

# Road Safety Strategy 2015

## Toward Zero Tolerance



Transportation and  
Infrastructure Renewal

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Hon. Robert S. Vessey  
*Minister of Transportation  
and Infrastructure  
Renewal*

Road safety affects every person travelling on Prince Edward Island. Someone is killed or seriously injured on one of the world's roads every six seconds according to the World Health Organization. These tragedies are unacceptable and largely preventable.

I am proud of the progress that has been made to reduce the trauma resulting from vehicle collisions on Island highways. However, impaired driving, excessive speed, and failure to wear seat belts continue to distract drivers and impair their ability to drive safely and responsibly.

I am pleased to present the Department of Transportation and Infrastructure Renewal's *Road Safety Strategy 2015*; an overview of how the department – in cooperation with police services and all road users – continues to improve road safety on Prince Edward Island.

This strategy confirms a trend of reduced road fatalities and injuries on Prince Edward Island over the past few years. Our government has introduced several legislative changes that have helped contribute to these results, including:

- banning the use of hand held cell phones while driving (2010);
- seven day, 30 day and 90 day license suspension for driving with a .05 BAC up to .08 BAC (2010);
- increased penalties for impaired driving if children are in the vehicle (2012);
- the mandatory installation of ignition interlock for all those convicted of impaired driving (2013);
- new legislation for drug impaired driving (2013),
- six month motor vehicle impoundment program for those charged for specific use of motor vehicle offences under the Criminal Code of Canada (2012); and,
- continued improvements to the Graduated Licensing Program.

In addition, progress on road safety initiatives continues with traffic calming measures, construction of roundabouts, electronic message boards, raised pavement markings, and the use of the International Roughness Index to measure the physical condition of highways.

Road safety is a responsibility we all share. This document demonstrates our successes and shows us where we can continue to make improvements. Let's work together to make our roads safer, for ourselves and for future generations.

A handwritten signature in black ink that reads "Robert Vessey". The signature is written in a cursive style and is positioned above a thin horizontal line.

Minister Robert Vessey



## INTRODUCTION

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The Prince Edward Island Department of Transportation and Infrastructure Renewal (TIR) has developed a Road Safety Strategy 2015 (TIR RSS) to guide initiatives within the department and to support Canada's commitment to reduce the number of traffic fatalities and serious injuries. The major objectives of the TIR RSS 2015 are to raise awareness of road safety on Prince Edward Island, to work towards safer journeys for all road users, and to promote TIRs best practices toward these efforts.

In 1996, Canada introduced *Road Safety Vision 2001*, a national, five-year road safety strategy committing all Canadian jurisdictions to work towards making our roads the safest in the world. Building on this idea, *Road Safety Vision 2010* was released in 2005. This document solidified Canada's commitment to develop comprehensive strategies to reduce the number of serious injuries and fatalities resulting from road collisions. In 2011, a third strategy was introduced, *Canada's Road Safety Strategy 2015*. This national program provides a safer systems approach to develop road safety programs. This approach encourages a better understanding of the interaction between key components of the road system: road users, highway infrastructure, speed, and the vehicle. The key difference between CRSS 2015 and previous national strategies is a focus on downward trending rather than the setting of hard percentage-based targets. The ultimate objective is to continually and consistently move towards zero traffic accidents and traffic related injuries.

The **key elements** of TIR RSS include: a downward trend in fatality and serious injuries as a result of vehicle collisions; a holistic safe systems approach that encompasses the road user, the vehicle, and road infrastructure; and a best practice schematic outlining interventions based on primary risk groups and causal factors.

The **primary risk groups** identified in this document are novice drivers (age 16 to 24 years), high-risk drivers (those who speed, do not wear or provide safety restraints (including child safety seats), drive impaired, or drive without a valid license), medically-at-risk drivers (those with conditions that could hinder driving ability or response times), vulnerable road users (pedestrians, motorcyclists, bicyclists), motor carriers (truck or bus drivers), and the general population.

The key **contributing factors** are impaired driving (alcohol, drugs, and fatigue), speed and aggressive driving, failure to adequately use safety belts and child car seats, and general medical health. Environmental or infrastructure factors that can contribute to road collisions include road surfaces and weather conditions.



## CONTEXT FOR A ROAD SAFETY STRATEGY

Traffic fatalities and injuries have significant personal, societal and monetary implications for the residents of Prince Edward Island. Between 2004 and 2012, 146 people were killed on our roads - an average of 15 persons per year. In 2004, traffic accidents were the leading cause of death by injury on PEI with a health care cost of \$17 million.<sup>1</sup>

Prince Edward Island had the highest fatality rate from traffic accidents in 2004 at 20.3 per cent, 12 per cent above the national average for that year.<sup>2</sup>

In 2006 there were 27 fatalities and 65 serious injuries related to traffic incidents. This same year, there were 345 convictions for driving under the influence of either alcohol or drugs.<sup>3</sup>

Based on 2007 mortality data, the Public Health Agency of Canada reported that motor vehicle traffic collisions are the leading cause of injury-related death among Canadians 1-24 years of age, and the leading cause of death overall for persons 15-24.<sup>4</sup>

Between 2007 and 2011, police on Prince Edward Island handed out approximately 20,000 speeding tickets.<sup>5</sup> In 2006, rural Islanders had the highest seat belt usage rate in the country at 95 per cent. By September 2010, this had declined to 81.9 per cent.<sup>6</sup> In 2012, the provincial traffic fatality rate in PEI was 7.5 per 100,000 population, representing a 13 per cent decrease since 2004.

Prince Edward Island has experienced significant improvement in the level of road safety. However, impaired driving, improper use of seat belts and speed are the leading causes of vehicle collisions and resulting injuries.

It is against this background that the TIR Road Safety Strategy has been developed.

### ***Transportation and Infrastructure Renewal - Road Safety Strategy***

- Sets key objectives and initiatives for the next 2 years.
- Identifies primary risk groups.
- Strategies are based on best practices.
- Focuses equally on lowering fatalities and serious injuries.
- Encourages shared responsibility for traffic safety outcomes.
- Supports the delivery of Canada's Road Safety Strategy 2015.

<sup>1</sup>The Economic Burden of Injury in Canada – Prince Edward Island, 94-95.

<sup>2</sup> Transport Canada, Canadian Motor Vehicle Traffic Collision Statistics, 2004.

<sup>3</sup> Department of Transportation and Infrastructure Renewal, Highway Safety Division.

<sup>4</sup> Injury in Review 2012 Edition, Spotlight on Road and Transport Safety, Public Health Agency of Canada, 2012, 7.

<sup>5</sup> <http://www.cbc.ca/news/canada/prince-edward-island/story/2011/11/16/pei-f-driving-concern-584.html>

<sup>6</sup> [http://peicanada.com/west\\_prince\\_graphic/publication/rural\\_islanders\\_rank\\_poorly\\_seatbelt\\_use](http://peicanada.com/west_prince_graphic/publication/rural_islanders_rank_poorly_seatbelt_use)

## SAFE SYSTEM APPROACH

According to the World Health Organization (WHO), road traffic injuries are a leading cause of death, killing nearly 1.3 million people annually. By 2030, this figure is predicted to rise and become the fifth leading cause of death in the world.<sup>7</sup> In 2010, the United Nations General Assembly established the Decade of Action for Road Safety in order to “stabilize and then reduce the forecasted level of road traffic fatalities around the world by increasing activities conducted at national, regional and global levels.” The Safe System Approach, led by the WHO, is the guiding principle behind the Decade of Action.<sup>8</sup>

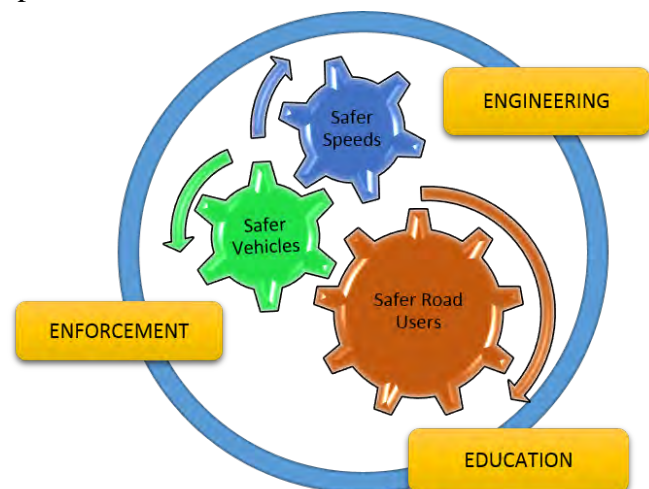
As with previous strategies, *Canada’s Road Safety Strategy 2015* has been guided by the WHO and publications such as the *Global Status Report on Road Safety 2013* which presents information on road safety from 182 countries, accounting for almost 99 per cent of the world’s population:

- About 1.24 million people die each year as a result of road traffic accidents.
- Road traffic injuries are the leading cause of death among young people, aged 15–29.
- Half of those dying on the world’s roads are “vulnerable road users”: pedestrians, cyclists and motorcyclists.
- Road traffic crashes cost countries between 1–3 per cent of their gross national product.
- Without action, road traffic accidents are predicted to result in the deaths of around 1.9 million people annually by 2020.<sup>9</sup>

The Safe System Approach provides a means of addressing road traffic fatalities by understanding the interconnections of all players. According to the WHO:

“Any road traffic system is highly complex and can be hazardous to human health. Elements of the system include motor vehicles, roads, and road users along with their physical, social and economic environments. Making a road traffic system less hazardous requires a systems approach - understanding the system as a whole and the interaction between its elements, and identifying where there is potential for interventions.”<sup>10</sup>

People make mistakes and unfortunately pay the greatest personal price as a result of vehicle collisions. While mistakes are inevitable, deaths and serious injuries from traffic accidents are not.



<sup>7</sup> World Health Organization: [www.who.int/violence\\_injury\\_prevention/global\\_status\\_report/flyer\\_en.pdf](http://www.who.int/violence_injury_prevention/global_status_report/flyer_en.pdf)

<sup>8</sup> Government of Canada, Road Safety Canada Consulting, Road Safety in Canada, 5.

<sup>9</sup> World Health Organization: [www.who.int/mediacentre/factsheets/fs358/en/](http://www.who.int/mediacentre/factsheets/fs358/en/)

<sup>10</sup> World Health Organization: [www.who.int/violence\\_injury\\_prevention/road\\_traffic/activities/roadsafety\\_training\\_manual\\_unit\\_2.pdf](http://www.who.int/violence_injury_prevention/road_traffic/activities/roadsafety_training_manual_unit_2.pdf)

## **ADDRESSING ROAD SAFETY: PROVINCIAL INITIATIVES**

The TIR RSS is the latest initiative designed to address road safety issues on Prince Edward Island. It is informed by collision statistics provided to the Department by the RCMP, “L” Division, and other police service units on the Island. Information was also provided by our partners including Mothers Against Drunk Driving (MADD) and the Canadian Council of Motor Transport Administrators.

Recent initiatives include:

- **511 system** implemented in December 2012 to provide traveller information on road conditions which can be accessed by phone, mobile device or computer.
- **Impaired Driving Summit** held in February 2013 which brought together local leaders and decision makers for dialogue and discussion on how to help combat impaired driving on Prince Edward Island roads.
- **Highway Safety website** launched in June 2013 to promote promotes awareness of safe driving practices and includes information on driver education, licensing, motor vehicle registration and inspections.
- **Mandatory Ignition Interlock** implemented for all drivers convicted of Impaired Driving.
- **Increased Ignition Interlock sanctions** for all those convicted of impaired driving when passengers below the age of 16 present in the vehicle.
- **Six month vehicle impoundments** for drivers charged with serious driving offences under the Criminal Code of Canada.
- **Drug impaired driving legislation** that includes immediate roadside suspensions for drivers who fail a Standard Field Sobriety Test, Administrative Driving Prohibitions for those charged for Drug Impaired driving under the Criminal Code of Canada and Zero Tolerance for those in the Graduated Driver Licensing Program.
- Developed and implemented **Call 911 for Suspected Impaired Driver** initiative that includes public education component involving media promotion and road sign advisory to the general public to report suspected offenders.
- Amended commercial vehicle cargo securement, pre-trip inspection, motor vehicle **inspection regulations** to reflect updates to National Safety Code Standards applicable to motor carriers.
- Implemented the use of **electronic message boards** and radar feedback signs to alert drivers to their approaching speed into communities on arterial highways.
- Developed and implemented a **salvage vehicle inspection program** for cars and light trucks that ensures that salvage vehicles are reassembled and repaired to an industry standard.

- Conducted a **Commercial Vehicle Safety Alliance (CVSA) Road Check** event during the first week of June that involves the roadside inspection of randomly selected commercial vehicles and drivers to promote safe commercial drivers and vehicles.
- Formed a **Traffic Safety Committee** that is comprised of representatives from the four police agencies within the province and Highway Safety personnel to facilitate discussion aimed at improving road safety through legislation, education and enforcement.
- Conduct **CVSA Operation Safe Driver activities** during the month of October aimed at increasing awareness of safe driving habits involving the interactivity of passenger and commercial vehicles on the highway.
- Conduct **CVSA Operation Air Brake** in tandem with commercial vehicle enforcement personnel in all three Maritime Provinces to promote awareness of properly maintained braking systems on commercial vehicles.
- Stage **Safe Driving Week** enforcement activities during the first week of December with all four police agencies within the province to promote safe driving habits heading into the holiday season.
- Develop and implement **driver training aids** and tests in languages other than English and French to enable a more comprehensive understanding for the newcomers accessing driver testing services.
- Continue **to maintain driver examiner certification** in the area of child seat/booster seat installation and inspection as a public service to promote and enhance safe child transport within the province.
- Participate in **Ad Hoc Driving While Impaired Working Group** aimed at exchanging information and identifying strategies to reduce impaired driving incidents throughout the province.
- Promote environmental awareness through the provision of training to all supervisory staff and integrating **environmental protection practices** in all work phases to ensure the safety and integrity of surface areas around all infrastructure projects.
- Continue to **improve intersection design** and review other infrastructure systems to improve visibility, reduce wait times, reduce occurrence and severity of collisions, and improve fuel efficiency.
- Increased **finest for drivers caught speeding** in school zones and construction zones.
- Expanded the use of **peripheral pavement markings** and transverse markings to heighten driver awareness.

Much is being done to improve road safety on Prince Edward Island. However, while statistics for Prince Edward Island over the past decade or so will show that deaths and serious injuries from traffic collisions are stabilizing, and in recent years, declining, efforts to sustain this trend must continue. The next section outlines fatality and serious injury data.



## FATALLITY AND SERIOUS INJURY TRENDS

Comprehensive data collection and analysis are essential for developing effective road safety strategies. The reliability and quality of data is critical when designing policies that affect the safety of road users. In Prince Edward Island, as in other Canadian jurisdictions, there is a concerted effort to link police reports with hospital records as well as traffic volume data so as to get a comprehensive overview of collision statistics. Data quality will help this Department's efforts to better understand the causal factors behind traffic fatalities and serious injuries.

Table 1 shows the trend towards lower fatalities and serious injuries is improving nationally and provincially. The year 2010 realized fewer fatality rates in both Canada and Prince Edward Island. The same can be seen for serious injuries.

**Table 1: Casualty Rates (2002 – 2010)**

		Per 100,000 Population		Per Billion Vehicle kilometers		Per 100,000 Licensed Drivers	
		Fatalities	Injuries	Fatalities	Injuries	Fatalities	Injuries
<b>2010</b>	<b>Canada</b>	6.5	500	6.6	504.1	9.5	724.8
	<b>PEI</b>	6.3	451.9	6.9	493.7	9.1	655.0
<b>2009</b>	<b>Canada</b>	6.6	512.7	6.6	518.7	9.5	745.3
	<b>PEI</b>	8.5	540.8	9.4	596.2	12.4	787.5
<b>2008</b>	<b>Canada</b>	7.3	536.6	7.4	549.2	10.5	778.6
	<b>PEI</b>	13.6	452.5	14.9	496.5	19.7	654.3
<b>2007</b>	<b>Canada</b>	8.4	589.7	8.3	584.4	12.2	859.0
	<b>PEI</b>	5.8	587.2	5.6	565.6	8.3	837.5
<b>2006</b>	<b>Canada</b>	8.9	604.0	8.9	604.2	13.0	884.5
	<b>PEI</b>	18.8	604.2	25.0	803.6	26.8	963.9
<b>2005</b>	<b>Canada</b>	9.1	652.7	9.3	668.0	13.3	960.2
	<b>PEI</b>	10.9	543.8	11.3	565.7	15.8	789.5
<b>2004</b>	<b>Canada</b>	8.5	664.7	8.8	680.8	12.6	979.8
	<b>PEI</b>	20.3	681.1	22.6	759.5	28.8	964.6
<b>2003</b>	<b>Canada</b>	8.8	702.7	8.9	711.0	13.0	1,036.9
	<b>PEI</b>	11.6	728.6	12.0	753.3	16.5	1,033.9
<b>2002</b>	<b>Canada</b>	9.3	725.1	9.3	721.2	13.9	1,076.3
	<b>PEI</b>	13.6	749.0	14.3	789.8	18.9	1,041.7

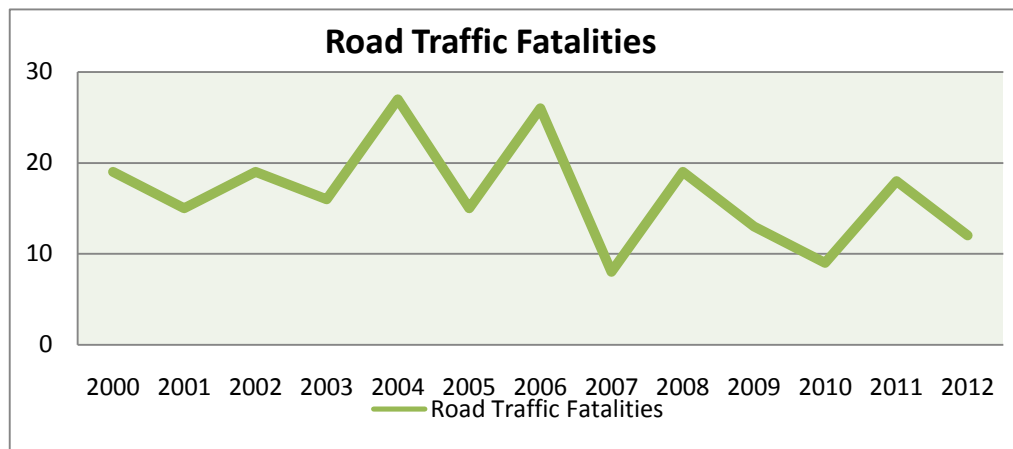
Even though fatality rates on Prince Edward Island have been consistently higher than the national average, with the exception of 2007 and 2010, a noticeable downward trend can be seen despite the increase in the number of vehicles on Island highways (Figure 3).

The primary causes of collisions and serious injuries are:

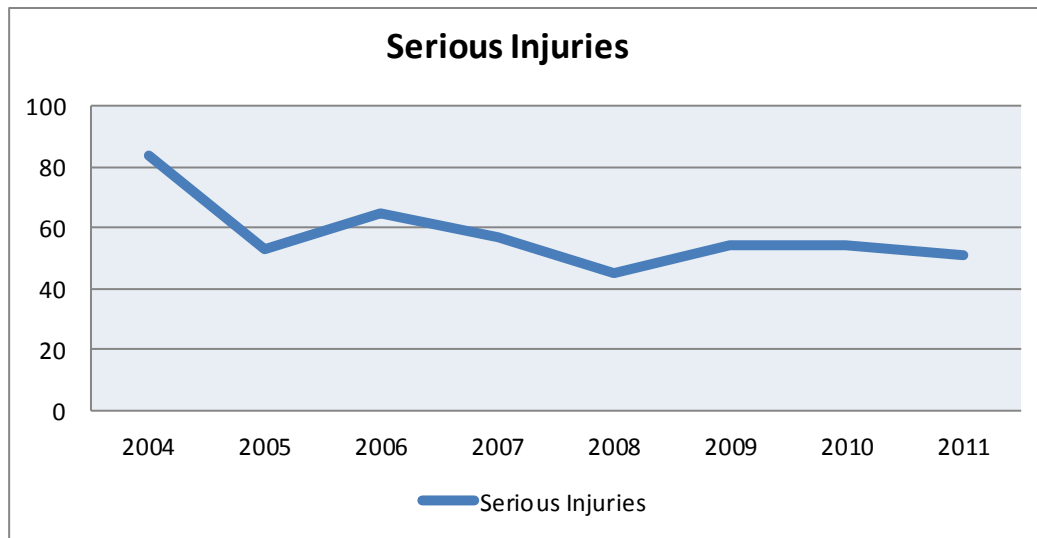
- Speed, inconsistent with, or inappropriate for the prevailing driving conditions;
- Impaired driving as a result of alcohol, drugs (prescription or non-prescription) or fatigue;
- Failure to use, or proper use of, seatbelts and child safety restraints;
- Unsafe or reckless behaviour towards, or by, vulnerable road users (pedestrians, motorcyclists, cyclists);
- Environmental factors that may affect the likelihood of a collision occurring such as roadway configuration or construction, or weather conditions.

The next section contains a series of graphs that show the incidence of vehicle collisions across Prince Edward Island, classified by factors such as population, vehicle registrations and type of road user.

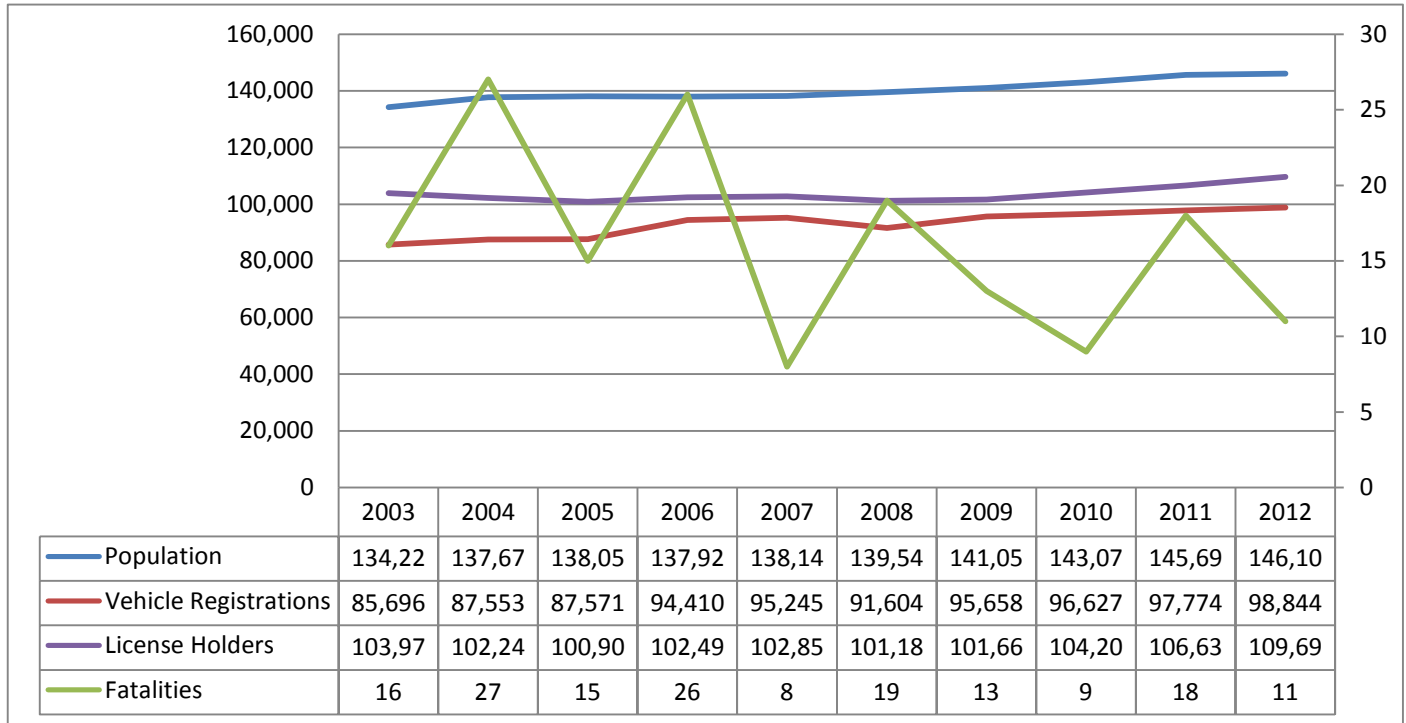
**Figure 1 - Road Traffic Fatalities (2000 – 2012)**



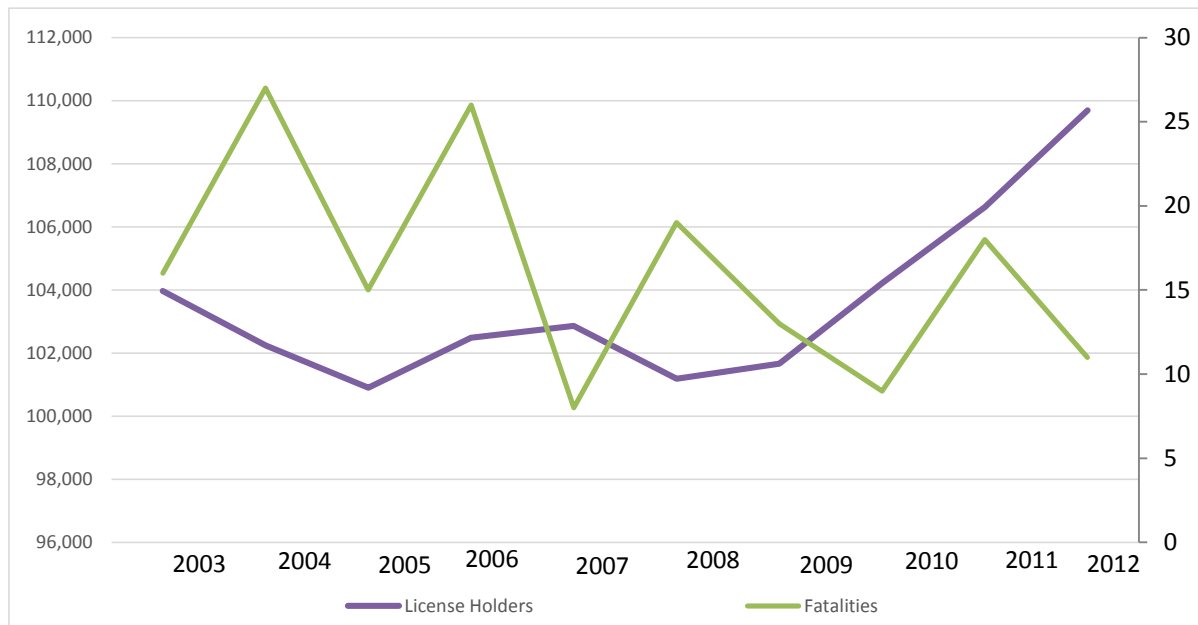
**Figure 2 – Road Traffic Serious Injuries (2004 – 2011)**



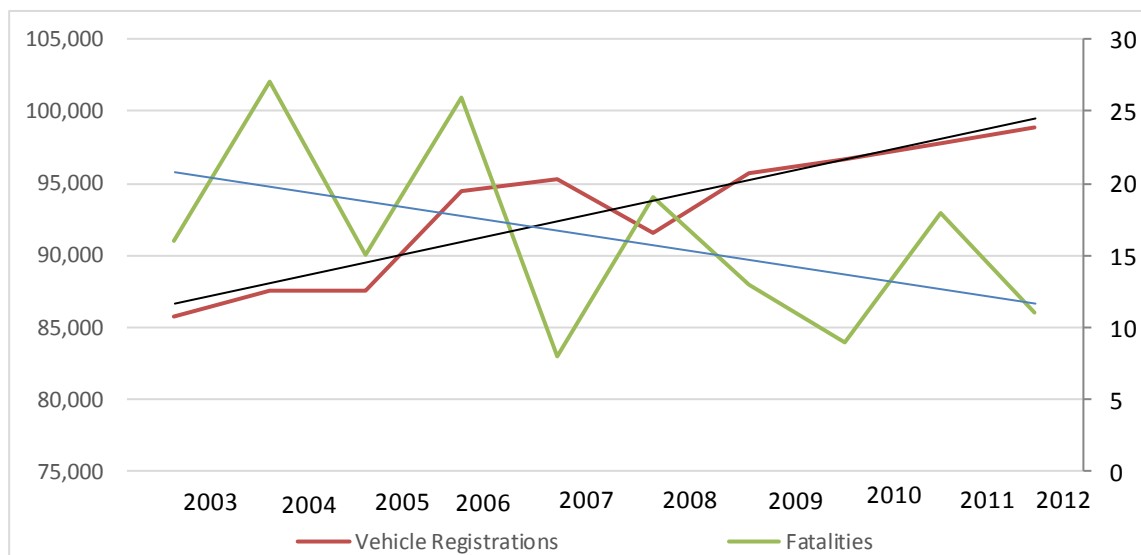
**Figure 3 – Trends: Road Fatalities, Population, Motor Vehicle Registrations, and License Holders (2003 – 2012)**



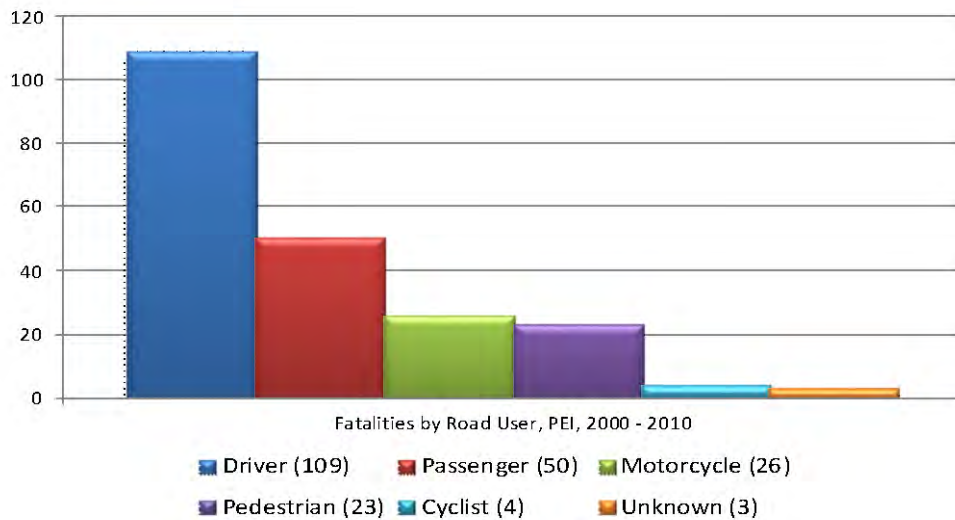
**Figure 4 – Trends: Road Fatalities, License Holders (2003 – 2012)**



**Figure 5 – Trends: Road Fatalities, Vehicle Registrations**



**Figure 6 – Fatalities by Class of Road User (2000 – 2010)**



The downward trend in fatalities and serious injuries caused by vehicle collisions was achieved despite moderate growth in both population and the number of license holders. Between 2003 and 2012, the population increased by 11,884 people which added 5,721 new drivers to Island highways.<sup>11</sup>

In 2012, there were 11 fatalities representing a 61 per cent decline since the previous year and the third lowest annual total since 2000. With respect to serious injuries, available data show that there were 51 serious injuries in 2011 representing a decrease of almost 40 per cent over 2004 levels.

The majority of fatalities resulting from vehicle collisions are drivers and passengers, followed by vulnerable road users which include motorcyclists, pedestrians and cyclists. Between 2000 and 2010 on Prince Edward Island, 159 (75 per cent) road fatalities were to vehicle occupants (Figure 6).

While national statistics provide benchmarks against which new strategies can be developed, the population size of Prince Edward Island must be taken into consideration when analyzing the data. One collision or one fatality in a population base of 143,000 can skew averages quite significantly.

<sup>11</sup>Government of Prince Edward Island, Finance and Municipal Affairs, *Prince Edward Island Population Projections 2013-2053*, 6.



## CAUSAL FACTORS

The following data provides a snapshot of the three most prominent risk factors that have contributed to vehicle fatalities within RCMP jurisdiction on Prince Edward Island between 2004 and 2010.

**Table 2: Risk Behaviour and Related Fatalities 2004-2010**

	2004	2005	2006	2007	2008	2009	2010	Totals
<b>Non-Use of Occupant Restraint Related Fatalities</b>	12	7	9	1	11	3	5	<b>48</b>
<b>Alcohol Related Fatalities</b>	10	3	10	3	8	7	1	<b>42</b>
<b>Speed Related Fatalities</b>	5	6	9	2	10	7	1	<b>40</b>
<b>Totals</b>	27	16	28	6	29	17	7	<b>130</b>

### Non-Use of Occupant Restraint (Seat Belts)

Based on the data in Table 2, the non-use of seat belts rated the highest number of fatalities at 48 during this six year period. If seat belts are worn correctly, the chances of a fatality in a collision can be reduced by 47 per cent and the chances of serious injury by 52 per cent.<sup>12</sup> As of 2010, 95 per cent of vehicle occupants wear seat belts. On Prince Edward Island, the average was 89.7 per cent. As of July 16, 2013, police services in the eastern part of our province issued 66 tickets from April through June, amounting to \$18,150 worth of fines. Police have noted that air bags should not be considered an alternative to wearing seatbelts as occupants, not drivers and passengers, can still be thrown from the vehicle.<sup>13</sup> As with the above table, yearly seatbelts convictions on Prince Edward Island have been trending consistently downward since 2008 (Table 3).

**Table 3: Yearly Seatbelt Convictions 2004 – 2012**

	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Prince Edward Island</b>	1530	799	762	860	925	451	407	392	323

<sup>12</sup>Transport Canada, Stewart et al., Publication No. TP 13110 E, 1997.

<sup>13</sup> CBC News, [www.cbc.ca](http://www.cbc.ca), Kings County RCMP issue \$18 K in seatbelt fines, July 16, 2013.

## Impaired Driving

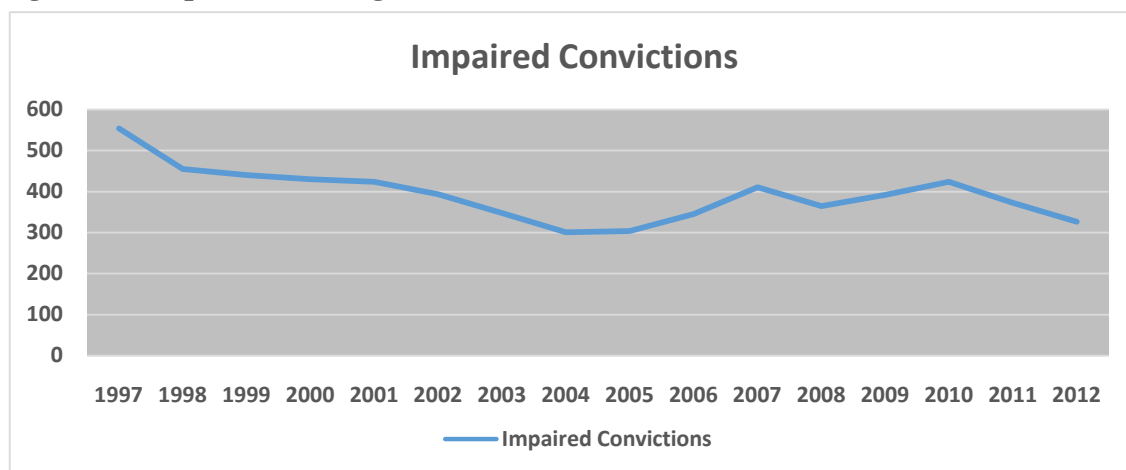
On Prince Edward Island it's no secret that impaired driving is a serious problem. Table 2 shows 42 alcohol related fatalities between 2004 and 2010 within RCMP jurisdiction. Based on research conducted by the Traffic Injury Research Foundation in 2008, of all people who died in alcohol-related collisions, all were male and all were drivers/operators of a vehicle (50 per cent were in a car; 34.5 per cent were in a truck/van; and 12.5 per cent were occupants of other vehicles). With respect to age, 25 per cent were under the age of 26<sup>14</sup>.

Drugs other than alcohol are being detected in fatally injured drivers. More than 80 per cent of fatally injured drivers involved in vehicle collisions are tested for alcohol. Since 2000, drivers who test positive for drug use have been entered into the National Fatality Database.<sup>15</sup> If we refer to Table 1, there were 13.6 fatalities in 2008; 12 of these fatalities were drivers. Of these, 66.7 per cent tested positive for alcohol and 58.3 per cent tested positive for drugs.<sup>16</sup>

In a continued effort to get dangerous drivers off our highways, Prince Edward Island has recently passed new legislation on impaired driving. As of February, 2013, all drivers convicted of impaired driving on Prince Edward Island are now required to install an ignition interlock system in their vehicles, at their own expense. The device must remain installed for one year following a first offense, two years for a second offense and five years for a third offense. An additional year is added if a child under the age of 16 is present at the time when the offense occurs. As of April, 2013, a driver's license can be immediately suspended for seven days if a driver is suspected of driving while impaired by drugs or refuses or fails the sobriety test.



**Figure 7 – Impaired Driving Convictions**



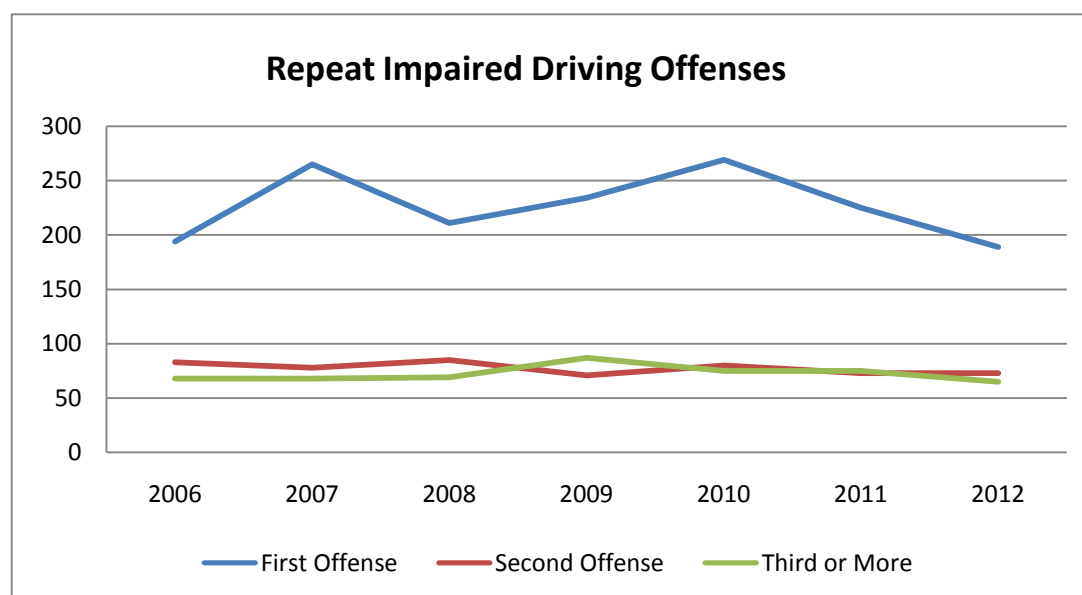
<sup>14</sup>CCMTA Road Safety Report Series, *Alcohol-Crash Problem in Canada, 2008*, Traffic Injury Research Foundation, 2010, 173-288.

<sup>15</sup>Canadian Centre on Substance Abuse, *Drug Use by Fatally Injured Drivers in Canada (2000-2008)*, CCMTA report, November 2011, 12.

<sup>16</sup>*Ibid.*, 26.

Impaired convictions on Prince Edward Island are trending downward (Figure 7). However, repeat offenders continue to be a serious cause for concern. Impairment-related collision deaths per 100,000 population has consistently been higher on Prince Edward Island than the national average (Table 4). Prince Edward Island continues to address this problem with enhanced legislation and road safety awareness campaigns.

**Figure 8 – Repeat Impaired Driving Offenses, (2006 – 2012)**



**Table 4: Impairment-Related Crash Fatalities**

Prince Edward Island					
Year	Number	As % of total crash deaths		Per 100,000 population	
		P.E.I.	Canada	P.E.I.	Canada
2000	8	39%	37%	5.64	3.83
2001	15	81%	40%	11.27	3.91
2002	12	61%	36%	8.84	3.70
2003	12	71%	40%	8.82	3.97
2004	12	40%	38%	8.79	3.62
2005	3	19%	38%	2.39	3.75
2006	17	59%	41%	11.96	3.92
2007	7	73%	41%	4.78	3.76
2008	10	52%	43%	7.10	3.49
2009	8	64%	42%	5.46	3.18

## Aggressive Driving

Among other hazardous driving behaviours, the Canada Road Safety Strategy defines aggressive driving as: speeding, running red lights, tailgating, weaving in and out of traffic, and failing to yield the right of way. As noted in Table 2, between 2004 and 2010, 31 per cent of fatalities that occurred within RCMP jurisdiction on Prince Edward Island were attributed to speed. Good quality data has gone a long way to assist provincial policy makers in the task of determining effective traffic calming techniques as well as reviewing options for engaging new technology to reduce vehicle speeds.

**Table 5: Yearly Speeding Convictions (2002 – 2010)**

	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Prince Edward Island</b>	4108	3463	3546	2951	3685	4122	3959	4486	4277

## Electronic Communication Device Usage

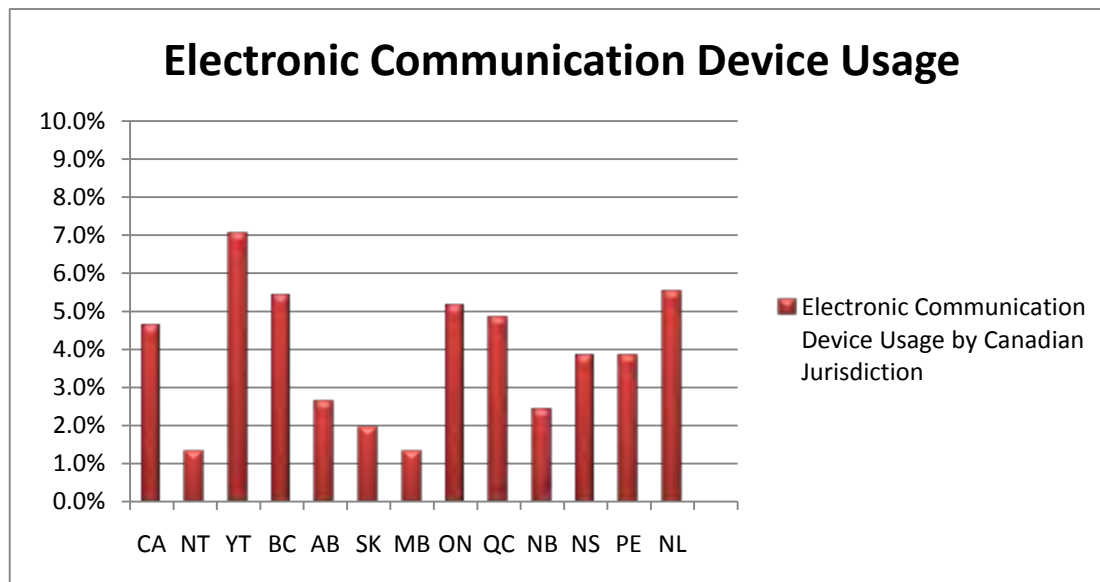
Another area of increasing concern to highway safety personnel, police services, and the general public is the use of electronic communication devices (ECDs) while driving. The use of an ECD (talking and texting) is a serious distraction for drivers. An ECD can be a mobile phone, smart phone or tablet. The Canadian Council of Motor Transport Administrators (CCMTA) compiled results for a Distracted Driver Survey taken in September 2012 while observing drivers in 286 sites across Canada. The national survey observed both men and women talking and typing in light duty vehicles. Some of the key findings included:

- ECD usage was more common among drivers under 25
- Typically among drivers of light trucks
- Women were more likely to use an ECD than men
- Men were more apt to talk than type
- Women talked and typed equally
- Drivers without passengers were more likely to use an ECD
- The use of ECDs was lower after laws prohibiting their use were brought into effect<sup>17</sup>

The graphs outlined on the following pages show the levels of distracted driving in Canada and on Prince Edward Island.

<sup>17</sup> CCMTA Distracted Driver Survey – Summary Report, February 2013.

**Figure 9 – Electronic Communication Device Usage in Canada**



Usage of ECD's in Canada was surveyed at 4.3 per cent. The highest usage was found in the Yukon at 7.0 per cent with the lowest in Manitoba at 1.3 per cent. Nova Scotia and Prince Edward Island all tied at 3.8 per cent. ECD use by age on Prince Edward Island was higher (7.5 per cent) among young drivers (< 25 years) than it as for those aged 25 to 49 (4.4 per cent) and those aged 50 and over (0.6 per cent).

**Table 6 – Type of Driver's ECD Usage by Type of Vehicle and Jurisdiction**

<i>Jurisdiction</i>	Talking			Typing		
	Passenger Cars	Minivans & SUVs	Light Trucks	Passenger Cars	Minivans & SUVs	Light Trucks
<i>Canada</i>	2.3%	2.5%	3.6%	1.8%	2.0%	2.0%
<i>PEI</i>	1.3%	1.8%	2.0%	1.4%	0.5%	3.3%

**Table 7 – Type of Driver's ECD Usage by Gender and Jurisdiction**

<i>Jurisdiction</i>	Talking		Typing	
	Male	Female	Male	Female
<i>Canada</i>	2.6%	2.3%	1.6%	2.4%
<i>PEI</i>	1.4%	2.0%	1.0%	2.2%



**Table 8 – Percentage of Drivers Talking on Hand-held Cell Phones (2007 – 2012)**

<i>Jurisdiction</i>	<b>Effective Date of Law</b>	<b>ECD Usage for Talking</b>		
		2007	2010	2012
<i>NL</i>	04/2003	5.6%	4.4%	3.1%
<i>NS</i>	04/2008	2.2%	4.4%	2.7%
<i>NB</i>	06/2011	2.9%	2.2%	1.8%
<i>PEI</i>	01/2010	3.4%	3.6%	1.5%
<i>Canada</i>		5.9%	3.3%	2.3%

## **SOCIETAL IMPLICATIONS**

The societal or economic cost of vehicle collisions on Prince Edward Island is difficult to measure. At present we do not have high quality evidence of the provincial cost of motor vehicle accidents. Provincial health records can be used to identify patients who are hospitalized or visit an emergency room. However, these records do not contain information regarding the medical costs of these patients or if the person or persons entered the hospital for reasons directly related to a vehicle accident.<sup>18</sup> Studies have shown that car accidents cost Canada a total of \$62.7 billion every year. This represents 4.9% of Canada's 2004 Gross Domestic Product (Transport Canada, 2007).<sup>19</sup>

It should be noted that the costs for collisions go beyond a person's stay in the hospital, they could include the following direct and indirect costs:

- Emergency response services (911, ambulance, fire stations)
- Police services
- Health care (hospital stay, physician services)
- Legal and court costs
- Lost income
- Insurance costs
- Costs related to property damage
- Vehicle repair costs and insurance payouts
- Disability and/or workers compensation payouts
- Increased costs to social programs as a result of tax payers being unable to work

<sup>18</sup> According to Health PEI, patient data is not entered or tracked in a way that information can be extracted pertaining specifically to motor vehicle accidents.

<sup>19</sup> Analysis and Estimation of the Social Cost of Motor Vehicle Collisions in Ontario, August, 2007, <http://www.tc.gc.ca/media/documents/roadsafety/tp14800e.pdf>

## **KEY CHALLENGES AND OBJECTIVES**

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The preceding section outlined factors contributing to road trauma on PEI. Many of the collisions, injuries and fatalities experienced on Island roads can be prevented through education and awareness, tougher enforcement, use of technology, and changes to behaviour.

The objectives of the Canadian Road Safety Strategy 2015 are to “raise public awareness, enhance enforcement of traffic laws, increase communications, cooperation and collaboration among partners and increase information in support of research and evaluation”. The TIR RSS supports the basic tenants of the national strategy and will target impaired driving as the lead risk factor impacting the level of fatalities and serious injury rates on PEI. Traffic safety begins with the person behind the wheel but it is a responsibility we all share equally.

### **The key challenges for the TIR RSS include:**

- Debunking the idea that impaired driving (alcohol, drugs, fatigue) is an acceptable type of behaviour;
- Increasing awareness that speeding is not socially acceptable;
- Continuing to identify medically at-risk road users while helping them to maintain their sense of independence as much as possible;
- Encouraging helmet and seatbelt use;
- Continuing to offer road safety training for personnel; and,
- Finding new and innovative ways to use technology to accommodate our aging population within road construction and design.

### **Objectives to be addressed over the lifetime of this strategy will include:**

- Continuing to decrease fatality and serious injury rates;
- Focusing on increasing driver education and awareness;
- Enhancing our efforts to protect vulnerable road users;
- Decreasing the societal impact of road trauma;
- Working with police services to enhance enforcement measures;
- Continue to review and modernize rules and regulations;
- Implement standards for medically at-risk road users ;
- Introducing new legislation for repeat impaired driver offenses; and,
- Continue to focus on road safety in the design, construction and maintenance of Island highways.

## **TIR ROAD SAFETY PRIORITIES**

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Using the matrix developed for *Canada's Road Safety Strategy 2015* as a guide, the following seven priorities have been identified for the Department:

1. Increase the rate of seat belt usage for all occupants.
2. Target impaired drivers (alcohol, drugs, fatigue).
3. Promote awareness programs on the social unacceptability of speed and aggressive driving.
4. Proactively address safety and mobility issues related to medically-at-risk drivers.
5. Promote awareness campaigns on the dangers of distracted driving.
6. Continue to adapt and improve initiatives for novice drivers such as the Graduated Licensing Program.
7. Identify and address high risk factors for vulnerable road users (pedestrians, cyclists, and motorcyclists).

To support the above priorities, a series of strategies have been developed to assist the Department in achieving road safety results.

## **OPERATIONAL STRATEGIES**

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### ***Occupant Protection***

- Continue to promote the benefits of seatbelts and supplementary restraint systems through the Safety Educator presentations to Driver Improvement and Driver Rehabilitation programs;
- Encourage police services to promote positive outcomes in press releases of collisions where passengers were protected by seat belts;
- Promote increased enforcement initiatives aimed at increasing driver and passenger compliance with seat belt laws;
- Provide access to the general public in regards to appropriate information about air bags, seat belts, or child restraint systems;
- Continue to work with police agencies to enforce passenger restrictions associated with the Graduated Driver Licensing Program (GDL); and,
- Raise public awareness of young driver crash risk.

### ***Impaired Driving***

- ❑ Work with police services to strengthen random breath and drug testing and unlicensed driver detection;
- ❑ Continue to work with the Medical Association of PEI and Health PEI to research the impact of prescription drug use on road users;
- ❑ Deliver and promote education and awareness campaigns;
- ❑ Continue to collaborate with MADD;
- ❑ Focus on repeat offenders;
- ❑ Educate road users about fatigue and distraction;
- ❑ Explore ways for improved data collection on impaired driving; and,
- ❑ Promote zero BAC for GDL drivers.

### ***Speed***

- ❑ Use of electronic message boards to alert drivers to their approaching speed into communities on arterial highways;
- ❑ Improve the lighting at intersections where deemed necessary;
- ❑ Continue the construction of roundabouts as a way to keep traffic moving but at a reduced speed;
- ❑ Limit access control, especially to the arterial highway;
- ❑ Continue or expand the use of peripheral pavement markings and transverse markings;
- ❑ Continue to monitor license plate cameras on school buses;
- ❑ Explore additional traffic calming techniques and review options for engaging new technology to reduce vehicle speeds; and,
- ❑ Continue to explore traffic calming techniques in residential areas.

### ***Medically At-Risk***

- ❑ Continue to respond to all requests for retesting;
- ❑ Expand the use of longer lasting lane designation lines;
- ❑ Raised pavement markings improve visual detection time for drivers ;
- ❑ Continue to improve reflectivity of signs by paying more attention to color and font size; and,
- ❑ Complete medical reporting for commercial drivers.

### ***Driver Distractions***

- ❑ Explore opportunities to educate the public on the incidence of vehicle collision as a result of using ECDs; and,
- ❑ Review current data collection methods and investigate opportunities for improved collection of fatigue and distraction related collisions.

### ***Novice Drivers***

- ❑ Work with police services to strengthen breath and drug testing and unlicensed driver detection;
- ❑ Continue to assess and analyze the Graduated Licensing Program;
- ❑ Work with the school system to raise awareness of students through the *Not Breaking the Rules Campaign*.;
- ❑ Raise public awareness of young driver crash risk;
- ❑ Promote zero BAC for drivers under the age of 21;
- ❑ Continue to assess and update the Novice Driver Program by integrating available training aids and receiving feedback from participants;
- ❑ Promote safe graduation practices through Safety Educator presentations to senior high school students; and,
- ❑ Continue to randomly select and test students from the Driver Education Program to ensure a consistent and thorough approach to driver training.

### ***Vulnerable Road Users***

- ❑ Continue the “Share the Road” signage program;
- ❑ Explore opportunities for increasing safe bicycle paths for cyclists;
- ❑ Work with municipalities to ensure crossing lights are long enough for pedestrians; and,
- ❑ Support community based cycle skills training to increase awareness.



## **TIR BEST PRACTICES FRAMEWORK**

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A TIR RSS **Best Practices Framework** (outlined on page 25) was developed based on TIR road safety priorities and the matrix designed for *Canada's Road Safety Strategy 2015* (refer to page 24). The TIR framework is a compilation of contributing factors, target groups, and initiatives that the Department is either pursuing at this time or intends to pursue in the future. For more detail, refer to Annex A and Annex B.

The following definitions from Canada's Road Safety Strategy 2015 will provide clarity to the rationale behind the initiatives that the TIR RSS has outlined.

### ***Contributing Factors***

The key causes of collisions being targeted are defined as follows:

- **Impaired Driving:** Includes all forms of impairment, such as impairment resulting from the ingestion of a chemical substance (alcohol and drugs – including prescription, over-the-counter or illicit varieties), as well as due to actions that result in driver impairment from natural causes (fatigue or distracted behaviours).
- **Speed & Aggressive Driving:** Includes driving at speeds beyond posted legal limits on all road types in urban and rural settings, and driver behaviours deemed outside socially acceptable norms, which put other road users at risk of injury, or contribute to collisions and casualties. It also includes driving too fast for road conditions.
- **Occupant Protection:** Includes using the proper restraint among all road users, vehicle technology enhancements (collision worthiness and collision-avoidance) and safer roads (e.g.: dangerous roadside obstacles, poor lighting, poor signage, etc.).
- **Environmental Factors:** Includes issues/factors that may affect the likelihood of traffic accidents occurring (e.g.: roadway configuration, roadway construction, road surface condition, road and roadside design, weather conditions, urban and rural infrastructure, etc.).

### ***Key Target Groups:***

The key groups of drivers being targeted are defined as follows:

- **Young drivers:** Drivers under the age of 25 years.
- **Medically-at-risk-drivers:** Drivers whose existing medical condition may affect the safe operation of their vehicles, their occupants and the safety of other road users would be targeted under this group (e.g.: drivers who suffer from epilepsy, ischemic heart disease etc.). This includes driver performance, related to the aging process, deemed to be outside the boundaries of normal driving behaviour (e.g.: poor cognitive or perception skills, slow reaction times in situations requiring quick decision-making, and visual or auditory limitations) that may result in traffic accidents.

- **Vulnerable road users:** Pedestrians, motorcyclists and cyclists and persons in personal mobile devices (e.g.: motorized wheelchairs and scooters).
- **Motor carriers:** A person or entity who is responsible for a commercial vehicle (e.g.: driver, carrier).
- **High-risk drivers:** Repeat offenders with patterned illegal driving behaviours (e.g.: recurring incidences of alcohol/drug impaired driving, traffic violations, collision involvement or suspended/prohibited drivers).
- **General population:** Road users who benefit from strategies/interventions/regulations/legislation introduced to make roads, vehicles and road users safer.

Death or serious injury on our roads is unacceptable. By improving the skills and attitudes of drivers and occupants, and by continually improving road safety education, the government can help to further reduce the cost of emergency and health care services, as well as the personal and social cost of traffic accidents.

## Canada's Road Safety Strategy 2015<sup>20</sup>

### Matrix

Key Target Groups	Contributing Factors			
	Impaired Driving (alcohol, drugs, fatigue, distraction)	Speed & Aggressive Driving	Occupant Protection	Environmental Factors
Young drivers				
Medically-at-risk-drivers				
Vulnerable road users				
Motor carriers				
High-risk drivers				
General population				

<sup>20</sup> <http://www.ccmta.ca/crss-2015/matrix.php>

## TIR RSS BEST PRACTICES FRAMEWORK

	Contributing Factors				
	Impaired Driving (alcohol, drugs, fatigue, distraction)	Speed and Aggressive Driving	Occupant Protection	Medical Fitness	Environmental Factors
<b><u>Target Groups</u></b>	<b>TIR RSS Initiatives</b>				
<b>Novice Drivers</b>	Graduated Driver License Program Novice Driver Program Demerit Point System Driver Education, Zero BAC Ignition Interlock	More Joint Spot Checks Electronic Message Boards	Promotion of seatbelts Demerit Point System		Raised Pavement Markings Transverse Pavement Markings
<b>Seniors</b>	55 Alive Program Ignition Interlock Drivers License Probation	Electronic Message Boards	Promotion of seatbelts	Respond to all retest requests	Partner with PEI Seniors Raised Pavement Markings
<b>High-Risk Drivers</b>	Assessment and Treatment Programs Ignition Interlock, Rumble Strips	Electronic Message Boards	Promotion of seatbelts		
<b>Vulnerable Road Users</b>	Graduated Driver License Program Novice Driver Program Demerit Point System Driver Education, Zero BAC Ignition Interlock	More Joint Spot Checks Electronic Message Boards	Promotion of seatbelts Demerit Point System		Raised Pavement Markings Transverse Pavement Markings

	Contributing Factors				
	Impaired Driving (alcohol, drugs, fatigue, distraction)	Speed and Aggressive Driving	Occupant Protection	Medical Fitness	Environmental Factors
<b><u>Target Groups</u></b>	<b>TIR RSS Initiatives</b>				
<b>Medically At-Risk</b>	Ignition Interlock		Promotion of seatbelts	Improve Intersections	Medically Reporting
<b>Motor Carriers</b>	Zero BAC, Ignition Interlock		Promotion of seatbelts		Cargo Securement Safety Rating Periodic motor vehicle inspections Pre-trip inspections PEI 511 Operation Air Brake Roundabouts Paved shoulders
<b>General Population</b>	911 Program Driver distraction Ignition Interlock Random Breath Testing	Electronic Message Boards Access control Automated Enforcement	Booster Seats Removal of seat belt exemptions One seat belt per occupant No riding in the back of a pick-up Increased penalties if impaired driving while children present Seat occupant sensors Guardrails		Road Safety Awareness Campaigns Road alignment Curve flattening Wind breaks/snow hedges Pre-wetting of salt International Roughness Index Bridge Condition Index Roundabouts PEI 511 Paved shoulders Transverse Pavement Marking

## **MONITORING OUR PROGRESS**

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In the spring of 2012, the Department of Transportation and Infrastructure Renewal developed specific performance measures as part of a strategic planning process. Included were measures that dealt specifically with driver, vehicle and road safety. The TIR Strategic Plan 2012 – 2015, and the TIR RSS 2015, represent the Department's commitment to road safety on Prince Edward Island.

Although responsibility for each initiative outlined in the previous section has, or will be assigned to a specific safety agency or government department, the Department of Transportation and Infrastructure Renewal will continue to monitor progress on those initiatives for which it is directly responsible. The ultimate measure of success will be a continuing reduction in fatalities and serious injuries as a result of vehicle collisions.

### **TIR Performance Measures**

#### **Driver and Vehicle Safety**

- Number of collisions
- Number of fatal collisions
- Number of serious injuries
- Number of vehicle registrations
- Number of DUI convictions
- Number of Road safety awareness campaigns
- Certification of Enforcement Officers in the handling of Transportation Dangerous Goods (TDG)

#### **Highway Infrastructure**


- Percentage of arterial network patching
- Km of road recapped
- Km of brush cutting
- Meters of guardrail repaired or replaced
- Physical condition of highways (IRI)
- Physical condition of bridges (BCI)

#### **Policy and Planning**



- Highway safety courses delivered to new Islanders
- Highway safety literature available to Mandarin, Japanese, Chinese, Farsi, Arabic residents in their own language.
- Process to enhance electronic medical reporting





## Appendix A

 Implemented or In Progress
  Under Consideration
  Not Applicable


### 1. “Proven” Road Users Initiatives



“PROVEN” ROAD USER INITIATIVES				
Ref #	Title - proven	Description	Applicable Uses by Causal Factor and Associated Risk Groups	Potential Performance / Indicator
U-1	GDL 	The Graduated Licensing Program (GDL) provides a more protective environment for novice drivers. The GDL is a system of licensing that gives new drivers the opportunity to gradually move into higher-risk driving situations after gaining experience in low—risk situations. Most systems and programs are multi-staged and include restrictions at each stage. Examples of restrictions imposed include supervised driving during Stage 1, restricted night time driving for those under the age of 21, all GDL drivers are required to have a decal displayed on any vehicle they operate while in the program.	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol, drug), Speed and Aggressive Driving: Young drivers, Vulnerable road users</li> <li>• Impaired Driving (distraction), Occupant Protection: Young drivers</li> </ul>	<ul style="list-style-type: none"> <li>• GDL’s effectiveness in reducing crashes and fatalities has been well documented at the national and international levels.<sup>1</sup></li> </ul>
U-2	Random breath testing 	Random Breath Testing (RBT) is a preliminary screening measure to determine whether there are grounds to demand evidentiary breath tests.	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol, drug): General population</li> </ul>	<ul style="list-style-type: none"> <li>• The recent increase in random testing at the national level (Norway) has been particularly effective in the case of light offenders. The reduction in drunk driving between 2000 and 2007 occurred only among relatively light offenders and not among the serious offenders who cause the vast majority of crashes (DVS, 2008).<sup>2</sup></li> </ul>

<b>“PROVEN” ROAD USER INITIATIVES</b>				
<b>Ref #</b>	<b>Title - proven</b>	<b>Description</b>	<b>Applicable Uses by Causal Factor and Associated Risk Groups</b>	<b>Potential Performance / Indicator</b>
U-3	911 program 	Launched on Prince Edward Island in 2000, the 911 program increases the detection and apprehension of impaired drivers by motivating the public to call 911 when witnessing an instance of suspected impaired driving.	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol, drug): General population</li> </ul>	<ul style="list-style-type: none"> <li>• A provincial campaign to encourage Islanders to call 911 to report suspected drunk drivers was initiated in 2011 by police and MADD.</li> <li>• Roadside signs were erected in the spring of 2013 to encourage people to contact police if they witnessed a drunk driver.</li> <li>• From January to June 2013, police received 125 calls from members of the public reporting what they suspect was an impaired driver. As a result of those calls, 23 impaired driving charges were laid.<sup>3</sup></li> </ul>



“PROVEN” ROAD USER INITIATIVES				
Ref #	Title - proven	Description	Applicable Uses by Causal Factor and Associated Risk Groups	Potential Performance / Indicator
U-4	Automated enforcement 	<p>Traffic enforcement camera systems, include a camera and a vehicle-monitoring device which is used to detect and identify vehicles disobeying a speed limit or some other legal road requirement.</p> <p>Research in this area has been carried out on Prince Edward Island in the past few years.</p>	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving: General population, High-risk drivers</li> </ul>	<ul style="list-style-type: none"> <li>The Speed Camera program in New Zealand was evaluated and the evaluation suggested a 23% reduction in collisions at urban locations, and an 11% reduction at rural locations. Hidden speed cameras operating under a trial program showed a 19% reduction in injury collisions.</li> <li>The State of Victoria started intensive speed camera enforcement, accompanied by intensive publicity in 1990. There was a 42% reduction in pedestrian deaths in Victoria in that same year.<sup>1</sup></li> <li>A recent assessment of the effect of speed cameras (permanent fixed cameras, but also mobile controls with speed cameras) on driving speeds and road safety in Great Britain shows large reductions in the number of speeding offenders and road crashes (Gains et al., 2005). The following estimations of reductions in injury crashes compared with the regional trend were made: 22% and 33% fewer for <i>fixed cameras</i> on urban and rural roads respectively, 22% and 15% fewer for <i>mobile cameras</i> on urban and rural roads. A formal impact assessment of speed cameras in Norway showed that they had a benefit-cost ratio of 2.11.<sup>4</sup></li> <li>A formal impact assessment of speed enforcement in Norway showed that it had a benefit cost ratio of 1.499.<sup>5</sup></li> </ul>




## “PROVEN” ROAD USER INITIATIVES

Ref #	Title - proven	Description	Applicable Uses by Causal Factor and Associated Risk Groups	Potential Performance / Indicator
U-5	Speed reader boards or radar feedback signs 	<p>Speed reader board programs strive to reduce excessive speeding by increasing driver awareness of posted speed limits and providing instant feedback by displaying the actual speed being traveled</p> <p>The portable speed reader board is equipped with a radar unit that is designed to detect the speeds of passing motorists. Speeds are recorded and displayed on the highly visible reader board. The device can be set up in strategic locations throughout a city including arterial, collector and local roads, and in school and playground zones.</p> <p>Speed Reader Board Programs increases awareness about excessive speeding, helps augment other speed awareness education and enforcement programs like Speed Watch and is an effective, inexpensive traffic education tool.</p>	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving; Vulnerable road users; General population, Young drivers</li> </ul>	<ul style="list-style-type: none"> <li>Experience in Canada has shown that more than 70% of drivers who are travelling more than 10 km/h over the speed limit slow down when they see a speed reader board.<sup>1</sup></li> </ul>



<b>“PROVEN” ROAD USER INITIATIVES</b>				
<b>Ref #</b>	<b>Title - proven</b>	<b>Description</b>	<b>Applicable Uses by Causal Factor and Associated Risk Groups</b>	<b>Potential Performance / Indicator</b>
U-6	Selective Traffic Enforcement Programs (STEP) 	<p>Selective enforcement is that part of a traffic safety program which involves the planning, directing, implementing and evaluation of traffic law enforcement activity with the ultimate goal of reducing collisions by systematically improving the manner in which available police manpower and equipment resources are used.</p> <p>Police target their resources and enforcement to locations (i.e.: rural areas) where seat belt non-use and/or drinking and driving is an issue.</p> <p>Other offences are integrated into the enforcement campaigns using Selective Traffic Enforcement Programs (STEP's) to address other road safety issues such as speeding, red light running, improper lane changes, following to close, cyclist and pedestrian safety etc.</p>	<ul style="list-style-type: none"> <li>Occupant Protection, Impaired Driving: General population</li> </ul>	<ul style="list-style-type: none"> <li>A formal impact assessment of drink driving enforcement in Norway showed that it had a benefit-cost ratio of 1.80.<sup>1</sup></li> <li>The one study of combined high-visibility enforcement, in three demonstration sites, produced “encouraging but inconclusive” overall results (Jones, Joksche, Lacey, Wiliszowski, &amp; Marchetti, 1995; Jones &amp; Lacey, 2001). Each site targeted belt use, speeding, and alcohol-impaired driving (DWI). One site maintained the planned high-intensity enforcement directed at all three behaviours and saw reduced DWI and speeding while maintaining a high belt use rate. A second site conducted only high-visibility DWI enforcement, which had an effect only on DWI. The third site failed to conduct high-visibility enforcement of any type and saw no effect. A formal impact assessment of seat belt use enforcement in Norway showed that it had a benefit-cost ratio of 2.44.<sup>5</sup></li> </ul>
U-7	Automated licence plate recognition (ALPR) 	ALPR is a camera and computer database system. Police are assisted by cameras mounted in their cars that capture images of licence plates on vehicles on public highways. The ALPR system reads the licence plate and instantly compares it against the data base in the onboard computer. The data base includes information associated with stolen vehicles and uninsured, unlicensed and prohibited drivers. ALPR can also assist the police to identify persons of interest associated with other criminal activity	<ul style="list-style-type: none"> <li>Environmental Factors: High-risk drivers</li> </ul>	<ul style="list-style-type: none"> <li>Research with ALPR has shown several benefits, namely, increased police efficiency. With an increased number of “hits” or successful matching between a scanned plate image and a database of interest, police are better able to identify more persons of interest. This increases the potential for the recovery of stolen goods as well as convictions. The technology also allows the police to identify uninsured vehicles, prohibited drivers and unlicensed driver much more quickly than previous police strategies.<sup>6</sup></li> </ul>



## “PROVEN” ROAD USER INITIATIVES



Ref #	Title - proven	Description	Applicable Uses by Causal Factor and Associated Risk Groups	Potential Performance / Indicator
U-8	School/parent patrol programs 	A program to assist children before and after school and to educate them on the importance of road safety.	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving: Vulnerable road users</li> </ul>	<ul style="list-style-type: none"> <li>The US national pedestrian death rate per 100,000 children aged 5 to 14 has dropped from 10.4 in 1935 (the first year records were kept) to 3 in 1986. By 2000, the death rate for pedestrians under age 10 was .81 per 100,000. Children in this age group used to have the second highest fatality rate of any age group; today they have the lowest. Experts credit School Safety Patrol Programs with making a strong contribution to this significant improvement.<sup>7</sup></li> </ul>
U-9	Education on speed and aggressive driving related crashes 	An education program for drivers, pedestrians, and other vulnerable road users on the impact of speed and aggressive driving related crashes.	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving: Vulnerable road users</li> </ul>	<ul style="list-style-type: none"> <li>A detailed study of fatal pedestrian crashes in Adelaide, Australia found that 32% of pedestrians who died would probably have survived if the vehicle that hit them had been traveling 5 km/h slower before the crash, while one in ten pedestrians would not have been hit at all (the driver would have been able to stop in time).</li> <li>The State of Victoria started intensive speed camera enforcement, accompanied by intensive publicity in 1990. There was a 42% reduction in pedestrian deaths in Victoria in that same year.<sup>1</sup></li> </ul>

<b>“PROVEN” ROAD USER INITIATIVES</b>				
<b>Ref #</b>	<b>Title - proven</b>	<b>Description</b>	<b>Applicable Uses by Causal Factor and Associated Risk Groups</b>	<b>Potential Performance / Indicator</b>
U-10	Booster seats 	<p>Booster seats use the vehicle’s seat belt to hold the child and the booster seat in place in a crash or sudden stop. Some booster seats can be used as a rear facing car seat and/or forward facing car seat first.</p> <p>Under the Prince Edward Island Highway Traffic Act:</p> <ul style="list-style-type: none"> <li>• Rear-Facing - Children must ride in a rear-facing car seat until they are a minimum of 10 kg (22 lb).</li> <li>• Forward-Facing - Children weighing 10 kg (22 lb) or more, but less than 18 kg (40 lb) must ride in a forward-facing seat.</li> <li>• Booster Seat - Effective January 1, 2008, Children must ride in a booster seat if they are over 18 kg (40 lb), are 9 years of age or less and are less than 145 cm (57 inches). Please note that maximum weight is based on booster seat manufacturer's recommendations.</li> </ul>	<ul style="list-style-type: none"> <li>• Occupant Protection: General population</li> </ul>	<ul style="list-style-type: none"> <li>• Many studies have examined the effectiveness of child restraint laws in increasing child restraint use and decreasing crash-related injuries. Houston, Richardson, &amp; Neeley (2001) evaluated the effectiveness of State child restraint laws in the United States by conducting a time series analysis for all 50 States for the period 1975 to 1994, and found that child restraint laws significantly reduced fatality rates among children up to 5 years old. A similar reduction in the fatality rate of an older age cohort (6 to 11 years old and not typically covered by these laws) was not found. Zaza, Sleet, Thompson, Sosin, and Bolen, (2001) conducted a systematic review of evidence of effectiveness for five interventions, including child restraint laws, to increase child safety seat use. Establishment of child restraint laws was one of the interventions found to be effective. <sup>1</sup></li> </ul>
U-11	Removal of seat belt exemptions 	NORP’s Model of Legislative Provisions for Motor Vehicle Occupants addresses seat belt exemptions. PEI has been following this model for 15 years.	<ul style="list-style-type: none"> <li>• Occupant Protection: Medically-at-risk-drivers, General population</li> </ul>	<ul style="list-style-type: none"> <li>• The Canadian Medical Association has publicly stated there is no medical reason to not wear a seat belt. <sup>8</sup></li> </ul>
U-12	Assessment and treatment programs 	Mandatory alcohol education/assessment/treatment programs for convicted impaired drivers. PEI Highway Safety works in conjunction with Addiction Services.	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol, drug): High-risk drivers</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluation of the rehabilitation courses offered in the United Kingdom indicated that those who do not attend a rehabilitation course are three times more likely to re-offend than those who do. <sup>1</sup></li> </ul>











<b>“PROVEN” ROAD USER INITIATIVES</b>				
<b>Ref #</b>	<b>Title - proven</b>	<b>Description</b>	<b>Applicable Uses by Causal Factor and Associated Risk Groups</b>	<b>Potential Performance / Indicator</b>
U-13	One seat belt per occupant 	PEI has implemented the requirement to have one person per seat belt in a vehicle.	<ul style="list-style-type: none"> <li>Occupant Protection: General population</li> </ul>	<ul style="list-style-type: none"> <li>Over 92 % of Ontarians wear their seat belt regularly. However, those 8 percent who don't represent over 600,000 people. It's easy to see the difference wearing a seat belt makes — for every one percent increase in seat belt use five lives are saved. Unbelted occupants can become projectiles during a collision and can seriously injure themselves, other passengers or the driver.<sup>9</sup></li> </ul>
U-14	Awareness / education programs 	<p>Programs which provide public awareness and education to promote road safety for all the target groups.</p> <p>PEI has a robust public education campaign that operates 12 months of the year and includes targeted programs for risk groups. Examples include bicycle safety campaigns, road construction safety training, helmet safety, Don't Text and Drive campaign, Don't Drink and Drive campaign.</p>	<ul style="list-style-type: none"> <li>Impaired Driving (all forms), Occupant Protection; Speed and Aggressive Driving: Young drivers, High-risk drivers; Vulnerable road users, General population</li> </ul>	<ul style="list-style-type: none"> <li>Education and awareness programs were demonstrated to be effective for targeted programs that support, and are supported by, enforcement. Uncertain effectiveness for stand-alone programs not supporting enforcement. The North Dakota and Amarillo campaigns are the only well-documented and successful examples. They used all the characteristics of effective communications and outreach campaigns: good target audience research, effective and creative message development, and good message placement using both paid and earned media. The overall South Central Region campaign produced only modest gains.<sup>1</sup></li> </ul>

<b>“PROVEN” ROAD USER INITIATIVES</b>				
<b>Ref #</b>	<b>Title - proven</b>	<b>Description</b>	<b>Applicable Uses by Causal Factor and Associated Risk Groups</b>	<b>Potential Performance / Indicator</b>
U-15	Jaywalking awareness 	Awareness programs related to the risks and serious outcomes of a collision with a motor vehicle while jaywalking. Jaywalking is a serious issue in urban settings, especially where vehicles are compounding the problem by driving over the speed limit, reducing the pedestrian’s ability to check traffic in all relevant conditions.	<ul style="list-style-type: none"> <li>Environment: Vulnerable road users</li> </ul>	<ul style="list-style-type: none"> <li>Van Houten and Malenfant (2004) found that driver yielding to pedestrians increased in response to targeted police enforcement at crosswalks on two corridors in Miami Beach, Florida. Warnings and educational flyers were handed out to most violators, while citations were issued for flagrant violations. Some publicity resulted from the enforcement efforts. Yielding also increased to some extent at other untreated crosswalks in the affected corridors. Increases in yielding were sustained for up to a year following the two-week intensive enforcement efforts with nominal additional enforcement, but effects on crashes and injuries have not been reported.<sup>1</sup></li> </ul>
U-16	No riding in the back of a pick-up 	Federal standards require that occupant compartments of vehicles be designed to protect occupants during a crash. The beds of pickup trucks are designed to carry cargo, not people, and are not designed to provide protection in a crash. In addition, children and adults can be easily ejected from cargo areas at relatively low speeds as a result of a sharp turn to avoid an obstacle or crash.	<ul style="list-style-type: none"> <li>Occupant Protection: General population</li> </ul>	<ul style="list-style-type: none"> <li>Travel in the cargo area of the pickup truck is a major occupant protection issue that disproportionately involves youth. Because the cargo area is not intended for passenger use, it is neither required nor designed to meet occupant safety standards applicable to passenger locations. Nevertheless, the cargo area is used for transporting passengers. In 1997, 161 deaths of occupants riding in the cargo area were reported; 77 (48%) were children and adolescents younger than 20 years. Of these occupants, 7 (9%) were younger than 5 years; 15 (19%) were 5 through 9 years of age; 14 (18%) were 10 through 14 years of age; and 41 (53%) were 15 through 19 years of age.<sup>9</sup></li> </ul>




<b>“PROVEN” ROAD USER INITIATIVES</b>				
<b>Ref #</b>	<b>Title - proven</b>	<b>Description</b>	<b>Applicable Uses by Causal Factor and Associated Risk Groups</b>	<b>Potential Performance / Indicator</b>
U-17	Zero BAC (GDL)   February 2007	A program for restricted alcohol use for higher risk populations such as young drivers who lack experience and motorcyclists who may be overly impacted by alcohol and commercial vehicles where the impact of a collision is larger.  Prince Edward Island amended the Highway Traffic Act in the Spring of 2013 to include drugs or a combination of alcohol and drugs to the legislation. Regulatory changes to be rolled out in the Fall of 2013.	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol, drug): Young drivers, Vulnerable road users, Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>• An early study in Maryland found that alcohol-involved crashes for drivers under age 21 dropped by 21% in six counties after the zero-tolerance law was implemented. After the law was publicized extensively, these crashes dropped by an additional 30% (Blomberg, 1992). No other studies have examined the effect of increasing enforcement and publicity for an existing zero-tolerance law.<sup>1</sup></li> </ul>
U-18	Increase penalties for impaired driving if children in vehicle 	Increase the penalties for an impaired driver if children are in the vehicle.	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol, drug): General population</li> </ul>	<ul style="list-style-type: none"> <li>• In May 2000, the Journal of the American Medical Association (JAMA) published “Characteristics of Child Passenger Deaths and Injuries Involving Drinking Drivers.” The study found that from 1985 to 1996, there were 5,555 child passenger deaths involving a drinking driver. Of these deaths, 3,556 (64 %) occurred while the child was riding with a drinking driver; 67 percent of these drinking drivers were old enough to be the parent or caregiver of the child.<sup>11 and 12</sup></li> <li>• From 1988 through 1996, an estimated 149,000 child passengers were non fatally injured in crashes involving a drinking driver. Of these, 58,000 (38.9 %) were riding with a drinking driver when injured in the crash.<sup>13 and 12</sup></li> </ul>

## “PROVEN” ROAD USER INITIATIVES





Ref #	Title - proven	Description	Applicable Uses by Causal Factor and Associated Risk Groups	Potential Performance / Indicator
U-19	Increase penalties in vulnerable areas 	Increase penalties for high risk driving behaviour in vulnerable areas, such as school zones, playgrounds, the vicinity of seniors’ residences, construction zones and passing emergency vehicles.	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving, Occupant Protection: High-risk drivers, General population</li> </ul>	<ul style="list-style-type: none"> <li>Masten and Peck (2004) reviewed the effectiveness evidence for different driver improvement and driver control actions, including penalty levels and types, from 35 high-quality studies of 106 individual actions and penalties. They found that, taken together, all actions and penalties reduced subsequent crashes by 6% and violations by 8%. Even simple warning letters have some effect on both violations and crashes. The effect increased as the “obtrusiveness” of the action increased, with license suspension or revocation the most effective by far. The authors noted that the threat of license suspension probably is responsible for the effectiveness of the weaker actions such as warning letters. Educational brochures by themselves had no effect. Finally, administrative penalties imposed by the driver licensing agency were more effective than penalties imposed by the courts.<sup>1</sup></li> </ul>
U-20	Driver distraction 	<p>Prohibiting the use of hand held cell phones and devices that require more than one touch to activate - this also included texting or emailing. Exemptions are provided to police, fire and ambulance personnel who may need to make calls in the performance of their duties, and motorists who need to call 9-1-1.</p> <p>Over the last 2 years, TIR has conducted roadside surveys to monitor cell phone use.</p>	<ul style="list-style-type: none"> <li>Impaired Driving (distraction): General population</li> </ul>	<ul style="list-style-type: none"> <li>After banning hand-held cell phone use while driving, 46 counties in New York experienced lower fatal accident rates, 10 of which did so at a statistically significant level, while all 62 counties experienced lower personal injury accident rates.<sup>14</sup></li> </ul>
U-21	Cargo securement 	A standard which outlines the specific requirements for securing loads to commercial vehicles to ensure they do not shift, move or spill onto the roadway.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>The Standard was developed based on extensive research.</li> </ul>

<b>“PROVEN” ROAD USER INITIATIVES</b>				
<b>Ref #</b>	<b>Title - proven</b>	<b>Description</b>	<b>Applicable Uses by Causal Factor and Associated Risk Groups</b>	<b>Potential Performance / Indicator</b>
U-22	Safety rating 	A standard which establishes the motor carrier safety rating framework by which each jurisdiction assesses the safety performance of motor carriers.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>The Standard provides for the removal of unsafe carriers by each jurisdiction.</li> </ul>
U-23	PMVI for motor carriers 	A standard which outlines maintenance and periodic inspections and how it is applied to: truck and truck-tractors, trailer, semi-trailer and C-Dolly and buses	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>The Standard promotes regular inspections and safe vehicles.</li> </ul>
U-24	Trip inspections 	A standard which prescribes daily trip inspection requirements and how it is applied to: truck, tractor and trailer, bus, motor coach (daily) motor coach (30 days or 12,000 km)	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>The Standard provides for immediate repair of the vehicle.</li> </ul>
U-25	Road check 	Annual North American enforcement campaign dedicated to commercial vehicle safety and conducted by CVSA officials.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>In 2009, in Canada, 7,800 trucks and buses (and drivers) were inspected with an out of service rate of about 17.8%. The out of service rate has continued a steady downward trend over the last twelve years.</li> </ul>
U-26	Operation Air Brake 	A North American enforcement initiative dedicated to brake safety and conducted by CVSA officials. This includes one unannounced “May brake check day” and “brake safety week” in September, whereby jurisdictions hold education and outreach events in cooperation with industry.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>Operation Air Brake has resulted in more than over 2.2 million brakes inspected since 1999. Over the last few years, 10-15% of commercial vehicles have been placed out of service for brakes and brake defects.</li> </ul>






## 2. “Proven” Infrastructure Initiatives







“PROVEN” INFRASTRUCTURE INITIATIVES				
Ref #	Title	Description	Applicable uses by causal factor and associated risk groups	Potential Performance / Indicator
I-1	Rumble strips 	<p>Rumble strips are used to alert the driver to a change in the pavement.</p> <ul style="list-style-type: none"> <li>Shoulder rumble strips help prevent single-vehicle run-off-road crashes. The noise and vibrations generated by driving over them work together to warn inattentive or drowsy drivers travelling on or too close to the shoulder.</li> <li>Transverse rumble strips may be used to call the road user’s attention to roadway environment where there is a need to exercise extraordinary caution</li> </ul>	<ul style="list-style-type: none"> <li>Impaired Driving (all forms): General population</li> <li>Speed and Aggressive Driving: High-risk drivers</li> <li>Environmental Factors: Motor carriers and General population</li> </ul>	<ul style="list-style-type: none"> <li>Shoulder rumble strips reduce single vehicle run-off-crashes by 20%.<sup>9</sup></li> <li>Transverse rumble strips reduce all types of crashes by 28% and rear end crashes by 90%.<sup>16</sup></li> </ul>
I-2	Divided highways 	The use of divided highways and/or median barriers which separate opposing directions of traffic by a central barrier or strip of land reduce the number of fatal head-on crashes.	<ul style="list-style-type: none"> <li>Impaired Driving (alcohol and drug): General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions per kilometer range from 40% to 60%.<sup>17</sup></li> </ul>
I-3	Median treatments 	Median treatments mitigate crash impact of left-turn maneuvers and concentrate them at established openings in the median or at signalized intersections. This makes it easier to regulate crossing traffic. In addition, raised medians can provide a refuge area for pedestrians crossing the roadway.	<ul style="list-style-type: none"> <li>Impaired Driving (alcohol and drug): General population</li> <li>Speed and Aggressive Driving: High-risk drivers</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) range from 24% to 44% for all crash types.<sup>16</sup></li> </ul>






## “PROVEN” INFRASTRUCTURE INITIATIVES

Ref #	Title	Description	Applicable uses by causal factor and associated risk groups	Potential Performance / Indicator
I-4	Forgiving roadsides 	<p>The use of forgiving roadways lessens the severity of run-off-road collisions. These elements include:</p> <ul style="list-style-type: none"> <li>• Energy absorbing barrier end treatments on the ends of guardrails to reduce the chance of serious injury. They are able to absorb much of the force of a crash and can reduce deaths.</li> <li>• Breakaway devices <i>such as breakaway light poles to reduce the risk of serious injury when vehicles hit them. By breaking away at the base, drivers don't hit a strong unyielding object.</i></li> <li>• Clear zone widening (an area adjacent to the roadway is <i>cleared of hazards such as trees</i>) <i>to allow space for drifting vehicles to either maneuver back onto the roadway or reduce the chance or severity of a collision.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol and drug): General population</li> <li>• Environmental Factors: Motor carriers, General population</li> </ul>	<ul style="list-style-type: none"> <li>• Energy absorbing barrier ends can reduce fatalities by up to 78% and injuries by up to 68%.<sup>8</sup></li> <li>• Breakaway devices can reduce fatalities and serious injuries by up to 30%.<sup>8</sup></li> <li>• Clear zone widening will reduce crashes by 44%.<sup>17</sup></li> </ul>
I-5	Grade separation (overpasses) 	<p>Grade separations are used to:</p> <ul style="list-style-type: none"> <li>• separate road user classes from motor vehicle traffic using pedestrian bridges, tunnels, or a combination of both, or</li> <li>• separate vehicles at an intersection.</li> </ul>	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol and drug): General population</li> </ul>	<ul style="list-style-type: none"> <li>• Crash reduction factors (CRF) range from 67% to 90% for vehicle/pedestrian crashes.<sup>16</sup></li> </ul>
I-6	Sign conspicuity and reflectivity 	<p>Conspicuity of road signs through colour and size increase the road user's understanding/awareness and compliance of the driving environment.</p>	<ul style="list-style-type: none"> <li>• Environmental Factors: Speed and Aggressive Driving: Medically-at-risk-drivers, General population</li> <li>• Impaired Driving (fatigue): General population</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing conspicuity of signage by using illumination can reduce all types of collisions by 15%.<sup>16</sup></li> </ul>
I-7	Transition zones 	<p>Traffic calming strategies in residential areas and transition zones aid to reduce speed.</p>	<ul style="list-style-type: none"> <li>• Speed and Aggressive Driving: Vulnerable road users, General population</li> <li>• Speed and Aggressive Driving: Vulnerable road users</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in all crash types range from 8% to 29%.<sup>18</sup></li> </ul>
















<b>“PROVEN” INFRASTRUCTURE INITIATIVES</b>				
<b>Ref #</b>	<b>Title</b>	<b>Description</b>	<b>Applicable uses by causal factor and associated risk groups</b>	<b>Potential Performance / Indicator</b>
I-8	Reduce speed limits 	The reduction of speed in residential and urban areas decreases all crash types.	<ul style="list-style-type: none"> <li>Environmental Factors: General population, Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>15% reduction in posted speed limit reduces all crash types by 44%. <sup>16</sup></li> </ul>
I-9	Collision prone locations program 	The use of network screening is a process for reviewing a transportation road network to identify and rank sites from the most likely to the least likely to benefit from a safety improvement. High-crash locations relating to speed and aggressive driving can be identified in order to introduce infrastructure and/or enforcement strategies (e.g. reduce speed limits) where needed.	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving: High-risk drivers</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in total crashes by 26%. <sup>19</sup></li> </ul>
I-10	Variable / seasonal speed limits (i.e., Confederation Bridge) 	The use of variable speed limits allows road authorities to dynamically change the speed limit (using variable message signs) based upon adverse weather conditions and real-time traffic speed and flow data. Downstream reductions in speed are forecasted in advance to indicate roadway conditions ahead which require drivers to slow down.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers, General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) range from 41% to 46% for all crash types. <sup>16</sup></li> </ul>
I-11	Access control / by passes 	Managed access control balances the competing needs of traffic movement and lane use. Too many access points to a roadway increases the vehicle speed variance and conflict points between all road users.	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving: General population</li> <li>Environmental Factors: Motor carriers, General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) is 40% for all crash types. <sup>16</sup></li> </ul>
I-12	Jersey barriers and guardrails 	Jersey barriers and guardrails make infrastructure more forgiving where we know users are most at risk, by preventing vehicles from crossing over into oncoming traffic lanes.	<ul style="list-style-type: none"> <li>Occupant Protection: General population</li> </ul>	<ul style="list-style-type: none"> <li>Fatal crashes can be reduced by up to 52%. <sup>17</sup></li> </ul>

<b>“PROVEN” INFRASTRUCTURE INITIATIVES</b>				
<b>Ref #</b>	<b>Title</b>	<b>Description</b>	<b>Applicable uses by causal factor and associated risk groups</b>	<b>Potential Performance / Indicator</b>
I-13	Improve intersection 	Use of modified intersections (road and curb) paved shoulders/refuge, corner bulges, refuge median, wheelchair curb cuts/ramps allow easier crossings.	<ul style="list-style-type: none"> <li>Environmental Factors: Medically-at-risk-drivers</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) is 25% for all crash types. <sup>17</sup></li> </ul>
I-14	Manage intersections for vulnerable road users 	Scramble intersections, advance pedestrian countdowns, clear sight lines by improving intersection angle limits and roadside furniture placement and fences reduce jaywalking.	<ul style="list-style-type: none"> <li>Environmental Factors: Vulnerable road users</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) range from 5% to 34% for all crash types. <sup>20</sup></li> </ul>
I-15	Positive guidance /pavement markings 	Tools provide information to the driver on the direction of the roadway. Drivers can safely drive the roadway with the help of pavement markings (including edge markings), signs, object markers, safe speed advisory signs and a clear view of the road ahead. Edge markings are often audio tactile reflective markers that are effective countermeasures against single-vehicle run-off road collisions. Increased conspicuity of these markings will also help increase the user's awareness.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers, General population</li> </ul>	<ul style="list-style-type: none"> <li>Reduction of all types of crashes between 8% and 44%. <sup>16</sup></li> </ul>
I-16	Paved shoulders 	Paved shoulders increase the ability of the driver to maintain control of the vehicle if it veers from its path.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers, General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factor (CRF) is 15% for all crash types, 86% for head-on crashes and 62% for nighttime crashes. <sup>16</sup></li> </ul>
I-17	Runaway lanes/escape ramps 	Runaway lanes and escape ramps are designed mainly for trucks in case of emergencies; such as brake failures or overheating; positioned at the bottom of a hill, they provide a safe exit for the trucks to slow down to a halt.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers, General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) are 25% for all crash types, 75% for run-off-road and 33% for rear end crashes. <sup>16</sup></li> </ul>
I-18	Roundabouts 	Roundabouts are an alternative to a standard intersection where traffic flows in a counter-clockwise circle around a centre island.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers, General population</li> </ul>	<ul style="list-style-type: none"> <li>Crashes can be reduced by 40% for all types and by 80% for fatal and injury-related crashes. <sup>15</sup></li> </ul>





<b>“PROVEN” INFRASTRUCTURE INITIATIVES</b>				
<b>Ref #</b>	<b>Title</b>	<b>Description</b>	<b>Applicable uses by causal factor and associated risk groups</b>	<b>Potential Performance / Indicator</b>
I-19	Advance intersection notification 	The provision of advance notification of an upcoming intersection helps improve the road user’s awareness of the upcoming need to stop, to watch out for oncoming traffic and/or crossing pedestrians.	<ul style="list-style-type: none"> <li>Environmental Factors: Motor carriers, General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) range from 25% to 70% for all crash types.<sup>16</sup></li> </ul>
I-20	2+1 roads with median 	2+1 roads are roads with a continuous three-lane cross section with alternating passing lanes. The directions of travel can be separated by line markings or a cable median barrier. They are installed in order to improve safety on two-lane highways with wide shoulders and wide lanes. They enable drivers to safely make passing maneuvers in the additional third centre lane.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Reduced fatal crashes by 76%.</li> </ul>
I-21	Road safety audits and in-service reviews 	Road safety audits are formal and independent safety performance reviews by an experienced team of safety specialists which address the safety of all road users. It is a tool that explicitly addresses road safety independently at the planning and design stage of a road transportation project and a proactive strategy that aims to lower the collision risk before collisions start occurring.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Reduces all crash types by 30% and injury types by 41%.<sup>18</sup></li> </ul>
I-22	Street lighting and illumination 	General illumination helps road users see upcoming hazards and be seen when road user conspicuity is low.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) range from 20% to 45% for nighttime crashes.<sup>16</sup></li> </ul>
I-23	Passing lanes 	Passing lanes added to a two-lane highway are limited lengths of road which give drivers a chance to safely pass slower moving vehicles, reducing the temptation to take risks.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Reductions range from 38% for all crash types and 29% for severe crashes.<sup>17</sup></li> </ul>

## “PROVEN” INFRASTRUCTURE INITIATIVES


Ref #	Title	Description	Applicable uses by causal factor and associated risk groups	Potential Performance / Indicator
I-24	Road alignment and curve flattening 	Horizontal curves with sharp (small) radii require more driver attentiveness and tend to be associated with a higher crash risk. Safety is usually improved by flattening curves to increase the radius.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) range from 39% to 87% for all crash types. <sup>16</sup></li> </ul>
I-25	Bus and high occupancy vehicle lanes 	Bus lanes and high occupancy vehicle lanes/travel demand management/improve timing signal/clearance interval can have positive safety implications.	<ul style="list-style-type: none"> <li>Environmental: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) range from 27% to 87% for various crash types. <sup>16</sup></li> </ul>
I-26	Longer pedestrian signals at crosswalks 	Longer pedestrian signals provide a greater clearance time for the pedestrians to cross safely. The lead pedestrian signal is a device that gives the pedestrians a head start over left and right turning vehicles at the start of the WALK. Pedestrians crossing the main line receive a 4 second exclusive pedestrian phase while all vehicle signals remain in an all red phase. This provides a longer clearance time for the pedestrians as well as making them more visible to the turning vehicles. Delayed pedestrian phasing detects pedestrians still in the intersections and delays the amber light so that the pedestrian has sufficient time to cross.	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving: General population, Young drivers, Medically-at-risk-drivers</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factor (CRF) is 37% for fatal and injury crashes. <sup>20</sup></li> </ul>
I-27	Improve signage at railway grade crossings 	Warning signs and devices, such as flashing lights and crossing gates along the roads near railroad tracks, regulate, warn or guide traffic. They alert drivers and other road users to the presence of railroad tracks and to the possibility of an approaching train.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction ranges from 46% to 84% for all crash types. <sup>17</sup></li> </ul>

“PROVEN” INFRASTRUCTURE INITIATIVES				
Ref #	Title	Description	Applicable uses by causal factor and associated risk groups	Potential Performance / Indicator
I-28	Highway messaging signs 	Highway messaging signs (regulatory /warning /guidance and informational) advise drivers of regulations for non-drinking and driving and compulsory seat belt use.	<ul style="list-style-type: none"> <li>Impaired Driving (alcohol and drugs): Young drivers</li> </ul>	<ul style="list-style-type: none"> <li>Crash reduction factors (CRF) range from 7% to 15% for all crash types. <sup>16</sup></li> </ul>
I-29	Wind breaks/snow hedges 	Reduce collisions and operational cost by reducing blowing and drifting snow.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (quantifiable data unknown).</li> </ul>
I-30	Fixed Automated Spray Technology (FAST) 	Reduce accidents by automated de-icing of ramps	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>100% reduction in crashes at 416/401 as a result of ice on ramp.</li> </ul>
I-31	Safety edge on pavements 	Reduce severity of road run-off on to shoulder by constructing beveled edge of pavement (proven in other jurisdictions, being tested by MTO)	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Evidence from other jurisdictions (FHWA).</li> </ul>
I-32	Road Weather Information Systems (RWIS) 	Roadside weather stations providing real-time conditions and supporting pavement forecasts. Better decision making for snow and ice control resulting in reduced accident potential	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (quantifiable data unknown).</li> </ul>
I-33	Anti-icing technology 	Applying de-icing liquids in advance of storms, reducing snow and ice accumulation and enhanced safety conditions for drivers.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (quantifiable data unknown).</li> </ul>
I-34	Pre-wetting of Salt 	Increased efficient use of salt for reducing snow/ice adherence. Improves driving conditions and driver safety.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (quantifiable data unknown).</li> </ul>
I-35	Truck dragnet arrestor system 	A dedicated facility for commercial vehicles with equipment failure (typically brakes) encounters a series of nets attached to steel ribbons. Slows vehicle to stop with minimal less than 1g force. Enhanced safety for vehicle driver and other road users	<ul style="list-style-type: none"> <li>Environmental Factors: General population, Motor carriers</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions and/or use by commercial vehicles (track actual usage of facility on Hwy 11 – Thibeault Hill, North Bay).</li> </ul>
I-36	Rock fall catchment fence 	High energy absorbing rock catchment fence to reduce chance of rock-vehicle collisions and rock debris on road	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (data analysis of historical and future incidents).</li> </ul>


## “PROVEN” INFRASTRUCTURE INITIATIVES


Ref #	Title	Description	Applicable uses by causal factor and associated risk groups	Potential Performance / Indicator
I-37	Signing (“Move Over for Emergency Vehicles” Signs) 	Signs installed to direct drivers to move over for emergency vehicles, improving safety for emergency responders and general public	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (data analysis of historical and future incidents).</li> </ul>
I-38	Advance warning systems at rural high speed signalized intersections (Texas detection system) 	System to reduce high speed collisions at rural intersections.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (report from Lakehead University for MTO on evaluation of installed systems – in final stage of publishing).</li> </ul>
I-39	Mobile barrier system (Balsi Beam) 	Mobile barrier system that protects workers involved in mobile highway operations. Developed in California, MTO is hoping to test summer 2010	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (quantifiable data unknown).</li> </ul>
I-40	Treated sand 	Winter sand treated with anti-icing liquids or salt to improve adhesion to snow/ice and accelerate performance resulting in improved driving conditions compared to non-treated sand	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	<ul style="list-style-type: none"> <li>Crash reductions (quantifiable data unknown).</li> </ul>


### 3. “Proven” Vehicle Initiatives



“PROVEN” VEHICLE INITIATIVES				
Ref #	Title	Description	Applicable uses by causal factor and associated risk groups	Potential Performance / Indicator
V-1	Crash avoidance technologies 	Crash avoidance technologies (i.e. forward collision warning system, lane departure warning system) to reduce the risk of collisions. ESC uses sensors to prevent vehicle roll-over.	<ul style="list-style-type: none"> <li>• Impaired Driving (all): All target groups</li> <li>• Speed and Aggressive Driving: All target groups</li> </ul>	<ul style="list-style-type: none"> <li>• The results of the studies is that ISA systems appear to have a number of positive safety effects on driving speed: ISA equipped vehicles show an average speed reduction of approximately 2 to 7 km/h, as well as a reduction in speed variance and speed violations. The size of these reductions depends on the type of ISA, with more controlling ISA types being more effective. Only one study found an increase in average speed. (Peltola &amp; Kumala, 2000) who investigated the effects of ISA on icy roads. The ISA system gave speed advice that was lower than the general speed limit in force. It appeared, however, that the mean speed of ISA drivers was higher than that of drivers without ISA. A possible explanation could be that the ISA speed advice exceeded the speed that drivers would have chosen themselves.<sup>5</sup></li> </ul>



<b>“PROVEN” VEHICLE INITIATIVES</b>				
<b>Ref #</b>	<b>Title</b>	<b>Description</b>	<b>Applicable uses by causal factor and associated risk groups</b>	<b>Potential Performance / Indicator</b>
V-2	Electronic stability control (ESC) 	ESC is a crash avoidance system that will help drivers stay in control of the vehicle when they need to swerve or brake suddenly to avoid an obstacle	<ul style="list-style-type: none"> <li>• Impaired Driving (all): All target groups</li> <li>• Speed and Aggressive Driving: All target groups</li> </ul>	<ul style="list-style-type: none"> <li>• A formal impact assessment of Electronic Stability Control in Norway showed that it yielded a benefit-cost ratio of 3.98 and ISA had a benefit-cost ratio of 1.95.<sup>21</sup></li> <li>• A study of the Electronic Stability Control in Canada conducted by Transport Canada indicated that ESC could prevent approximately 29% of fatal and injury causing crashes involving loss of control for light duty vehicles. Transport Canada estimated that there would have been 225 fewer deaths and 755 fewer seriously injured victims in 2006 if all light duty vehicles had been equipped with ESC that year<sup>23</sup>.</li> </ul>







<b>“PROVEN” VEHICLE INITIATIVES</b>				
<b>Ref #</b>	<b>Title</b>	<b>Description</b>	<b>Applicable uses by causal factor and associated risk groups</b>	<b>Potential Performance / Indicator</b>
V-3	After-market electronic vehicle immobilizers 	A device that prevents a vehicle from starting and is designed to reduce vehicle thefts.	<ul style="list-style-type: none"> <li>Environmental Factors: General population, High-risk drivers</li> </ul>	<ul style="list-style-type: none"> <li>In Manitoba the Government passed a Regulation mandating the installation of approved after-market vehicle immobilizers as a condition of registration for most-at-risk vehicles registered in Winnipeg or commuting to Winnipeg. Most-at-risk vehicles are deemed as such based on actual claims experience tracked by Manitoba Public Insurance. MPI funds the cost of the approved immobilizer and a standard installation. As a result of the mandatory immobilizer program, and a complementary program to closely monitor high-risk (Level IV) youth offenders called the Winnipeg Auto Theft Suppression Strategy (WATSS), actual vehicle thefts in the high-risk Winnipeg region decreased by 75% in the twelve month period from March 2009 to February 2010, when compared to total thefts in Winnipeg over the same twelve month period from March 2004 to February 2005.</li> </ul>






<b>“PROVEN” VEHICLE INITIATIVES</b>				
<b>Ref #</b>	<b>Title</b>	<b>Description</b>	<b>Applicable uses by causal factor and associated risk groups</b>	<b>Potential Performance / Indicator</b>
V-4	Ignition Interlock Program   PEI implemented a voluntary program in 2007. A mandatory program as of February, 2013 for persons convicted of a DUI offense.	<p>An ignition interlock device or breath alcohol ignition interlock device (IID and BIID) is a mechanism, like a breathalyzer, installed to a motor vehicle's dashboard. Before the vehicle's motor can be started, the driver first must exhale into the device, if the resultant breath-alcohol concentration analyzed result is greater than the programmed blood alcohol concentration — usually 0.02% or 0.04%, the device prevents the engine from being started.</p> <p>Ignition interlock devices help rehabilitate safe and sober driving practices, by preventing a convicted drunk driver from repeating the offence.</p>	<ul style="list-style-type: none"> <li>• Impaired Driving (alcohol and drugs): All target groups</li> </ul>	<ul style="list-style-type: none"> <li>• Research suggests that they effectively reduce the incidences of impaired driving when fitted on the vehicle.</li> <li>• A formal impact assessment of Ignition Interlocks in Norway showed that it yielded a benefit-cost ratio of 8.75.<sup>5</sup></li> </ul>








“PROVEN” VEHICLE INITIATIVES				
Ref #	Title	Description	Applicable uses by causal factor and associated risk groups	Potential Performance / Indicator
V-5	Seat occupant sensors 	Standard rules to require seat occupant sensors in all seating positions for seat belt use	<ul style="list-style-type: none"> <li>Occupant Protection: General population</li> </ul>	<p>Krafft et al. (2006) recently published the results of an observation study among Swedish drivers, irrespective of car brand. A total of more than 3,000 drivers were observed in five different Swedish cities. The study showed that seatbelt use was 99% in cars with a rather intrusive version of the seatbelt reminder (the system proposed by Euro NCAP that has an acoustic signal with increasing volume which continues for at least 90 seconds), 93% for a 'friendly middle' version (a system that uses a light signal and not more than a quiet sound signal), and 83% for cars without any seatbelt reminder. Therefore, acoustic seatbelt reminders are, more effective than visual seatbelt reminders. A formal impact assessment of seat belt reminders in Norway showed that it had a benefit-cost ratio of 16.21.<sup>5</sup></p> <p>SWOV Fact Sheet: Seatbelt reminders, which can be viewed at: <a href="http://www.swov.nl/UK/Research/Publicaties/inhoud/factsheets.htm">http://www.swov.nl/UK/Research/Publicaties/inhoud/factsheets.htm</a><sup>22</sup></p>
V-6	Vehicle Classification Model 	A government tool for proactive identification and evaluation of motor vehicles, including licensing criteria and ‘use’ criteria for numerous types of unusual, modified and imported vehicles appearing on Canada’s roads. The elements of the VCM include motor vehicle type and description, certification, safety compliance, use criteria and inspection. It also includes a discussion forum capability which is confidential among government administrators respecting registration and management of vehicle types.	<ul style="list-style-type: none"> <li>Environmental Factors: General population</li> </ul>	The VCM provides for information and dialogue among Registrars to promote cooperation, harmonization and to ensure only vehicles that are safe are allowed on Canada’s roads.







## Appendix B

### 1. Other Good Initiatives: Road User

OTHER GOOD ROAD USER INITIATIVES				
Ref#	Title	Description	Applicable uses by Causal Factor	Applicable Risk Group
U-27	Substance abuse reporting 	Reporting of substance abusers by doctors (prescription or otherwise) so that driver records can be updated.	<ul style="list-style-type: none"> <li>Impaired Driving: (alcohol)</li> </ul>	<ul style="list-style-type: none"> <li>Medically-at-risk-drivers</li> </ul>
U-28	CCMTA high-risk driver definition 	<p>Driver information systems that can identify high-risk driver as per the following definition:</p> <ul style="list-style-type: none"> <li>- a driver who has been involved in three or more distinct events (a traffic violation (including ALS), a CCC offence or a collision) within a two-year period; or</li> <li>- a driver convicted of a first offence with a BAC of greater than or equal to .16, or refused to provide a breath sample or of a repeat offence (including driving while prohibited or disqualified).</li> </ul>	<ul style="list-style-type: none"> <li>Impaired Driving: (alcohol, drug), Speed and Aggressive Driving, Occupant Protection</li> </ul>	<ul style="list-style-type: none"> <li>High-risk drivers</li> </ul>
U-29	Booze and drug buses 	Mobile dual purpose buses used by the enforcement community aimed at conducting drug and alcohol testing at the roadside. They are usually used for an operation involving a large number of police at a fixed location.	<ul style="list-style-type: none"> <li>Impaired Driving: (alcohol, drug)</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-30	Administrative sanctions independent of CCC convictions 	Administrative sanctions independent of CCC convictions improve the “swift” element of the sanctions and include roadside suspensions (CCMTA Model), mandatory interlock installation for repeat offenders and other immediate consequences of being charged with impaired driving.	<ul style="list-style-type: none"> <li>Impaired Driving: (alcohol, drug)</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-31	Increase look back window for drinking and driving sanctions 	The look back window reflects how far back a search is done for a previous impaired driving offence. A longer look back window increases the number of drivers who will be considered repeat offenders and reduces delaying of cases to have convictions not counted.	<ul style="list-style-type: none"> <li>Impaired Driving (alcohol, drug):</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-32	Lower BAC drinking driver strategy 	The strategy to address lower BAC drinking drivers is a comprehensive, integrated and tiered BAC system. Key elements are: immediate roadside suspensions, surrender of the driver licence, an assessment, ignition interlock, a licence reinstatement fee.	<ul style="list-style-type: none"> <li>Impaired Driving (alcohol, drug):</li> </ul>	<ul style="list-style-type: none"> <li>General population, High-risk driver</li> </ul>






OTHER GOOD ROAD USER INITIATIVES				
Ref#	Title	Description	Applicable uses by Causal Factor	Applicable Risk Group
U-33	Reduce suspensions with participation in the ignition interlock program 	Reduced periods of prohibition increase significantly the number of drivers that make use of alcohol ignition programs.	<ul style="list-style-type: none"> <li>Impaired Driving: (alcohol, drug)</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-34	Ignition Interlock Standard 	The technical standard for vehicular breath alcohol interlock devices sets the performance criteria for ignition interlock devices and describes manufacturer funded device certification testing, which can be done in private testing facilities or by the Alcohol Test Committee of the Centre for Forensic Sciences. The national standard promotes reciprocal arrangements among jurisdictions.	<ul style="list-style-type: none"> <li>Impaired Driving: (alcohol, drug)</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-35	Joint police services operations 	Dedicated impaired driving enforcement teams have realized significant reductions in impaired driving collision fatalities and serious injuries.	<ul style="list-style-type: none"> <li>Impaired Driving: (alcohol, drug)</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-36	National ignition interlock reciprocity 	National interlock reciprocity facilitates drivers who move permanently from one jurisdiction to another to continue with the program in a new jurisdiction.	<ul style="list-style-type: none"> <li>Impaired Driving: (alcohol, drug)</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-37	Medical screening and intervention 	<p>Medical screening and intervention involves the deployment of health professionals in screening to detect those at risk of unsafe driving and to assist aging and medically at-risk drivers to access information on healthy aging and maintaining mobility. The screening process attempts to distinguish between those who require further assessment of their driving safety and those who are most likely safe drivers.</p> <p>Assessment following screening is a more detailed evaluation of driving abilities and safety performed by a health professional with expertise in driving evaluation.</p> <p>The intervention stage uses the results from the screening assessment stages to offer options and alternatives to improve driver safety or wean drivers off driving. It involves the use of specialized expertise in training/retraining of driving skills, and the use of assistive technology for driving among others.</p>	<ul style="list-style-type: none"> <li>Impaired Driving: (fatigue)</li> <li>Impaired Driving: (fatigue)</li> </ul>	<ul style="list-style-type: none"> <li>Medically-at-risk-drivers</li> <li>Motor carrier, General population</li> </ul>
U-38	Employers'	Employer programs which prohibit the use of technologies that distract	<ul style="list-style-type: none"> <li>Impaired Driving:</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>

OTHER GOOD ROAD USER INITIATIVES				
Ref#	Title	Description	Applicable uses by Causal Factor	Applicable Risk Group
	policies to restrict exposure to distractions 	drivers and educates employees about the dangers of distracted driving.	(distraction)	
U-39	Driver training for ATVs/ motorcycles 	Compulsory driver and safety training for motorcycle, ATV and snowmobile operators help reduce the risk to those who do not have a driver's licence.	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving</li> </ul>	<ul style="list-style-type: none"> <li>Vulnerable road users</li> </ul>
U-40	Comprehensive data exchange between jurisdictions 	The Interprovincial Record Exchange (IRE) exists for a number of driver and vehicle application suites. The applications support the Canadian Driver Licence Agreement and the one driver, one record, one licence concept.	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving</li> </ul>	<ul style="list-style-type: none"> <li>High-risk drivers</li> </ul>
U-41	Vehicle impoundment 	Vehicle impoundment is a program whereby a vehicle is immediately towed to an impound yard for a minimum period of time usually anywhere from 2 to 60 days depending on the offence resulting from the actions of the driver. The vehicle that is driven at the time of the occurrence is the one that is impounded regardless of whether the vehicle is borrowed, used for business or employment purposes, rented or leased. The vehicle owner or plate holder must pay the towing and storage costs before the vehicle is released at the end of the impoundment period. Examples currently being used in jurisdictions in Canada relate to street racing, driving without a valid driver licence, driving while prohibited or suspended.	<ul style="list-style-type: none"> <li>Impaired Driving (alcohol, drug)</li> <li>Occupant Protection, Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>High-risk driver</li> <li>General population</li> </ul>
U-42	Pace Car Program 	A pace car program entails placing vehicles driving at the speed limits to set the pace for other vehicles.	<ul style="list-style-type: none"> <li>Speed</li> <li>Aggressive Driving</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-43	Driver responsibility for seat belts 	The driver of a light duty vehicle is responsible for all passengers rather than just those under 16.	<ul style="list-style-type: none"> <li>Occupant Protection</li> </ul>	<ul style="list-style-type: none"> <li>Medically-at-risk-drivers</li> <li>General population</li> </ul>
U-44	Periodic driver referral / screening 	This encompasses procedures to detect functionally impaired aging and medically at-risk drivers who pose an elevated risk to themselves and others. It involves putting a mechanism in place that would result in re-examinations of aging and medically at-risk drivers referred by law enforcement, medical and vision specialists, therapists, the courts, and concerned family members. A re-examination generally consists	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>Medically-at-risk-drivers</li> </ul>





OTHER GOOD ROAD USER INITIATIVES				
Ref#	Title	Description	Applicable uses by Causal Factor	Applicable Risk Group
		of medical and/or vision evaluation of the driver usually submitted by a physician, a written test and driving skills testing.		
U-45	Conditional licensing 	Conditioning licensing allows older drivers or drivers with medical conditions to retain some mobility and protects them from more dangerous traffic scenarios. Refer to CCMTA's 2008 Aging Driver Strategy.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>Medically-at-risk-drivers</li> </ul>
U-46	Expanded road safety partnerships 	Road safety is a shared responsibility involving collaboration between multi-disciplinary road safety stakeholders. Partnerships are an effective means of ensuring stakeholders view the problem and solutions holistically and collaboratively.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-47	Road safety champion 	A high-level road safety champion speaking to the media, public and road safety agencies will help to give focus to the road safety problem. This person will ensure that road safety is placed on the public agenda and that it is treated as an important public/government priority.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-48	Winter and shoulder season driving and 511 # 	Drivers can find information on current road conditions which allows them to make informed trip decisions.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-49	Operation Safe Driver 	<p>This is a CVSA initiative, usually staged in Sept/Oct involving a number of strategies aimed at educating commercial and non-commercial drivers with regards to fatigue, safe driving, proper driving techniques, use of seat belts and the hazards associated with operating around commercial vehicles as well as the role of enforcement agencies in providing a safe and secure place to travel.</p> <p>This initiative has received an endorsement by the Canadian Association of Chiefs of Police.</p>	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
U-50	Chain of responsibility 	A program comprising investigations to determine culpability and to assign responsibility through charges to the shipper, driver, carrier and/or receiver for the safe loading and operation of trucks used to move goods.	<ul style="list-style-type: none"> <li>Impaired Driving: (fatigue)</li> </ul>	<ul style="list-style-type: none"> <li>Motor carriers</li> </ul>








## 2. Other Good Initiatives: Infrastructure

OTHER GOOD INFRASTRUCTURE INITIATIVES				
Ref#	Title	Description	Applicable uses by causal factor	Applicable uses by risk group
I-41	<b>Pull-outs</b> 	Design infrastructure that supports additional pull-outs when testing for impaired driving as well as load securement and emergency stopping of commercial vehicles.	<ul style="list-style-type: none"> <li>• Impaired Driving: (alcohol and drugs)</li> <li>• Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>• Motor carriers</li> <li>• General population</li> </ul>
I-42	<b>Rest areas</b> (Borden Scales) 	Rest areas for commercial motor vehicles addresses issues of driver fatigue and load securement, and reduces roadside stopping that may pose hazards to other road users.	<ul style="list-style-type: none"> <li>• Impaired Driving: (fatigue and distraction)</li> <li>• Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>• All target groups</li> <li>• Motor carriers</li> </ul>
I-43	Designated truck lanes 	Use of designated truck lanes, increase use of lane delineation/right lane on 4-lane highways and truck climbing lanes contribute to road safety.	<ul style="list-style-type: none"> <li>• Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>• Motor carriers</li> </ul>
I-44	Accommodating intersections for large vehicles 	Where large vehicles are prevalent in an urban environment, intersection design that can safely accommodate all road users. Many intersections are designed with a turning radius that does not support the safe and efficient manoeuvring of large commercial vehicles. This can cause conflict with the vulnerable road users, especially in an urban environment.	<ul style="list-style-type: none"> <li>• Speed and Aggressive Driving</li> </ul>	<ul style="list-style-type: none"> <li>• Motor carriers</li> </ul>
I-45	Motorcycle friendly barriers 	Crash barriers that save the lives of car occupants can cause devastating injuries to motorcyclists. Barriers can be designed to absorb an impact with a motorcycle in order to reduce the severity of the collision.	<ul style="list-style-type: none"> <li>• Speed and Aggressive Driving</li> </ul>	<ul style="list-style-type: none"> <li>• Vulnerable road users</li> </ul>








## OTHER GOOD INFRASTRUCTURE INITIATIVES

Ref#	Title	Description	Applicable uses by causal factor	Applicable uses by risk group
		These barriers have more ‘give’ than regular barriers. They are designed with less “aggressive” features such as lower rails to prevent riders from hitting crash barrier support posts.		
I-46	Coordinate bus stops with crosswalks 	Bus stops with crosswalks can be coordinated in such a way that the stopped bus does not block the crosswalk or impede the line of site between pedestrians and motor vehicles. Crosswalks should be available to pedestrians to allow them to safely cross the street after getting off the bus.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>Vulnerable road users</li> </ul>
I-47	Self-explaining Roads 	Self-explaining roads are roads on which the driver is encouraged to naturally alter his driving behaviour in order to be consistent with the road design and function. The aim of these types of roads is to distinctly identify <u>each class of road</u> that has specific features for all road users, so that when the driver encounters a specific road type he/she will instinctively know how to behave (speed, overtaking, etc.).	<ul style="list-style-type: none"> <li>Speed and Aggressive Driving</li> </ul>	<ul style="list-style-type: none"> <li>Vulnerable road user</li> <li>General population</li> </ul>
I-48	Work zone management 	Work zone safety includes proper signs, guidance and warning devices near work zones including strategies such as accelerated construction to minimize exposure to the road users and the work crew.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-49	Winter road maintenance 	Winter road maintenance provides real-time response and mitigation to adverse weather road conditions by such measures	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>Motor carriers</li> <li>General population</li> </ul>

## OTHER GOOD INFRASTRUCTURE INITIATIVES




Ref#	Title	Description	Applicable uses by causal factor	Applicable uses by risk group
		as clearing surfaces and increasing the road surface friction, using sand, salt or other chemical agents. Weather information system technologies have shown promise for timely responses from winter road crews as well as providing driver notification for trip planning.		
I-50	Pedestrian detectors at crosswalks 	Pedestrian detection systems provide the means to detect the presence of pedestrians as they approach the curb prior to crossing the street, and then activate the walk signal without any action required on the part of the pedestrian.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>Medically-at-risk-drivers</li> </ul>
I-51	Chirping pedestrian signals (Accessible Pedestrian Signals – APS) 	Chirping pedestrian signals emit auditory cues for pedestrians to alert them that they have the right of way at an intersection or crosswalk. They help improve safety, especially to the visually impaired, by communicating when it is safe to cross the street.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>Medically-at-risk-drivers</li> </ul>
I-52	Decision sight distance 	A clear line of sight allows the driver ample time for corrective manoeuvring or reaction time that may be necessary due to obstacles or oncoming vehicles that may cause conflicts.	<ul style="list-style-type: none"> <li>Environmental Factors:</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-53	Dedicated and separate pedestrian and cycling lanes 	Separate cyclists and pedestrians through dedicated trails and lanes.	<ul style="list-style-type: none"> <li>Impaired Driving (alcohol and drugs)</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-54	Under body finger plows 	A new type of blade that removes snow from ruts in road aiding in snow and ice removal and resulting in safer driving conditions	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>

## OTHER GOOD INFRASTRUCTURE INITIATIVES

Ref#	Title	Description	Applicable uses by causal factor	Applicable uses by risk group
I-55	Hot water sander 	Adds hot water to sand resulting in increase friction on snow covered highways (Class V in Ontario) for a longer period of time, providing increase safety	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-56	Managing traffic through highway work zones 	A number of research projects have been completed by different institutions for MTO (Carleton, U of T, Waterloo) on managing traffic in highway work zones identifying strategies that protect drivers and highway workers	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-57	Advanced vehicle control systems supporting ITS 	A research project was completed by Ryerson (2007/08) in improve road safety by investigating how the vision of individual drivers can be extended beyond his/her physical boundary through the use of inter-vehicle communication technology.	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-58	Orange pavement markings in construction zones 	Using orange coloured pavement markings to increase driver awareness of being in construction zone and modify driving behaviour, creating a safer driving environment	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-59	Splatter paint 	MTO has tested three-dimensional splatter markings to increase the durability and visibility of pavement markings under wet conditions to improve safety	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-60	Effects of winter weather and maintenance treatments on highway safety 	A research project was completed by University of Waterloo (2004/05) to analysis and identify winter maintenance processes/activities that can be changed to increase safety to drivers	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>
I-61	Wildlife detection system 	MTO has tested a system that detects wildlife activity in an area and sends an	<ul style="list-style-type: none"> <li>Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>General population</li> </ul>

OTHER GOOD INFRASTRUCTURE INITIATIVES				
Ref#	Title	Description	Applicable uses by causal factor	Applicable uses by risk group
		automated warning to drivers using roadside signing		

### 3. Other Good Initiatives: Vehicles

OTHER GOOD VEHICLE INITIATIVES: APPLICABLE USES				
Ref#	Title	Description	Applicable uses by causal factor and associated risk groups	Applicable uses by risk group
V-7	Speed limiting technologies for commercial vehicles 	Promote the use of commercial vehicle speed limiters. They were examined extensively by Ontario and Transport Canada prior to their introduction in January 2009 in Ontario and Quebec. Ontario is conducting an evaluation of the first year of the speed limiter program. This has the potential to be extended to other target audiences.	<ul style="list-style-type: none"> <li>• Speed</li> <li>• Aggressive Driving</li> <li>• Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>• Motor Carriers, Young drivers, Motor carriers, High-risk drivers</li> </ul>
V-8	Vehicle fleet renewal 	Programs that encourage vehicle fleet renewal with the rationale that newer vehicles provide better occupant protection/crash avoidance or mitigation.	<ul style="list-style-type: none"> <li>• Environmental Factors</li> </ul>	<ul style="list-style-type: none"> <li>• General population</li> </ul>
V-9	Police in car- video cameras for impaired driving evidence gathering 	Police in-car video cameras show the vehicle action and driver behaviour as the officer observes it. Such evidence facilitates officer safety, guilty pleas and reduces arguments related to whether the officer had sufficient suspicion to stop the vehicle and test the driver.	<ul style="list-style-type: none"> <li>• Impaired driving (alcohol and drugs)</li> </ul>	<ul style="list-style-type: none"> <li>• General population</li> </ul>

## Appendix A and Appendix B - Sources:

- <sup>1</sup> Compendium of Road Safety Initiatives [http://publications.apec.org/publication-detail.php?pub\\_id=449](http://publications.apec.org/publication-detail.php?pub_id=449)
- <sup>2</sup> Prospect for Improving Road Safety in Norway, which can be viewed at: <http://www.nordicroads.com/website/index.asp?pageID=203>
- <sup>3</sup> CBC News: <http://www.cbc.ca/news/canada/prince-edward-island/story/2013/06/04/pei-drunk-drivers-911-rcmp-584.html>.
- <sup>4</sup> SWOV Fact Sheet: Driving under the influence of alcohol, which can be viewed at: <http://www.swov.nl/UK/Research/Publicaties/inhoud/factsheets.htm>
- <sup>5</sup> 'Countermeasures That Work: A Highway Safety Countermeasure Guide For State Highway Safety Offices, Fifth Edition 2010'
- <sup>6</sup> A report on the Utility of the Automated Licence Plate Recognition System in British Columbia: I Cohen, D. Plecas and A. McCormick, School of Criminology and Social Justice, University College of the Fraser Valley: 2007
- <sup>7</sup> AAASCHOOL SAFETY PATROL™ PROGRAM
- <sup>8</sup> Determining Medical Fitness to Operate a Motor Vehicle: CMA's Driver's Guide, 7<sup>th</sup> Edition
- <sup>9</sup> Ontario Ministry of Transportation Website: <http://www.mto.gov.on.ca/english/safety/seatbelt.shtml>
- <sup>10</sup> American Academy of Pediatrics: Children in Pickup Trucks, Committee on Injury and Poison Prevention. Pediatrics, Vol. 106 No. 4 October 2000, pp. 857-859
- <sup>11</sup> National Survey of Drinking and Driving Attitudes and Behavior: 1999, Volume 1: Findings. Washington, DC: US Dept of Transportation
- <sup>12</sup> *MADD: 2004 Child Endangerment Report: Every Child Deserves a Designated Driver.*
- <sup>13</sup> National Highway Traffic Safety Administration, 2000. DOT Report HS 809 190 from 1988 through 1996, an estimated 149,000 child passengers were non-fatally injured in crashes involving a drinking driver. Of these, 58,000 (38.9 percent) were riding with a drinking driver when injured in the crash.
- <sup>14</sup> Transportation Research Part A: Policy and Practice: Volume 44, Issue 3, March 2010, Pages 182-193: "Evaluating the Impact of Legislation Prohibiting Hand-Held [Cell Phone](#) Use While Driving", Sheldon H. Jacobson
- <sup>15</sup> National Cooperative Highway Research Program: Research Results Digest 299 <http://onlinepubs.trb.org/>
- <sup>16</sup> Crash Modification Factors Clearinghouse [www.cmfclearinghouse.org/](http://www.cmfclearinghouse.org/)
- <sup>17</sup> Transport Canada: Road Safety Benchmarks Over Time <http://www.tc.gc.ca/eng/roadsafety/tp-tp14328-menu-176.htm>
- <sup>18</sup> Transport Canada and the Canadian Council of Motor Transport Administrators: Rural Road Safety Survey, 2007
- <sup>19</sup> MDOT, Highway Safety Improvement Program, Annual Report for the Period Ending Dec 31, 1997
- <sup>20</sup> Federal Highway Administration: Toolbox of countermeasures and Their Potential Effectiveness for Roadway Departure Crashes
- <sup>21</sup> SWOV Fact Sheet: Police enforcement and driving speed, which can be viewed at: <http://www.swov.nl/UK/Research/Publicaties/inhoud/factsheets.htm>
- <sup>22</sup> SWOV Fact Sheet: Seatbelt reminders, which can be viewed at: <http://www.swov.nl/UK/Research/Publicaties/inhoud/factsheets.htm>
- <sup>23</sup> Transport Canada: "A Study of the Effectiveness of Electronic Stability Control in Canada", 2009.

## **Appendix C Contributing Resources**

The Department of Transportation and Infrastructure Renewal is focused on helping to achieve a consistent downward trend in both traffic fatalities and injuries resulting from road collisions. A number of key documents influenced the development of the TIR RSS 2015:

### **Road Safety Vision 2001**

The Road Safety Vision 2001 (released in 1996) was adopted by the Canadian Council of Motor Transport Administrators (CCMTA) and endorsed by the Ministers of Transportation and Highway Safety. The Vision document was an initiative to make Canada's roads the safest in the world. It was implemented to address levelling off of annual reductions in fatalities and injuries and to re-energize stakeholders to utilize collaborative approaches. The initiative committed all provinces and territories to 4 priorities:

- raising public awareness of road safety issues;
- improving communication, coordination and collaboration among road safety agencies;
- developing more efficient enforcement to deal with problem areas, e.g., impaired driving, non-use of seat belts, repeat offenders, and high-risk drivers; and,
- improving the collection and quality of data to ensure road safety programs are practical and cost effective.

### **Road Safety Vision 2010**

The aim of the Road Safety Vision 2010 (released in 2005) was to reduce the average number of fatalities and serious injuries by 30 % from 2008 to 2010 comparable 1996-2001 figures.

### **Road Safety Strategy 2015**

The Road Safety Strategy 2015(released in 2011) represents an overarching framework that provides a baseline for the development of individual jurisdictional plans. Key elements include no hard targets, a best practice framework, and a flexibility that allows each jurisdiction to tailor strategies to align with their own unique situations.

### **United Nations Decade of Action for Road Safety 2011 – 2020**

The Decade of Action for Road Safety 2011-2020 is a United Nations initiative aimed at reducing the projected global road traffic deaths by 50 % over the next ten years. The pillars of the action plan are road safety management; safer roads and mobility; safer vehicles; safer road users; and post-collision response.

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- Image 2**      **Page 1: Robert Vessey, Minister of Transportation and Infrastructure Renewal**  
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- Image 3**      **Page 3: Canada's Road Safety Strategy 2015, "Rethink Road Safety" logo.**  
Credit: Canadian Council of Motor Transport Administrator's (CCMTA)  
Web: <http://www.ccmta.ca/crss-2015/tools.php>
- Image 4**      **Page 5: Graphical depiction of the three E's (Engineering, Education, and Enforcement) and their interactive relationship with highway safety.**  
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## **Acknowledgements**

The author is indebted to everyone who supplied information and or expertise for this report. A special thank you is extended to the following individuals within the Department of Transportation and Infrastructure Renewal:

- John MacDonald, Director, Highway Safety;
- Graham Miner, Registrar, Highway Safety;
- Doug MacEwen, Safety Co-Ordinator, Highway Safety;
- Darren Chaisson, Director, Highway Maintenance;
- Allan Aitken, Traffic Operations Engineer, Capital Projects;
- Darrell Evans, Manager, Design and Bridge Maintenance, Capital Projects;
- Brian Thompson, Director, Land and Environment; and,
- Brad Chatfield, TIR Communications Officer, Communications PEI.

Printed by Document Publishing Centre, Charlottetown, PEI.

Prepared by Deborah Hagen, Government of Prince Edward Island



# Transportation and Infrastructure Renewal