersection is divided into two segments; PR 391 to Split Lake and Split Lake to the PR 280/PR 290 intersection. A third section of PR 280 is from the PR 280/PR 290 intersection to Gillam. Traffic data for PR 290 are from temporary counters located just east of PR 280 and west of Sundance.

Table 1 summarizes the AADT for the segments of PR 280 and PR 290 for the years of 2003, 2005, 2007, 2009, 2011, 2013 and 2015 (rounded to the nearest five).

Table 1 – PR 280 & PR 290 Traffic Volumes

Highway	Segment	Annual Average Daily Traffic (AADT)						
		2003	2005	2007	2009	2011	2013	2015
PR 280	PR 391 to Split Lake	230	155	135	175	210	270	340
	Split Lake to PR 280/290	115	95	95	120	140	160	230
	PR 280/290 to Gillam	205	210	235	225	255	375	450
PR 290	East of PR 280	100	100	130	150	140	240	295
	West of Sundance	10	30	50	50	40	80	150

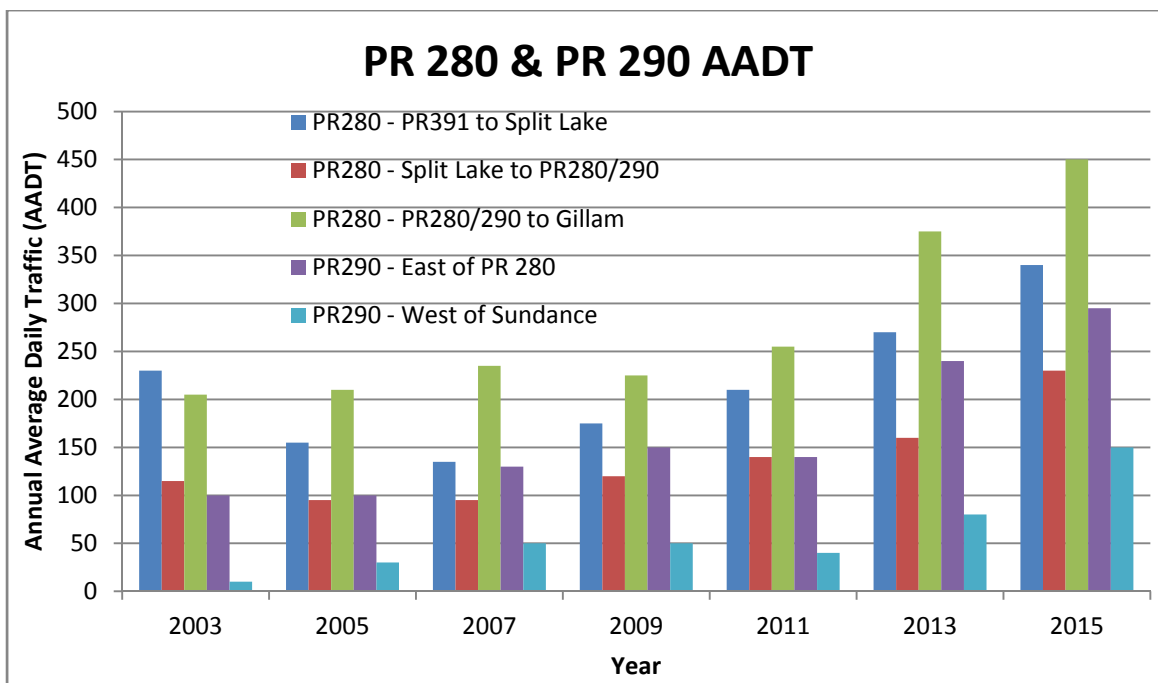


Figure 3 – PR 280 & PR 290 Traffic Volumes

Table 2 summarizes the two, four, six, eight, ten and twelve year growth rates for PR 280. Due to the small sample size on PR 290, growth rates would be skewed and are therefore not calculated for this section of roadway.

Table 2 – PR 280 Traffic Growth Rates

Highway	Segment	Growth Rates					
		2-year	4-year	6-year	8-year	10-year	12-year
PR 280	PR 391 to Split Lake	12.2%	12.8%	11.7%	12.2%	8.2%	3.3%
	Split Lake to PR 280/290	19.9%	13.2%	11.5%	11.7%	9.2%	5.9%
	PR 280/290 to Gillam	9.5%	15.3%	12.2%	8.5%	7.9%	6.8%

Current Data

Traffic Monitoring Stations

Data from the traffic monitoring stations indicates that there has been a steady increase in traffic volumes since monitoring began in 2015. Counts began to steadily decline during the spring thaw period in 2016 and slowly increased over the summer months. It is anticipated that the same trend will occur in 2017. Traffic data collected over the past year seems to indicate that traffic volumes tend to be cyclical. Further analysis over the upcoming years would help confirm this.

Figures 4 and 5 show the traffic counts since mid-July 2015. Monitoring stations 3, 10 and 11 did not begin counts until mid-October 2015. There was a failure at Station 1 in November 2015 that lasted two weeks, therefore these month's average daily traffic (ADT) were extrapolated based on the partial month's data collection. Station 1 experienced another failure for three days in June 2016 so results have been based on a 27 day period rather than 30 for this month. Also, another failure occurred in July 2016 for a three week duration, therefore results for this month are skewed as well.

Figures 4 and 5 show an increase in traffic volumes in February and March of 2016 and 2017. To better understand potential activities causing this increase, large vehicle traffic was graphed against overall traffic as shown for Site 1 in Figure 6. Truck traffic vs overall traffic graphs for other sites are given in Appendix A.

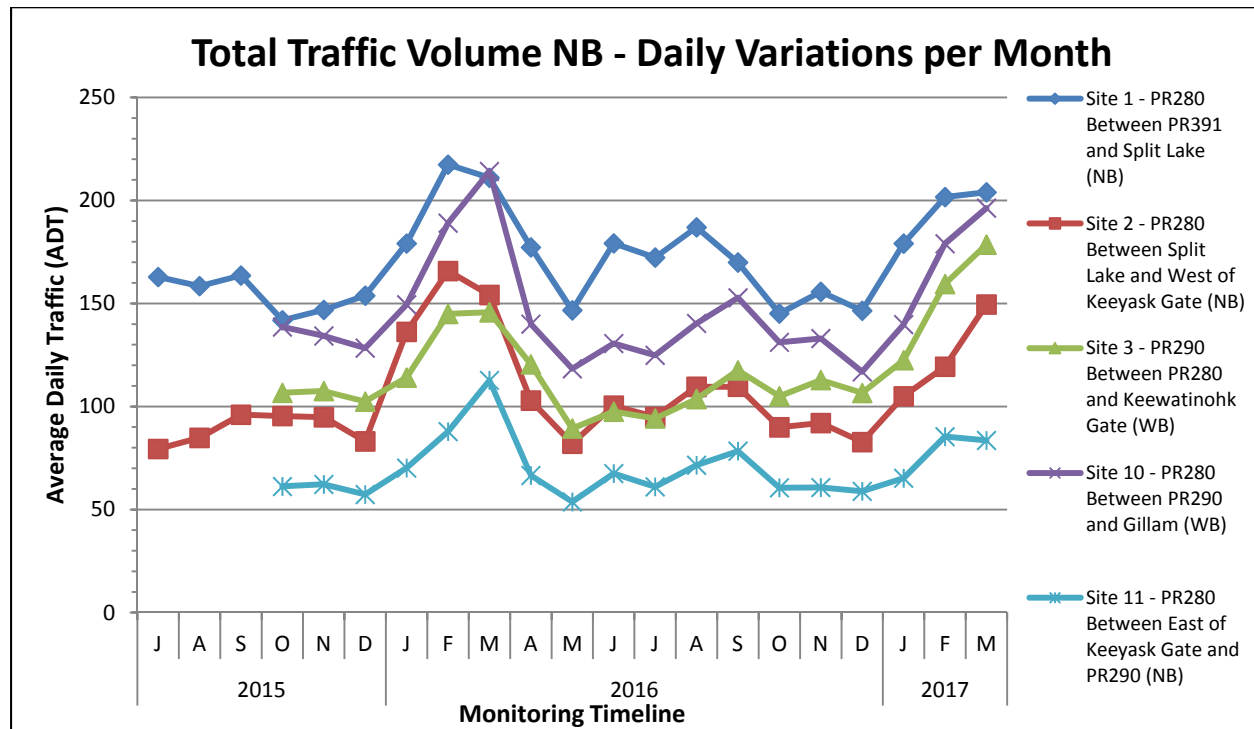


Figure 4 – Northbound Monthly Station Counts

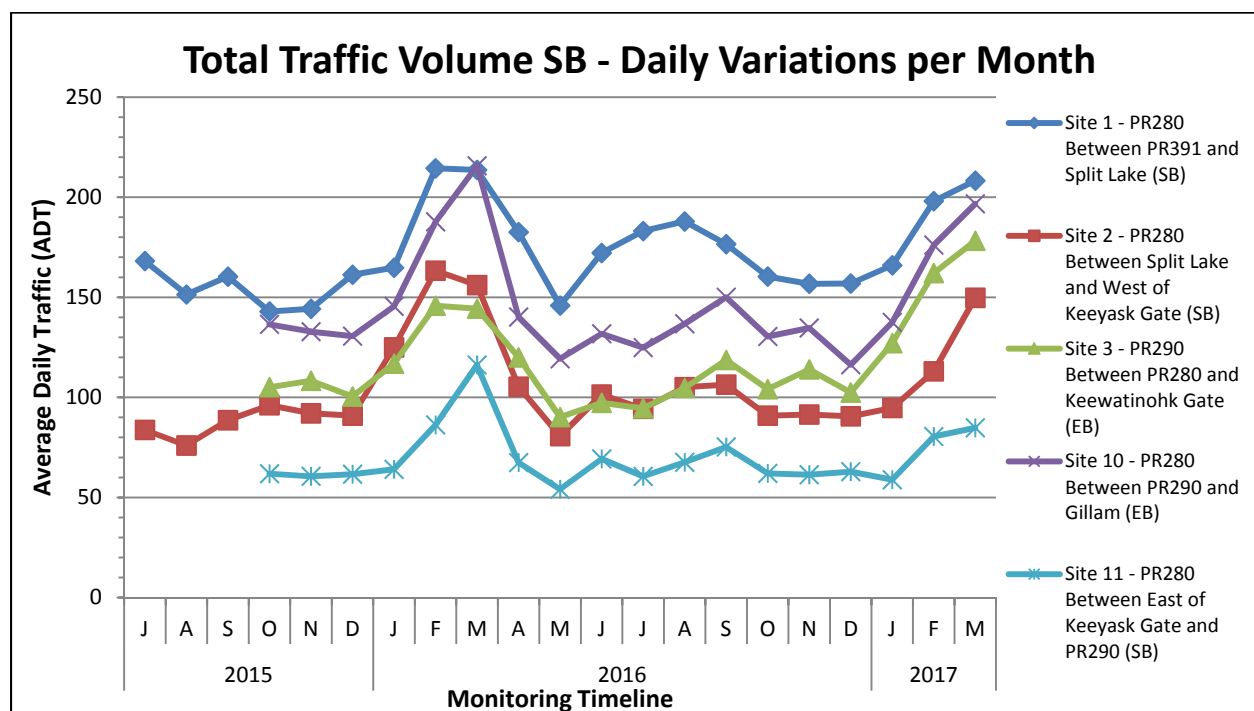


Figure 5 – Southbound Monthly Station Counts

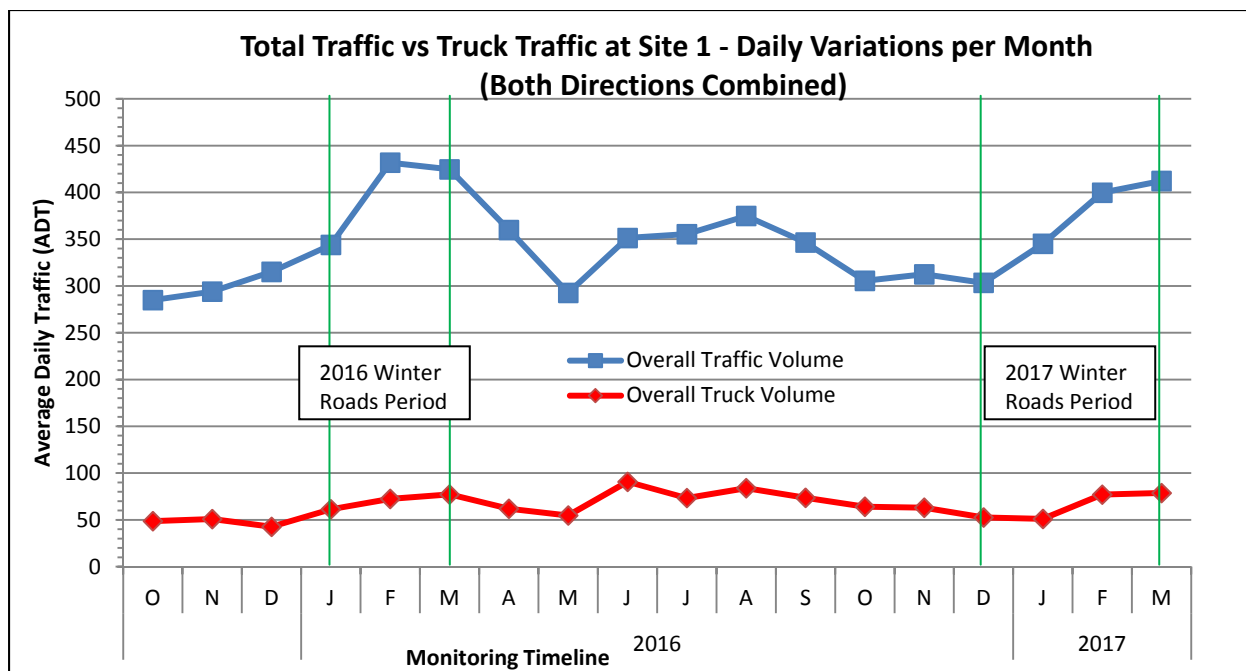


Figure 6 – Site 1 Truck Traffic vs All Traffic (Both Directions Combined)

Representative graphs in **Figures 7 and 8** show Average Daily Traffic (ADT) counts since monitoring began including the past yearly quarter. **Figure 9** gives the average hourly counts for the most recent month of data.

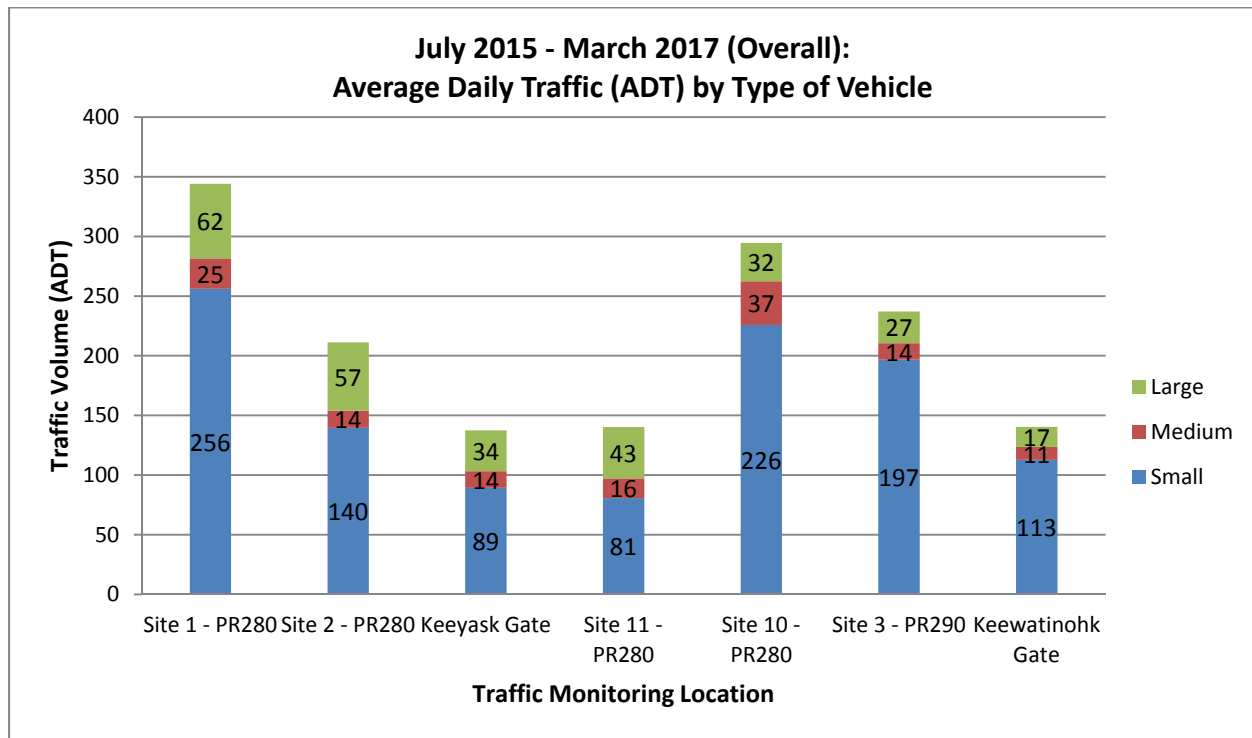


Figure 7 – Overall Average Daily Traffic Volume by Type of Vehicle (Both Directions Combined)

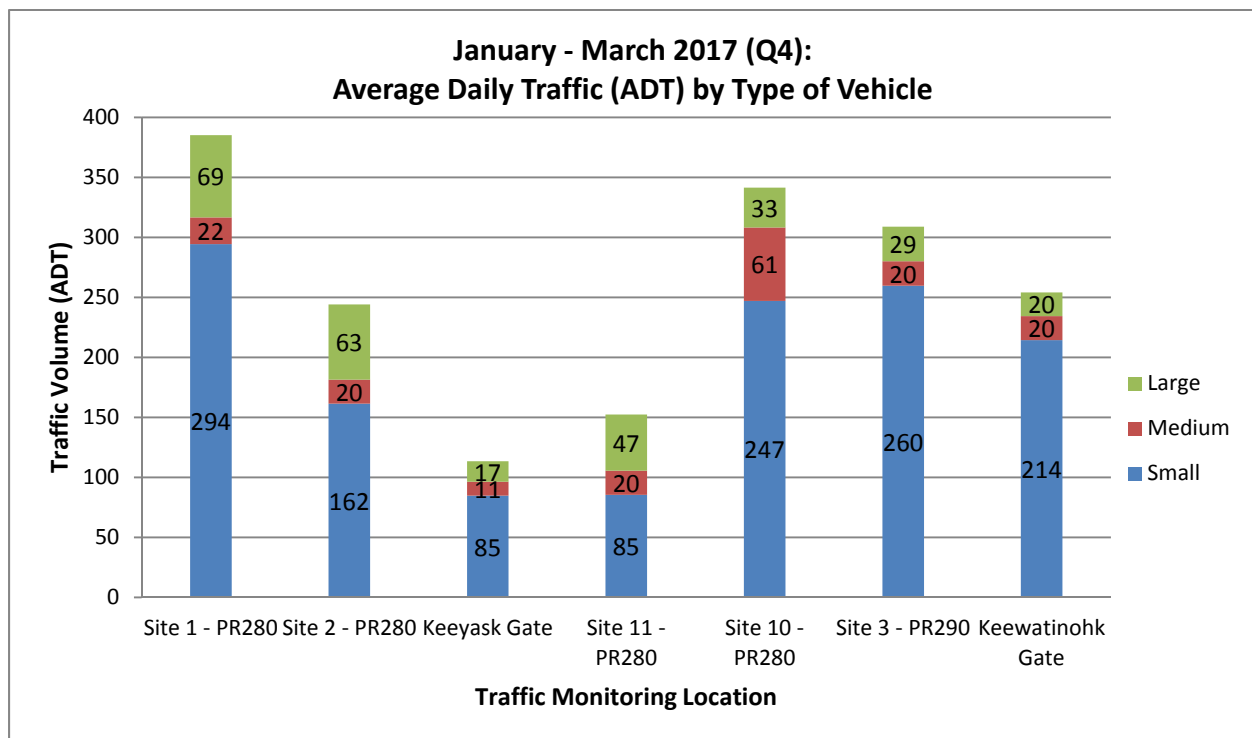


Figure 8 – Quarterly Average Daily Traffic Volume by Type of Vehicle (Both Directions Combined)

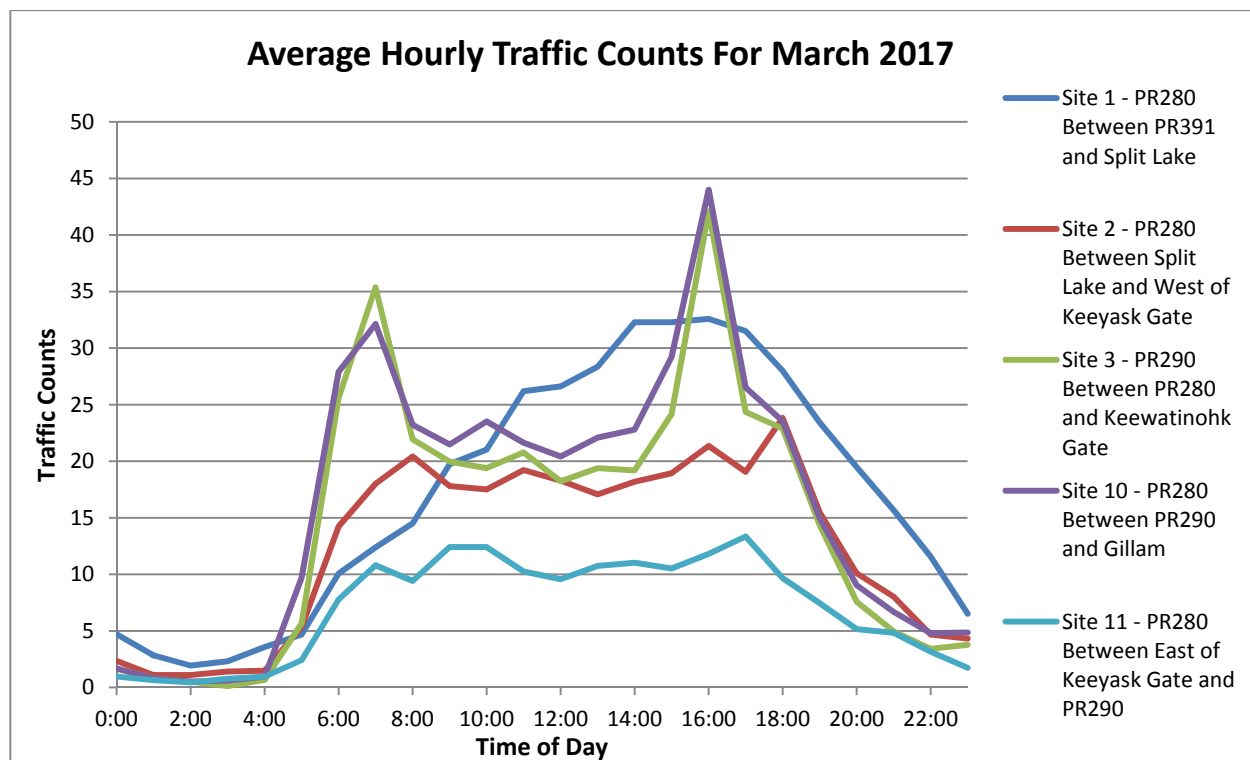


Figure 9 – March 2017 Average Hourly Traffic Counts (Both Directions Combined)

Traffic counts that are shown in the above graphs are considered a very low volume in comparison to other Manitoba highways. While increase percentages appear high, this equates to approximately 3 or 4 more vehicles per hour.

Monthly data for individual stations is available in **Appendix B**.

Speed Data

As mentioned earlier, the traffic monitoring stations are able to calculate the speed of a given vehicle that passes over the induction loops. The Gillam RCMP detachment have supplied data regarding traffic infractions, however, speed enforcement by the RCMP is periodic based only on speeding infractions that occur when they are patrolling. The data supplied by them cannot be considered representative of the conditions on PR 280 and PR 290.

It is apparent that speeding is prevalent, as indicated by **Figures 10 and 11**. These graphs show the percentage of vehicles exceeding the posted speed limit (>90km/hr) as recorded by the various traffic monitoring stations. **Figure 10** shows traffic conditions travelling in the direction of the sites, ie away from Thompson. **Figure 11** shows conditions of vehicles driving away from site, ie towards Thompson.

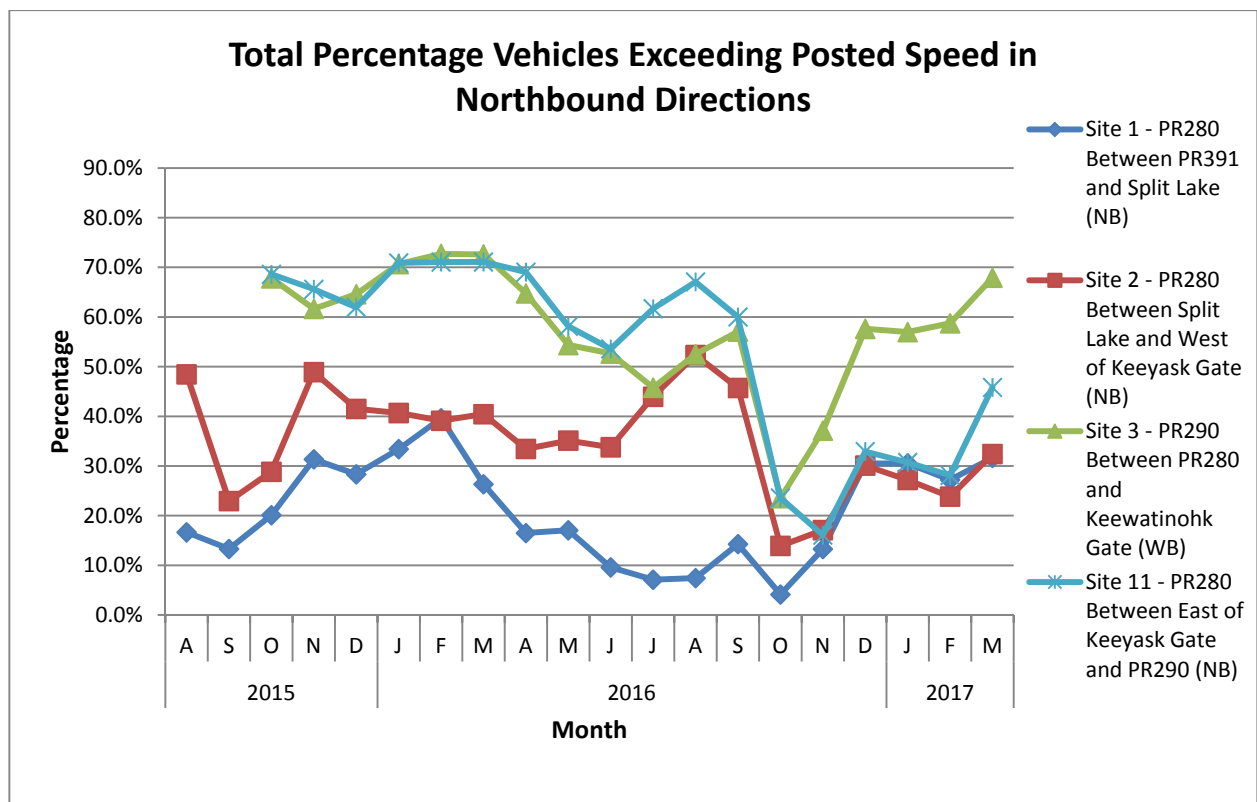


Figure 10 – Percentage of Vehicles Exceeding Posted Speed Northbound

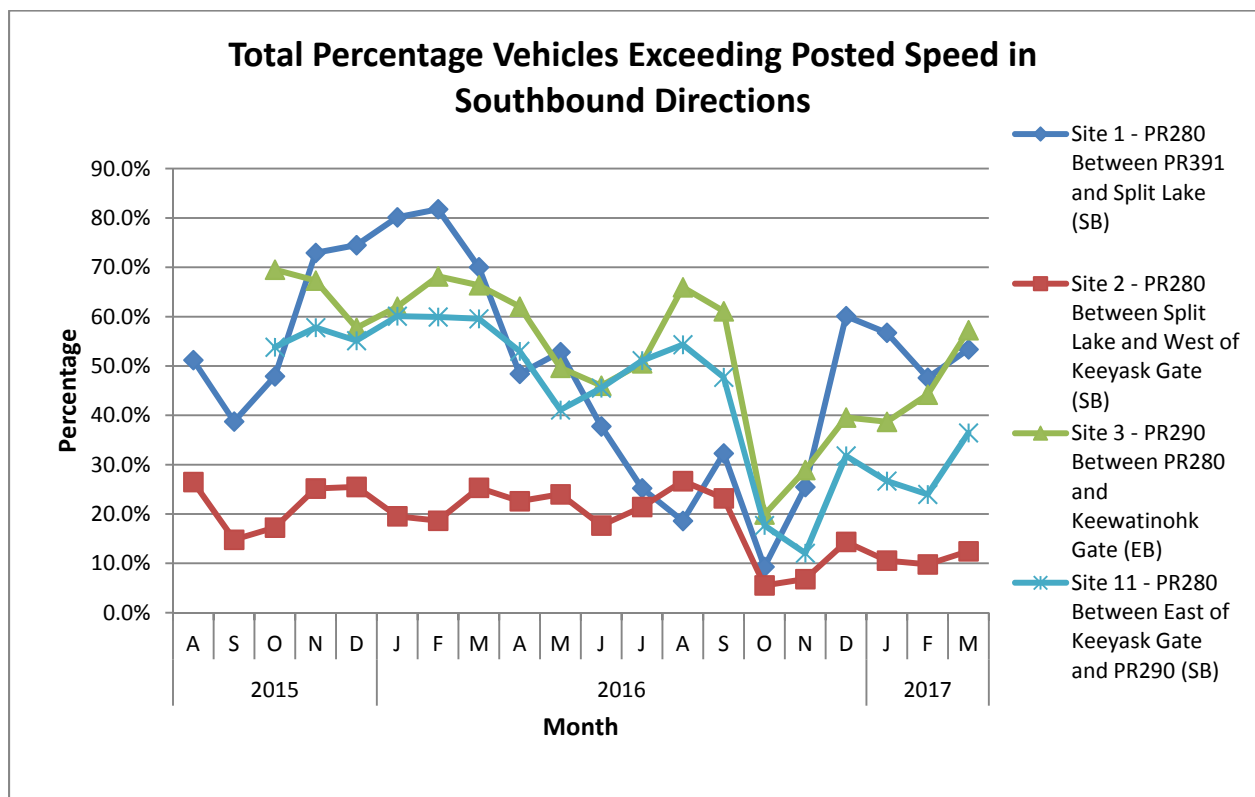


Figure 11 - Percentage of Vehicles Exceeding Posted Speed Southbound

Speed data is influenced by the location of the monitoring stations and by driver comfort level. Comfort level is influenced by both road conditions and driver familiarity with the roadway. Monitoring locations give data related to that specific location only. The Site 1 station shows higher speeding rates for southbound traffic compared to northbound traffic speeding rates. This is due to the monitoring station being in close proximity to the PR 391 intersection. Vehicles travelling northbound have not had time to speed up before crossing the monitoring station. This is similar to Site 2 but reversed directions. Site 10 is located at the curve on the north side of Long Spruce Generating Station. Vehicles are either slowing down to navigate the curve before passing the monitoring station or have just come out of the curve and are still speeding up. This is resulting in a negligible amount of vehicles exceeding the posted speed limit. For this reason, speed data for Site 10 was not included in **Figures 10 and 11**.

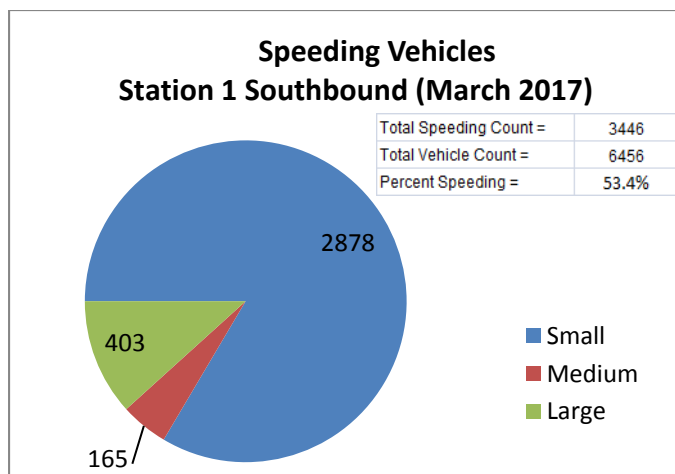
Average speed is higher in winter months than summer which can be attributed to frozen road conditions which tend to be smoother and free of dust. As **Figures 10 and 11** show, speeding has varied throughout the spring and summer of 2016 with a decrease in speeding in the fall. This could be attributed to poor road conditions, road reconstruction, or even to driver awareness initiatives being implemented by MH and MI. The average speed began to climb again as the road structure froze over the winter of 2016/17.

Road improvements, in particular at Sites 3 and 11 may be reflected in vehicle type speed data in **Table 3**. Earlier in 2015, the number of small vehicles that were speeding exceeded medium and large vehicles combined. However, overall speeding rates for both medium and large vehicles have increased at Sites 3 and 11 where substantial road improvements have occurred. The drop in average speed rates in late 2016 can be attributed to weather conditions where rain and snow were prevalent throughout the fall season which resulted in a deteriorated road surface.

Station	Posted Speed	Avg Speed (July to Oct 2015)			Avg Speed (Nov to Mar 2016)			Avg Speed (Apr to Oct 2016)			Avg Speed (Nov to Mar 2017)		
		Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Site 1 – PR280 between PR391 and Split Lake	90 - NB	78	71	67	86	82	76	74	66	62	83	79	75
	90 - SB	88	79	76	100	99	91	88	81	70	83	77	70
Site 2 – PR280 between Split Lake and Keeyask	90 - NB	83	79	72	90	82	77	91	86	81	93	86	84
	90 - SB	79	72	68	79	72	71	94	92	81	85	82	73
Site 3 – PR290 east of PR280/290 intersection	90 - WB	95	83	86	98	91	90	84	77	70	91	83	79
	90 - EB	95	95	91	95	92	88	77	70	64	72	67	62
Site 11 – PR280 north of the PR280/290 intersection	90 - NB	98	96	90	97	96	88	90	94	80	89	85	78
	90 - SB	96	83	82	94	88	86	90	83	79	84	77	73

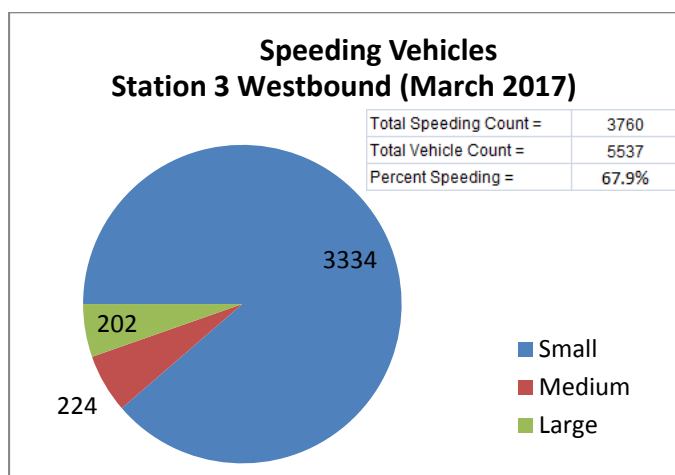
Table 3 – Average Vehicle Speeds

A breakdown of speeding information is provided in **Figure 12** for monitoring locations that are deemed to be representative of traffic conditions.



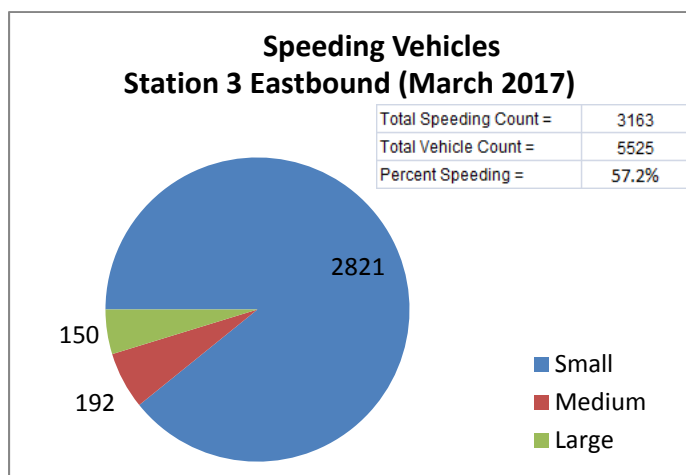
Speed Data				
Southbound - Station 1				
March 2017				
	Small	Medium	Large	Total
<= 90 kph	1960	217	833	3010
	40.5%	56.8%	67.4%	46.6%
> 90 kph	2878	165	403	3446
	59.5%	43.2%	32.6%	53.4%
> 100 kph	1578	79	91	1748
	32.6%	20.7%	7.4%	27.1%
> 110 kph	674	26	9	709
	13.9%	6.8%	0.7%	11.0%
Total	4838	382	1236	6456

Station 1 – PR 280 between PR 391 and Split Lake (Southbound)



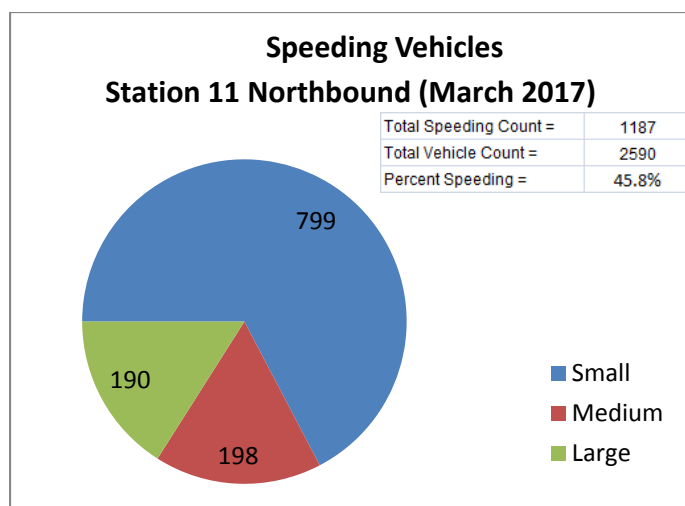
Speed Data				
Westbound - Station 3				
March 2017				
	Small	Medium	Large	Total
<= 90 kph	1363	168	246	1777
	29.0%	42.9%	54.9%	32.1%
> 90 kph	3334	224	202	3760
	71.0%	57.1%	45.1%	67.9%
> 100 kph	1629	74	62	1765
	34.7%	18.9%	13.8%	31.9%
> 110 kph	607	25	9	641
	12.9%	6.4%	2.0%	11.6%
Total	4697	392	448	5537

Station 3 – PR 290 between PR 280 and Keewatinohk Gate (Westbound)



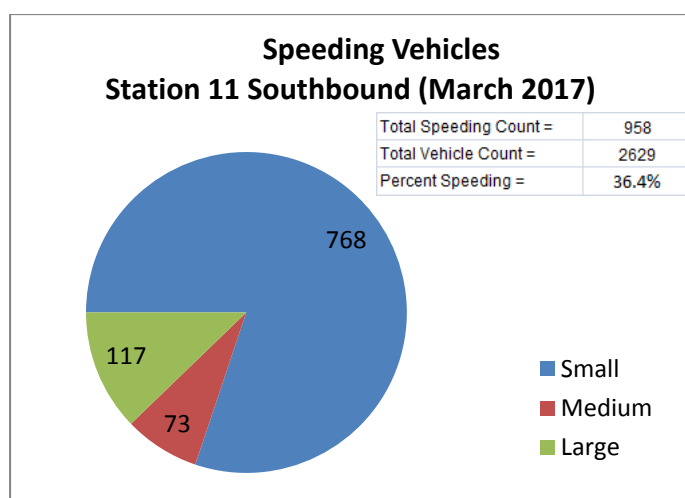
Speed Data				
Eastbound - Station 3				
March 2017				
	Small	Medium	Large	Total
<= 90 kph	1897	197	268	2362
	40.2%	50.6%	64.1%	42.8%
> 90 kph	2821	192	150	3163
	59.8%	49.4%	35.9%	57.2%
> 100 kph	1231	88	46	1365
	26.1%	22.6%	11.0%	24.7%
> 110 kph	483	38	11	532
	10.2%	9.8%	2.6%	9.6%
Total	4718	389	418	5525

Station 3 – PR 290 between PR 280 and Keewatinohk Gate (Eastbound)
Figure 12 – Breakdown of Speeding Vehicles at Various Sites in March 2017



Speed Data				
Northbound - Station 11 March 2017				
	Small	Medium	Large	Total
<= 90 kph	629 44.0%	234 54.2%	540 74.0%	1403 54.2%
> 90 kph	799 56.0%	198 45.8%	190 26.0%	1187 45.8%
> 100 kph	480 33.6%	97 22.5%	28 3.8%	605 23.4%
> 110 kph	236 16.5%	39 9.0%	0 0.0%	275 10.6%
Total	1428	432	730	2590

Station 11 – PR 280 between East of Keeyask Gate and PR 290 (Northbound)



Speed Data				
Southbound - Station 11 March 2017				
	Small	Medium	Large	Total
<= 90 kph	860 52.8%	191 72.3%	620 84.1%	1671 63.6%
> 90 kph	768 47.2%	73 27.7%	117 15.9%	958 36.4%
> 100 kph	331 20.3%	25 9.5%	18 2.4%	374 14.2%
> 110 kph	128 7.9%	8 3.0%	3 0.4%	139 5.3%
Total	1628	264	737	2629

Station 11 – PR 280 between East of Keeyask Gate and PR 290 (Southbound)

Figure 12 (continued) – Breakdown of Speeding Vehicles at Various Sites in March 2017

Collision Data

Collision data for the years 2005 to 2016 was provided by MPI for PR 280. Prior to 2012, collision data was collected by the RCMP but has since been compiled by MPI. Collision trends by season are illustrated in **Figure 13**. Other collision related graphs are given in **Appendix C**. Collision severity and contributing factors for PR 280 are summarized in **Table 4**. The collision rate for PR 280 is summarized in **Table 5**.

Collision data for PR 290 is very low and ranges from 0 collisions to a high of 2 collisions per year. For this reason, this data is not included in the following tables and graphs.

There were a total of 179 collisions on PR 280 between 2005 and 2016, an average of 15 collisions per year. Collisions during the spring (March, April and May) and fall (September, October and November) months were most frequent, accounting for 28 and 30 percent, respectively, of all collisions over the twelve year period.

Single vehicle collisions were most frequent, accounting for over 90% percent of all collisions during the analysis period.

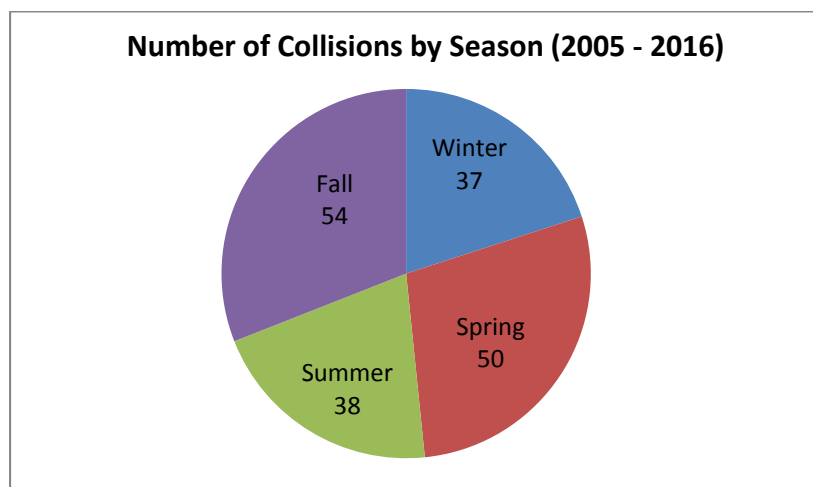


Figure 13 – PR 280 Collisions by Season

Table 4 – PR 280 Collision Severity and Contributing Factors

Year	Severity			Contributing Factor		
	Property Damage	Non-Fatal Injury	Fatality	Wildlife	Ran-off Road	Other/Unknown
2005	12	4	0	2	8	6
2006	11	6	0	3	13	1
2007	9	3	1	0	4	9
2008	6	2	0	1	4	3
2009	10	4	1	0	9	6
2010	8	1	0	1	3	5
2011	2	2	0	0	1	3
2012	2	0	0	0	1	1
2013	3	0	1	0	1	3
2014	26	4	0	6	3	21
2015	23	1	0	6	6	12
2016	34	3	0	7	8	22
Total	146	30	3	26	61	92

The majority of collisions along PR 280 were property damage. There were 30 non-fatal injury collisions and 3 fatalities over the twelve year analysis period. Running off the road was the contributing factor in 34 percent of collisions. Other factors, including collisions with other vehicles and overturning in the roadway accounted for approximately 51 percent of all reported collisions. Although the exact cause cannot be identified, running off the road collisions are typically caused by loss of control, fatigue, speeding along curved sections or attempting to avoid another vehicle or wildlife. The number of collisions reported for 2016 increased from previous years in particular for property damage but in the majority of incidents the contributing factor is unknown.

Collision rate is a measure of the risk faced by the road user and is based on the number of collisions that occurred and the volume of traffic on a section of roadway during a specified period. Collision rate is measured as the number of collisions per million vehicle-kilometres of travel (MVKT) on a section of roadway during the analysis period, which in this case is the eleven year period from 2005 to 2015. Traffic volumes used in calculating the collision rate are the average of the annual average daily traffic (AADT) volume recorded each year over the eleven year period. AADT volumes for PR 280 were only available from the MHTIS website for 2005, 2007, 2009, 2011, 2013 and 2015. Many agencies, including MI, consider road sections with collision rates exceeding 1.5 incidents per MVKT as warranting further review.

Based on the AADT and the number of collisions for 2005, 2007, 2009, 2011, 2013 and 2015, PR 280 has an average collision rate of approximately 0.61 incidents per MVKT over the study period. Due to the age and lack of detail of the collision data provided, it is difficult to determine any site specific conditions or locations associated with the collision information. Previous reports used broad information to calculate the collision rate that resulted in erroneous values. **Table 5** has been updated using more reliable data.

Table 5 – PR 280 Collision Rate

Year	Collision Rate (incidents per MVKT)
2005	0.98
2007	0.79
2009	0.82
2011	0.19
2013	0.14
2015	0.72
Average	0.61
MI Threshold	1.50

As discussed on Page 4, the AADT data that has been supplied by MHTIS occurs on a biennial basis. In keeping with the biennial collision rate reporting pattern in **Table 5**, the 2016 collision data was not included, however there were 37 reported collisions in 2016. The daily traffic monitoring program resulted in a very accurate AADT for PR 280 in 2016. The collision rate calculated for 2016 is 1.20. This remains below MI's standard threshold of 1.5 incidents per MVKT. The collision rate will continue to be monitored on an annual basis for the duration of the project.

Note that the AADT counts used to calculate the collision rate in **Table 5** are based on a collection period of only two weeks. Counts are extrapolated based on this two week count. The 2016 counts are very accurate and thus a comparison of the 2016 MVKT collision rate to previous years is not valid.

Results

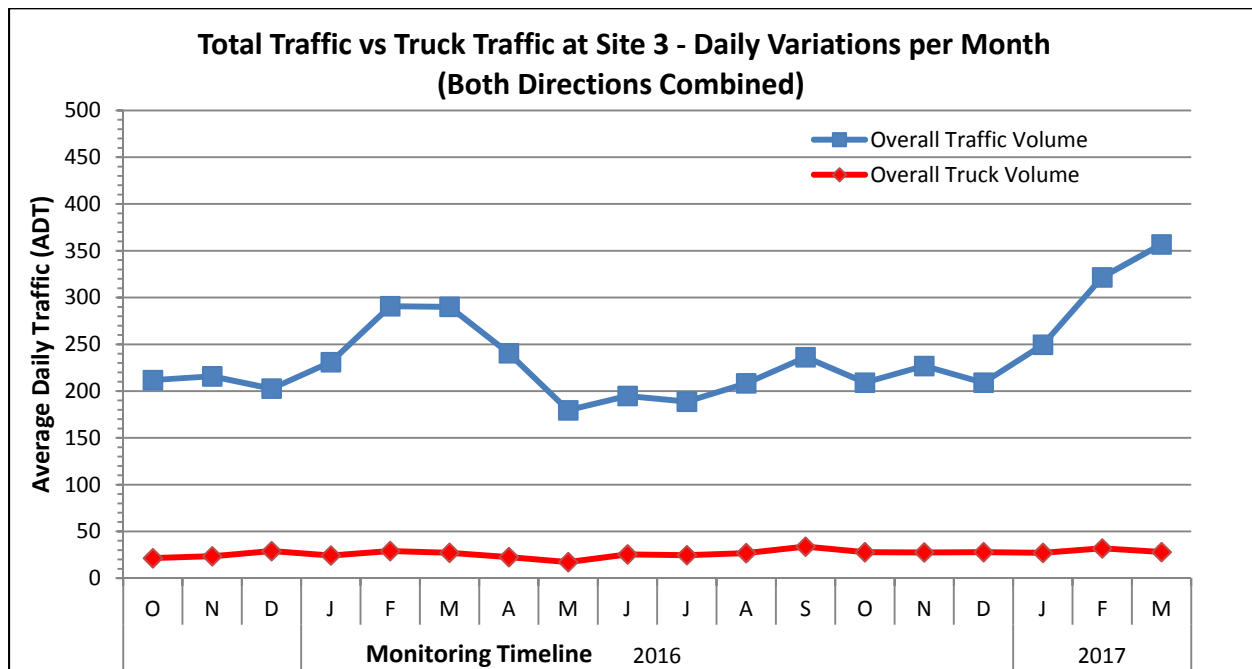
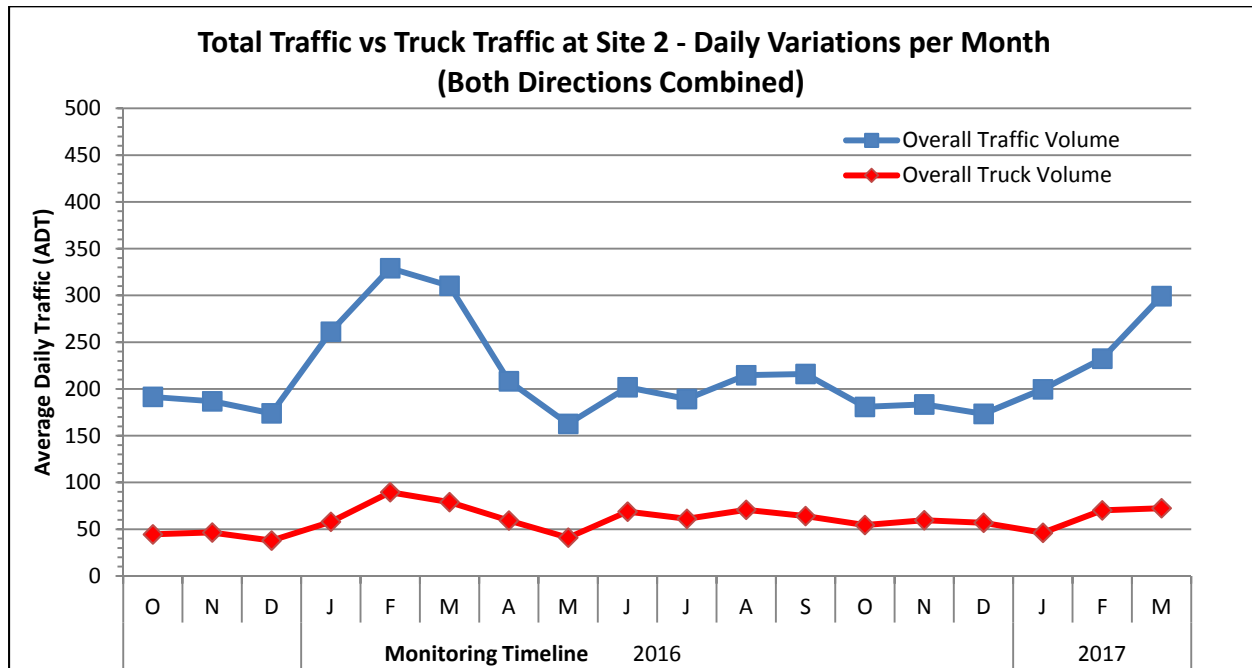
Traffic volumes have been steadily increasing approximately 7%-12% per year over the past eight years on PR 280 and PR 290. However, the 2016 data shows that traffic volumes plateau early in the year and this same pattern is likely to occur in 2017. Traffic volumes required to sustain construction activities in 2017 is predicted to be comparable to those in 2016. Keewatinohk expects a 50% reduction in truck traffic in 2017, resulting from the wind down of civil work and start of commissioning, while Keeyask is expecting a 30% increase in truck traffic based on increased work productivity at site. The AADT counts are not substantial enough to warrant a review of the road geometry or design elements.

An increase in total traffic was noted in the winter months, in particular, January, February and March of 2016 and 2017. This coincides with the operating schedule for the winter road network which serves the communities of Shamattawa, War Lake and York Landing. The total traffic vs truck traffic graphs show that this increase in traffic does not directly correlate to an increase in truck traffic.

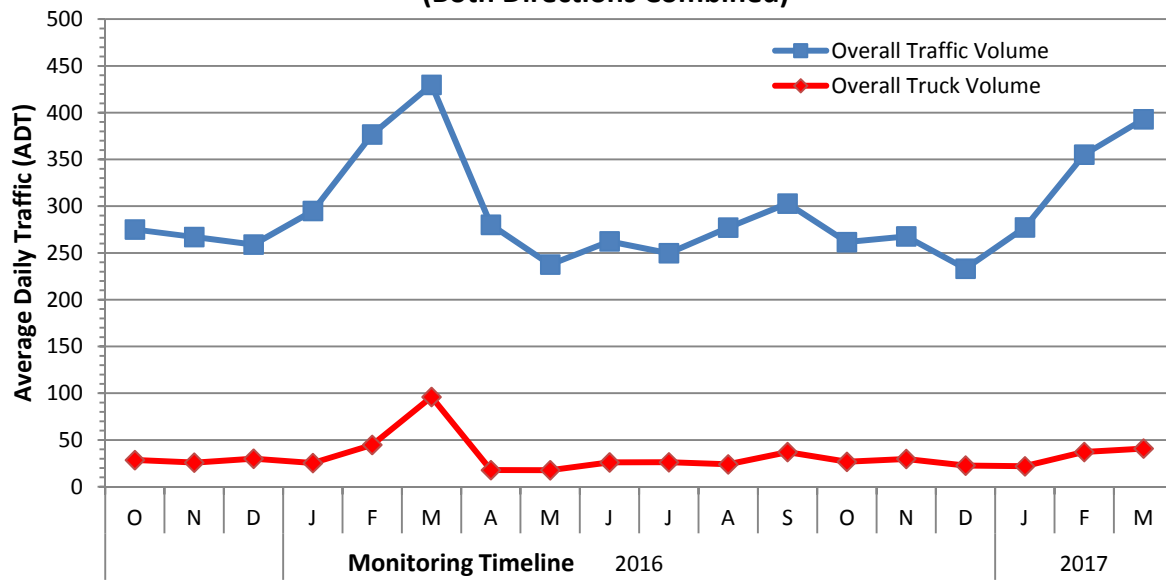
Winter conditions have shown an increase in the overall speed of vehicles. This can be attributed to improved road conditions in combination with the frozen roadway and ongoing road improvements. The data collected to the end of March 2017 supports this assumption, given that the winter months in 2016 and 2017 show an increase in speeding. However, in late 2016 the data shows a significant decrease in speeding when compared to late 2015. This decrease was a result of inclement weather which resulted in a deteriorated road surface.

Collision rates along the PR 280 and PR 290 corridors have remained below MI's threshold of 1.5 MVKT. Collision rates are a factor of AADT, road length and reported collisions. Collision rates remain below the allowable threshold, and a road safety analysis would not be triggered by MI. Spot grade improvements, localized design considerations, and other road safety improvements are being implemented to address ongoing concerns and to improve the driving experience for all road users.

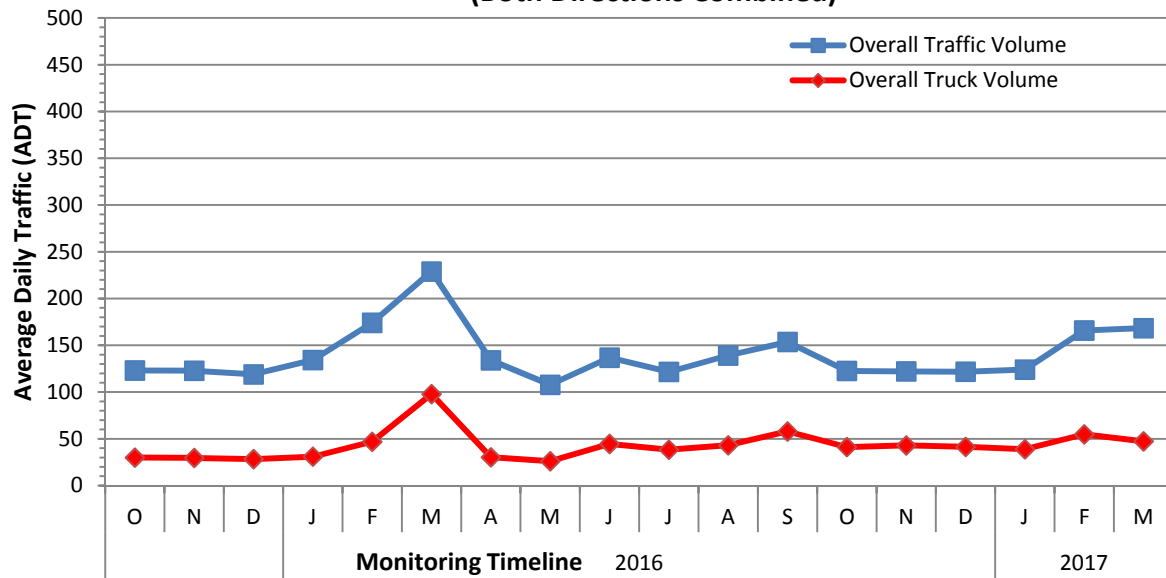
Appendix A – Truck Traffic vs All Traffic



**Total Traffic vs Truck Traffic at Site 10 - Daily Variations per Month
(Both Directions Combined)**



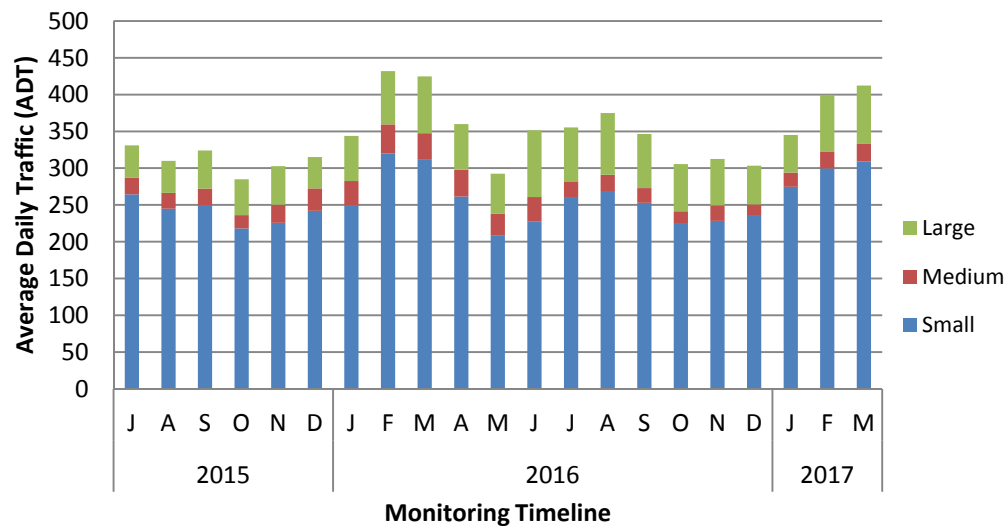
**Total Traffic vs Truck Traffic at Site 11 - Daily Variations per Month
(Both Directions Combined)**



Appendix B – Monthly Traffic Counts

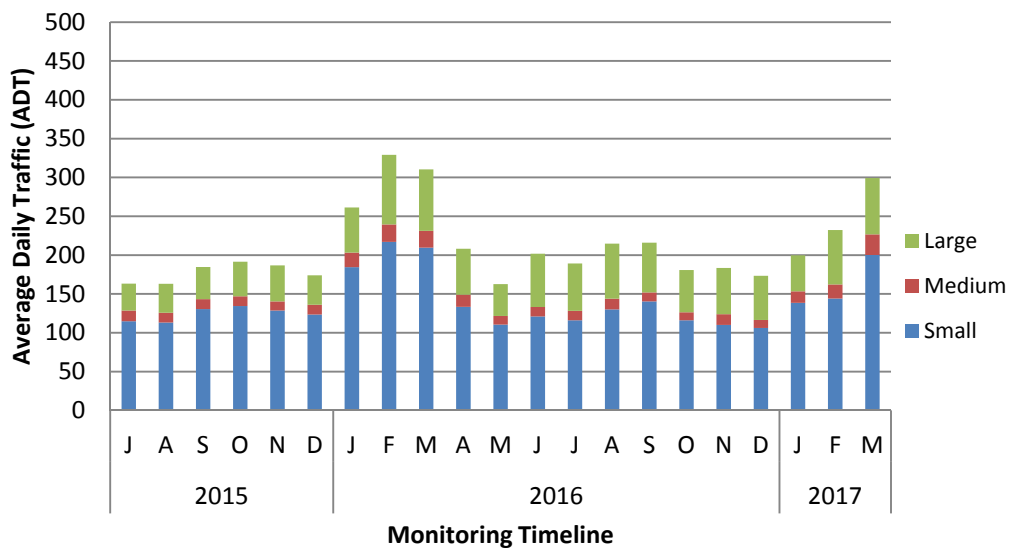
Site 1 - ADT by Traffic Types

(July '15 data based on 16 days. Nov '15 data based on 17 days. June '16 data based on 21 days)



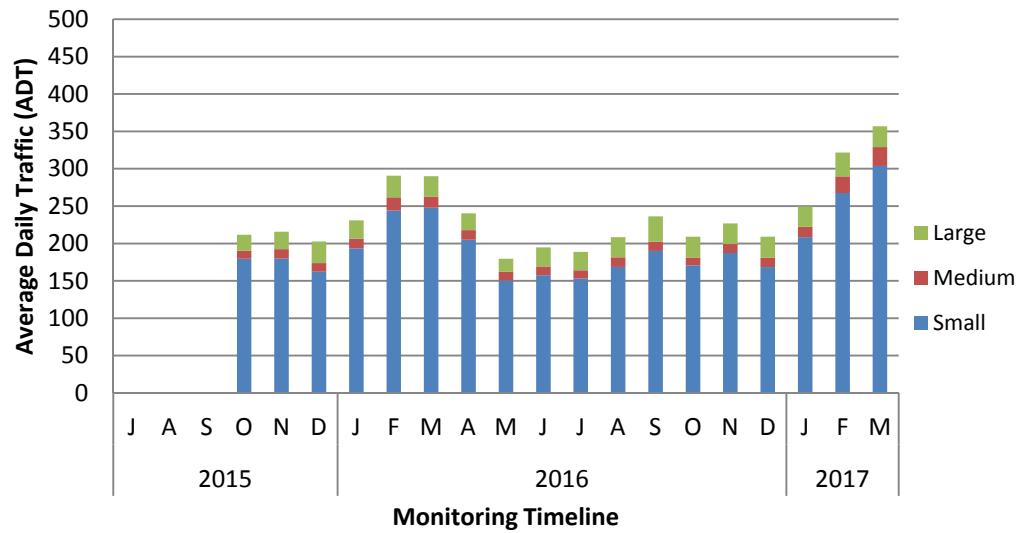
Site 2 - ADT by Traffic Types

(July '15 data based on 16 days)



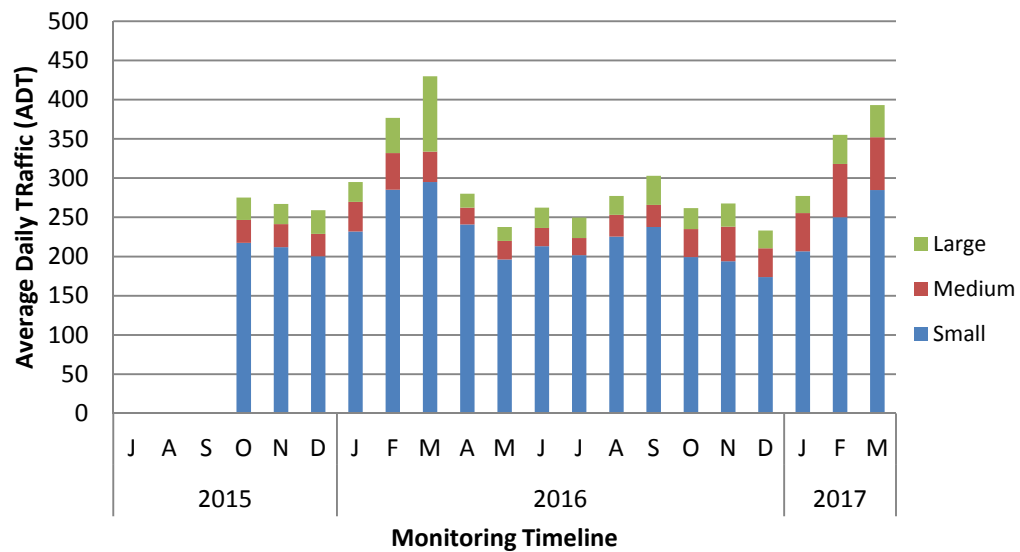
Site 3 - ADT by Traffic Types

(October '15 data based on 14 days)



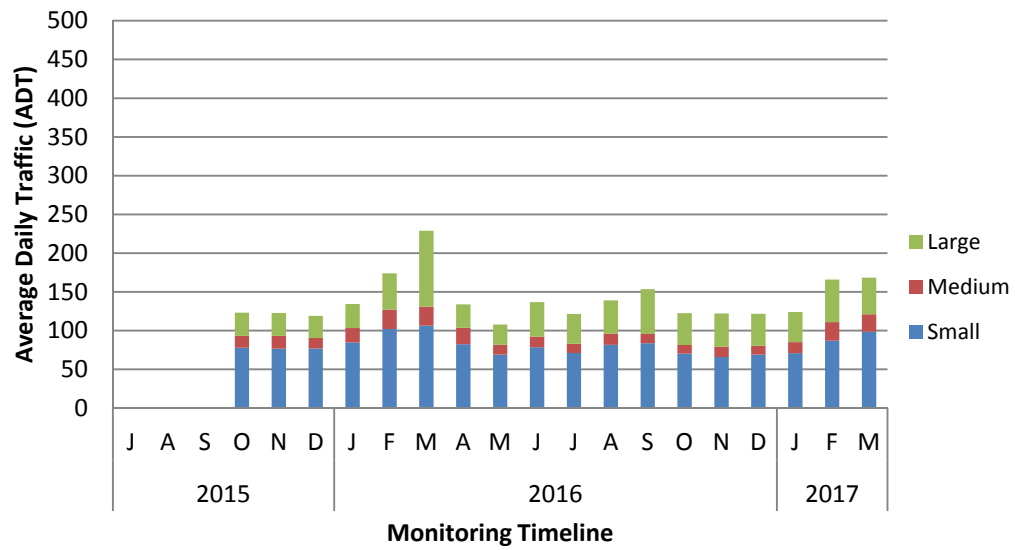
Site 10 - ADT by Traffic Types

(October '15 data based on 14 days)

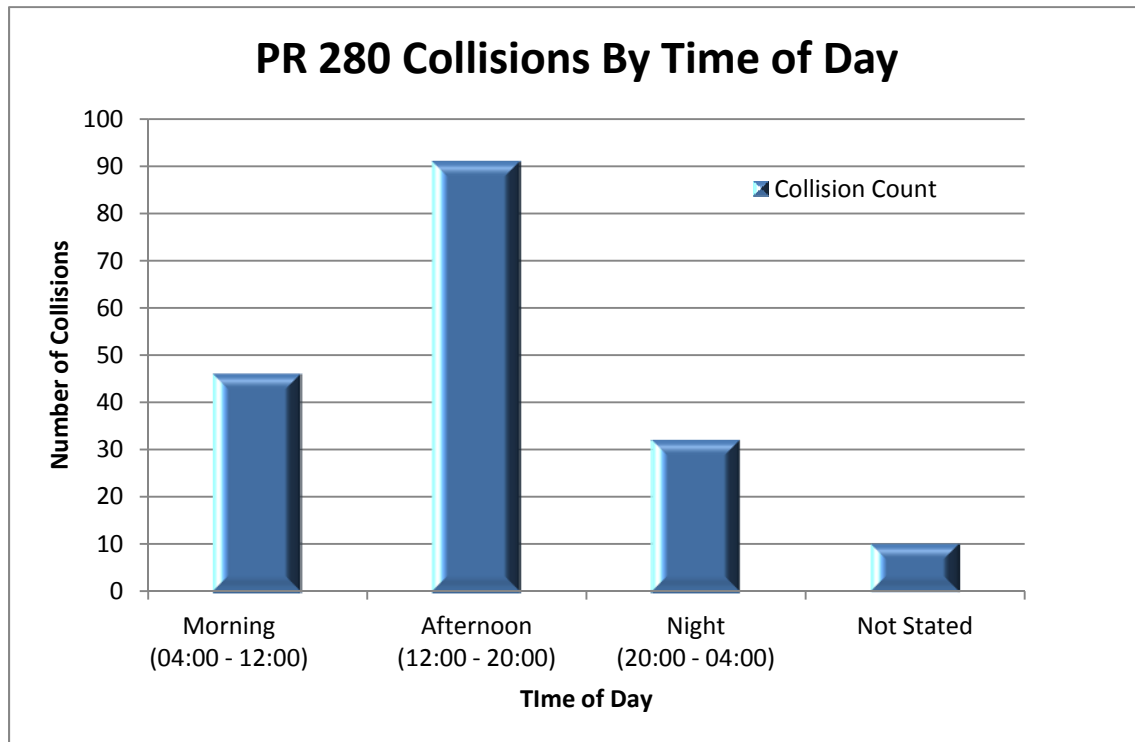


Site 11 - ADT by Traffic Types

(October '15 data based on 14 days)



Appendix C – Collision Summary



Appendix D – Traffic Monitoring Locations

