DECISION/DIRECTION NOTE

Title:	2018 Traffic Pilot Projects
Date Prepared:	March 5, 2020
Report To:	Committee of the Whole
Councillor and Role:	Sandy Hickman - Transportation
Ward:	Ward 2 & 4

Decision/Direction Required:

Decision is required on whether the City of St. John's should permanently implement the changes tested in the 2018 traffic pilot projects.

Discussion – Background and Current Status:

In February/March of 2018 City Council Directives R2018-02-19/13 and R2018-03-05/11 approved the implementation of the following transportation pilot projects. These projects were developed in response to specific local traffic concerns and were intended to test effectiveness of new treatments, improve overall traffic flow, enhance pedestrian safety, and reduce the number of potential conflict points between vehicles and/or pedestrians in project areas.

1. Rawlins Cross – Unsignalized Traffic Circulation
2. Ladysmith Drive at Kiwanis Street – Curb extensions and crosswalk
3. Freshwater Road at Pennywell Road, Cookstown Road, and Field Street – Guide Islands
4. Military Road at Bannerman Park – Curb extensions and crosswalk
5. Terra Nova Road and Wishingwell Road – Curb extensions
6. Tree Top Drive – Neighbourhood Street Art Painting

Council decided that unlike pilot projects previously completed, the 2018 pilot projects would remain in place over the winter and until evaluation of the projects was completed. There was some initial delay in implementing these projects as the initial designs were reviewed to ensure the temporary configurations would accommodate winter maintenance operations.

The first two projects on this list were completed in 2018. Subsequently, the Tree Top Drive street painting project was canceled in absence of community support (Council Directive R2018-11-19/12) and installation of the other pilot projects was deferred (City Council Directive R2018-12-03/1) until such time as those that were already in progress were completed and implemented.

Prior to making any changes, background data (such as speed, traffic counts, pedestrian counts) was collected at the Rawlins Cross and Ladysmith Drive/Kiwanis Street project locations. The City issued a media release, YouTube video, multiple PSAs regarding the projects, and held a public information session on the Rawlins Cross project at the Bannerman Park Pool House on July 25, 2018 to provide more information for people interested in the project and an opportunity to ask questions of staff.

The Ladysmith Drive/Kiwanis Street and Rawlins Cross pilot projects were implemented in June 2018 and in August 2018 respectively. They have been monitored since by the City's Transportation Engineering group. General feedback on the projects was collected and a public survey on the projects was conducted from April 16, 2019 to May 15, 2019. Approximately 2,500 people responded in total with 685 of these commenting on the Ladysmith pilot project and about 2,150 commenting on the Rawlins Cross pilot.

Over the course of the pilot the crosswalk at Ladysmith and Kiwanis did attract new pedestrian traffic. Unfortunately, the pedestrian volume still falls well below technical warrants for a marked crosswalk. A majority of feedback on this project was also negative, primarily from drivers who felt the curb extensions impacted them negatively.

The traffic circle configuration of Rawlins Cross was successful in achieving low speeds and reducing collisions. Vehicle delays were slightly higher on some approaches at peak times but otherwise delay through the area was also lower. Pedestrian volumes did not appear to be affected and pedestrian delay was reduced.

There was a significant amount of feedback expressing concerns for pedestrian safety as part of the Rawlins Cross pilot. There was also a substantial amount of unsolicited feedback indicating support for the project and a preference for the pilot configuration. Many comments also took the form of " I like the pilot project but…" and went on to specify a personal concern with an aspect of Rawlins Cross such as pedestrian safety or driver behaviour.

Key Considerations/Implications

1. ***Budget/Financial Implications***

   For Rawlins Cross a provisional budget of $1M has been identified to address the changes required to make the traffic circle configuration permanent. This budget would need to be supplemented by rehabilitation funding to address current pavement conditions, possibly additional capital funding to improve underground infrastructure, and another allocation would need to be made for the costs associated with any public space improvements.

   Council has reserved $150,000 in the 2020 capital budget to complete design work on Rawlins Cross if the traffic circle configuration is to become permanent.

2. *Partners or Other Stakeholders*

There are many community stakeholders that would be involved if Rawlins Cross were to become a traffic circle permanently.

3. *Alignment with Strategic Directions/Adopted Plans*

These pilot projects predate the current strategic plan. However, they directly support the goal to improve safety for all users on a well-maintained street network. Which falls under the strategic direction “A City that Moves”.

4. *Legal or Policy Implication*

N/A

5. *Privacy Implications*

N/A

6. *Engagement and Communications Considerations*

Community engagement will form a part of the design process for Rawlins Cross should Council decide to permanently implement the traffic circle configuration.

City advisory bodies, such as the Inclusion Advisory Committee (IAC) and the Built Heritage Experts Panel (BHEP) as well as people who live in and travel through the area will play a key role in providing input to the design process.

It is important to note that the pilot configuration represents a proof of concept and, if the traffic circle configuration at Rawlins Cross were to be made permanent, that significant changes to the design of the area would occur with the express intent of further improving safety and addressing community concerns.

The city will communicate the final decision of council and next steps for the area via Public Service Announcement on the city’s website. Information that is posted on the city website will also be shared on the city’s social media accounts. Traffic advisories will also be published as required.

7. *Human Resource Implications*

N/A

8. *Procurement Implications*

If Rawlins Cross were to become a traffic circle permanently an RFP for design services would need to be issued as the next step.

9. *Information Technology Implications*

N/A

10. Other Implications:

N/A

Recommendations:

That council direct staff to:

1. remove the pilot curb extensions and marked crosswalk at Ladysmith Drive and Kiwanis Street and monitor Ladysmith Drive for future warranted crosswalk improvements;
2. proceed with design and implementation of a permanent traffic circle configuration for Rawlins Cross;
3. include the closed portion of Military, the existing parking lot, and the existing green space within the centre of Rawlins Cross in the scope for the public space design; and,
4. expand the Key 2 Access pilot project to include the two crosswalks at Rawlins Cross currently equipped with Rectangular Rapid Flashing Beacons (RRFBs).

Prepared by/Date:

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Approved by/Date:

Garrett Donaher, Manager, Transportation Engineering

Attachments:

2018 Traffic Pilot Projects - Final Report

Ladysmith Drive at Kiwanis Street – Curb Extensions and Crosswalk

Background

In response to community requests for a crosswalk on Ladysmith Drive, this pilot trialed a marked crosswalk enhanced with curb extensions created using temporary traffic control islands. Past studies have indicated that a crosswalk is not warranted but feedback from the community has indicated that it would be used if available. This project would test this "if you build it, they will come" premise – the latent pedestrian crossing demand. Figure 1 illustrates the proposed pilot implementation in plan view and Figure 2 shows an isometric aerial view of the installation.

By installing the temporary curb extensions and crosswalk, the crossing distance at the intersection was shortened for pedestrians and visibility was improved. The justification for this project assumed that these changes would attract more pedestrians to the crosswalk (as indicated by community commentary) and slow vehicles down at the crossing, improving safety for all road users.

Figure 1: Ladysmith Drive at Kiwanis Street Pilot Plan

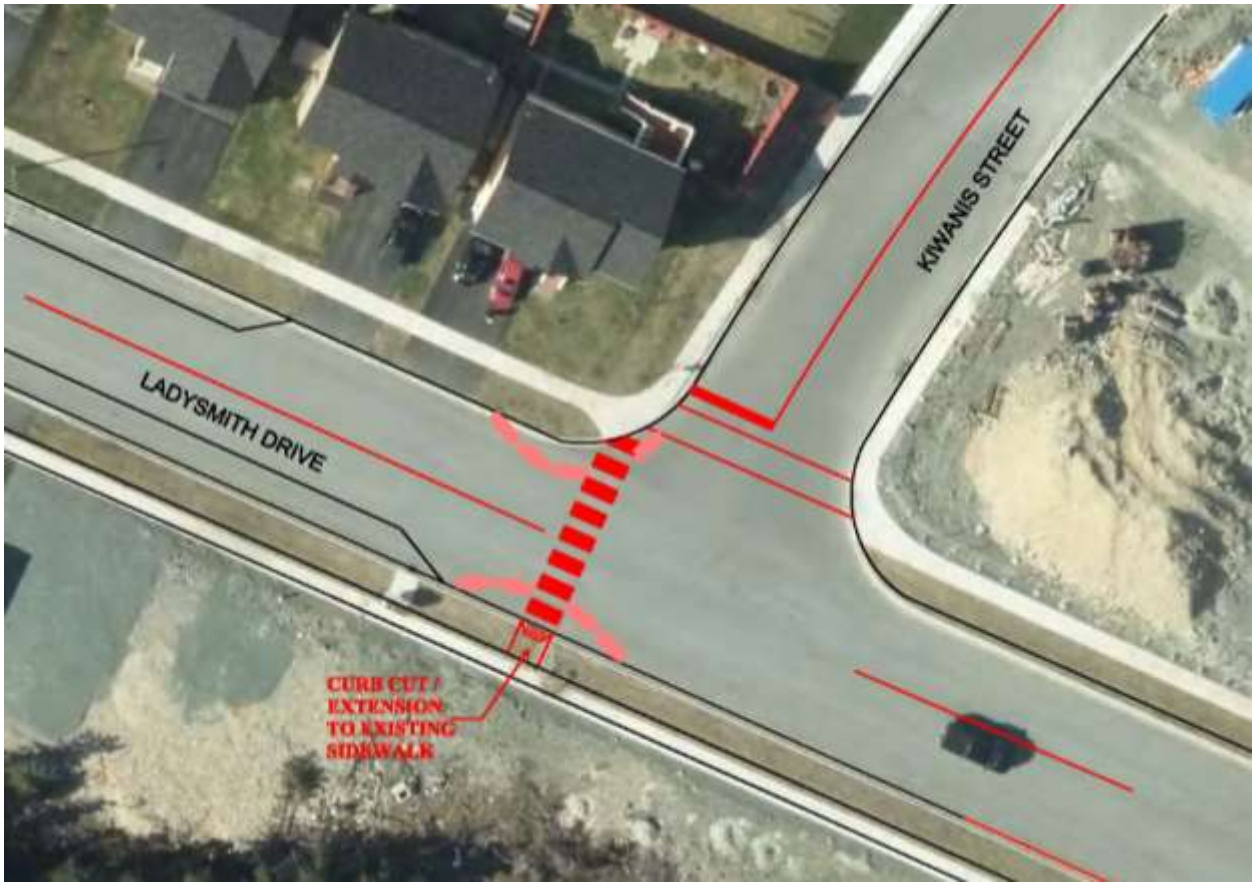


Figure 2: Ladysmith Drive at Kiwanis Street Implemented

Before and After Data Collection

The key performance indicators for this pilot project was the number of pedestrians crossing at the location and the effect on speed along Ladysmith Drive in the area of the intersection.

Speeds along Ladysmith Drive were captures approximately 100m upstream of crossing before and after the pilot project was installed. Four days of speed data was collected in May of 2018 before the pilot was installed and four days of speed data was collected in August of 2019 after the pilot was installed. Although there was evidence of a small reduction in speed northbound on Ladysmith it was not conclusive.

Turning movement counts for traffic and pedestrians were completed on Wednesday, September 21, 2016 and again on Wednesday, October 4, 2017 before the pilot project was implemented during mild weather. Observations were made throughout the early months of implementation and again during the warmer months of 2019. A follow-up traffic and pedestrian count was completed on Wednesday, October 9, 2019. The table below summarizes the 7-hour count of pedestrians crossing Ladysmith Drive at the intersection for each count completed:

Table 1: Ladysmith 7-Hour Pedestrian Crossing Volume

Counted 8:00 - 9:00 AM, 11:00 AM - 1:00 PM, and 2:00 - 6:00 PM	**Before**	**After**	
	September 2016	**October 2017**	**October 2019**
Ladysmith Dr. at Kiwanis St.	0	3	36

As shown, the 7-hour pedestrian crossing volume on Ladysmith Drive increased in 2019. This increased demand may be a result of the pilot crosswalk and/or may also be attributed to a growing number of pedestrians in the area. The volume of pedestrian crossings observed was an average of one person crossing every 12 minutes or five people every hour.

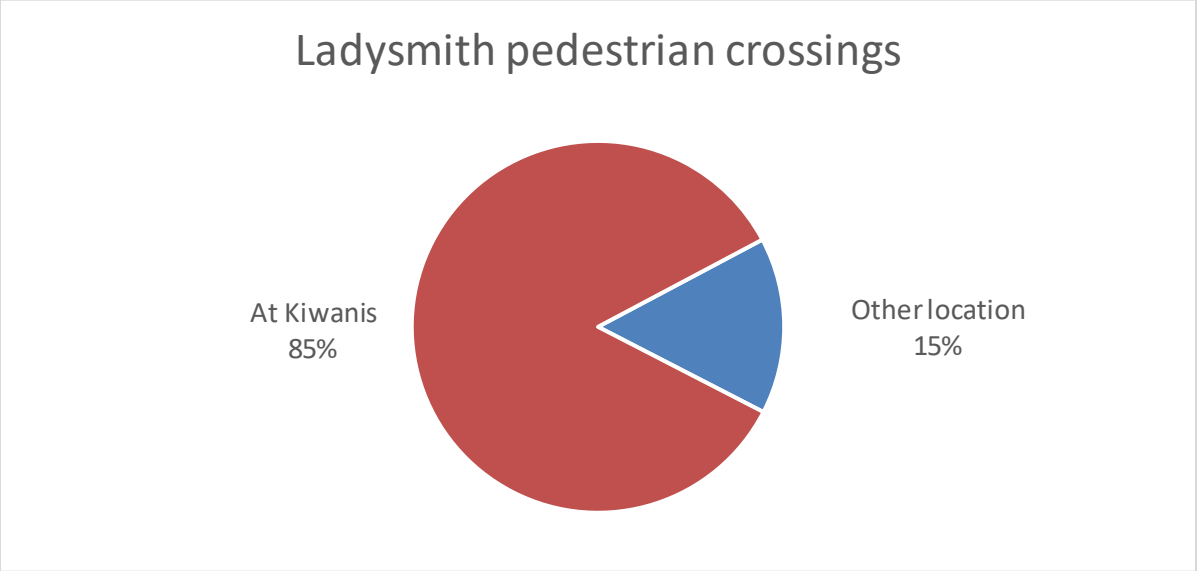
A crosswalk warrant assessment is an engineering tool that provides guidance as to when a crosswalk should be marked (painted and signed) and/or enhanced (with lights, signals, or other treatments). The typical minimum pedestrian volume threshold for warranting a marked crosswalk is an average of 15 EAU (Equivalent Adult Units) per hour over a 7-hour count. The pedestrian volumes captured in 2019 (once factored into EAUs) is approximately 42 crossings or an average of 6 EAUs per hour which is still well below the minimum volume threshold.

Public Survey and Resident/Stakeholder Feedback

A total of 685 survey participants provided feedback on the Ladysmith Drive and Kiwanis Street pilot project through the online survey. Of the folks who responded, 43% said they had used the pilot crosswalk or had crossed at another spot as a pedestrian in the area and 92% said they had driven through the pilot project intersection.

Figure 3 shows a large majority of participants who identified as pedestrians used the pilot location. When asked whether the location selected was the best spot for a marked crosswalk only 55% agreed that it was. Others suggested having multiple crossings, having the crossing located mid-block further up Ladysmith Drive, or locating the crossing at Great Eastern Avenue.

Figure 3: Survey response on crossing location



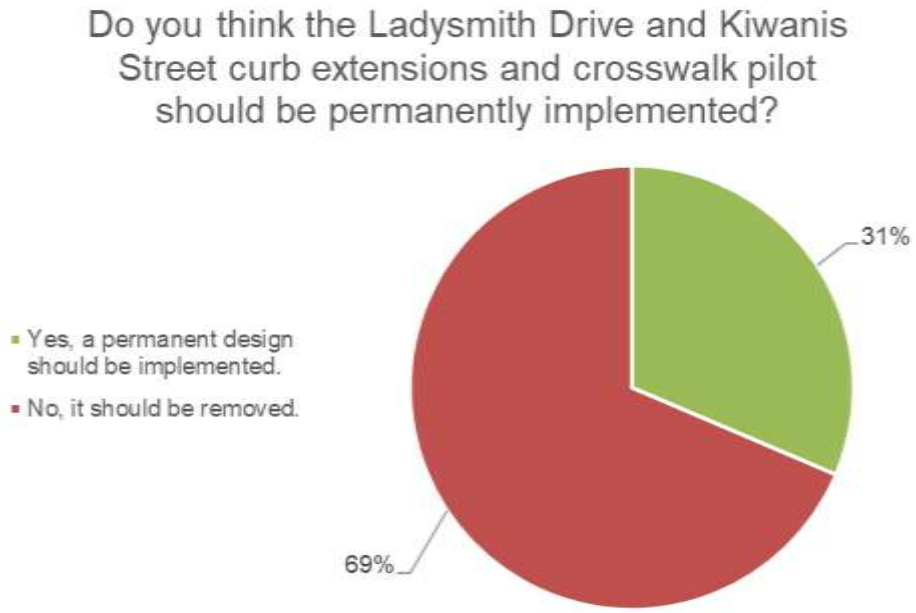
Participants who identified as drivers in the area were asked how the trial crosswalk impacted them and 78% responded that pilot had made their travel somewhat less convenient while 11% reported no impact and 11% reported that it made their travel somewhat easier.

General comments on the project submitted by survey participants expressed frustration with increased driver delay at the intersection, particularly for drivers turning onto Ladysmith Drive from Kiwanis Street. Concerns were also expressed with the maintenance of the pilot treatment during the winter and displeasure with the unappealing look of the temporary extensions.

All survey participants who provided feedback on the pilot project were asked if they thought a permanent design of this pilot project, including the construction of formal curb extensions, should be implemented.

As shown in Figure 4, 69% of all survey participants felt the pilot project should be removed while 31% felt it should be permanently implemented. It is noted that of the survey participants who said they had used the crosswalk as a pedestrian, 70% felt the pilot should be removed and 30% felt it should be permanently implemented.

Figure 4: Ladysmith Overall Response



Considerations for Permanent Installation

Although the minimum volume threshold for a marked crosswalk is not met at this time, this crossing location may still be a candidate for a marked crossing in the future. The observed increase in pedestrian crossing volume indicates this crossing location falls on a pedestrian desire line and the crosswalk may warrant improvement as pedestrian demand grows.

Conclusion

This project did not enjoy great success. There was some increase in pedestrian traffic, but it was generally poorly received. As the observed pedestrian volumes have not grown to the point of warranting a marked crosswalk at this location, it is recommended that the pilot crosswalk and extensions be removed and that pedestrian volumes at the intersection are monitored for consideration of improvements in the future.

The curb ramp added at this location is not planned to be removed if the pilot is discontinued.

Under the Highway Traffic Act, a crosswalk includes a crossing between sidewalks on opposite sides of a roadway at any intersection, even if not painted or signed. It should be recognized that removing the pilot extensions and crosswalk paint and signs does not change a driver's legal obligation to yield to pedestrians that are within the crosswalk.

Rawlins Cross – Unsignalized Traffic Circulation

Background

Historically, the area of Rawlins Cross has been a collision hot spot.

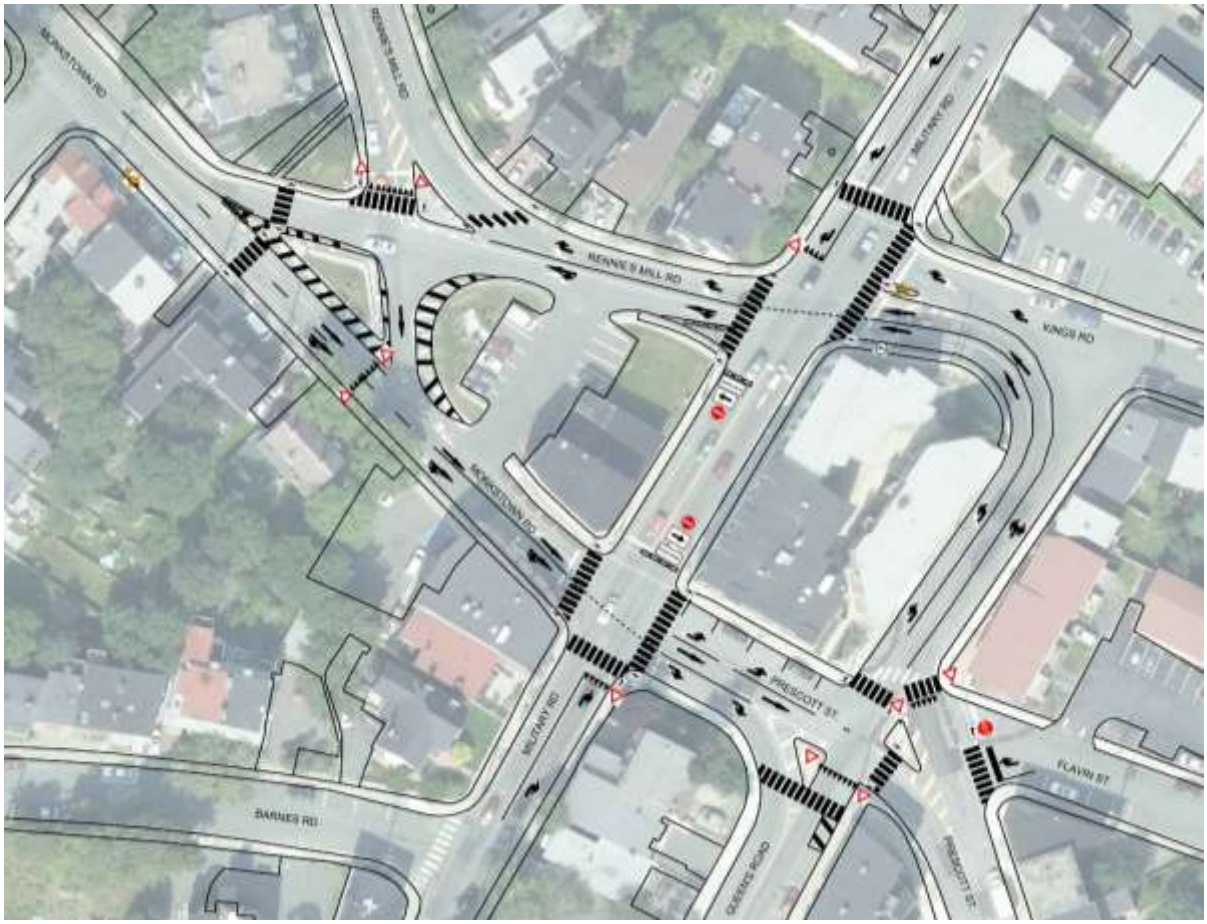
The project aimed to:

- Improve safety in the area through shorter pedestrian crossings, better visibility, and reducing the possibility of severe right-angle vehicle collisions;
- Reduce delay and time spent waiting at traffic lights for all modes of transportation; and,
- Simplify circulation and possible conflicts with consistent rules for all vehicles entering the area.

Figure 5 shows an aerial photo of the Rawlins Cross area in 2015 before any changes were made and Figure 6 shows a plan of the reconfiguration.

Figure 5: Rawlins Cross Before Pilot Project Changes

Figure 6: Rawlins Cross Pilot 'Traffic Circle' Installation



In addition to changing traffic control to yield on all intersection approaches for vehicles, some changes were made to pedestrian crossings. Before the pilot project configuration was implemented there were a total of 11 marked crosswalks at the intersections in the Rawlins Cross area. Implementation of the pilot project made the following crosswalk changes:

- six crosswalks were changed from traffic signal control to yield control at the Military Road intersections with Monkstown Road and King's Road
- one crosswalk on Military Road at Monkstown Road/Prescott Street was closed to vehicle traffic within the centre segment of Military Road
- two crosswalks on Queen's Road and on Flavin Street were reconfigured and shortened using temporary curb extensions
- two marked crosswalks were added (one two-stage crossing on the Monkstown Road approach and one on the Prescott Street exit at Queen's Road)

- two crosswalks remained unchanged (on the Rennie's Mill Road approach and on the Queen's Road approach)

Before the pilot project was installed, the changes were advertised to the public through a media release, YouTube video, multiple PSAs, and a public open house was hosted on July 25, 2018 at the Bannerman Park Pool House to provide more information and an opportunity for folks to ask questions and discuss the project with City staff. The pilot reconfiguration was activated on August 29, 2018.

General public feedback received by the City following the pilot project installation identified concern for pedestrian safety in the area, particularly at the crosswalks on Monkstown Road and King's Road that cross into the centre of the area (along Military Road). A permanent design, if approved, would include Rapid Rectangular Flashing Beacons (RRFB) enhancements at these crosswalks in addition to other geometric and landscape improvements. This information which shared with participants who took the online public feedback survey was conducted in April/May of 2019 after the pilot projects had been in place for about eight months. The majority of survey participants supported the installation of the RRFB equipment as soon as possible.

In the fall of 2019, Council was presented with an opportunity to make an early purchase of beacon equipment that would be used at future warranted crosswalk locations. Council voted to purchase the equipment and install it at the Rawlins Cross crosswalks in the interim with the understanding that it could be reused elsewhere depending on the outcome of the pilot project. The equipment was purchased, and installation of the beacons at Rawlins Cross was completed on December 23, 2019.

Before and After Data Evaluation

While public opinion is an important consideration in this pilot project, there are several objective measures that were used to evaluate the project from a technical perspective. Key indicators for this pilot project were the impact of the reconfiguration on the number of collisions in the area as well as the measured traffic speeds in the area post-conversion. These metrics provide insight into the potential overall impact of the reconfiguration on road safety in the area. Other important data included traffic and pedestrian volumes as well as Metrobus travel time data as a surrogate for traffic delays.

Traffic and Pedestrian Volumes

Vehicle traffic and pedestrian volumes were counted at the intersections of Rawlins Cross before the reconfiguration was implemented on March 21, 2018 and after implementation on September 20, 2018 and again on May 14, 2019. Morning and

evening peak hour volumes of vehicles entering and exiting the area from the primary streets and pedestrian crossing volumes were compared.

It is noted that during the September 2018 count, construction to replace water transmission mains along Portugal Cove Road was being completed. This work created traffic disruptions in the area and interrupted typical travel patterns.

Figure 7 and Table 2 summarize the morning and evening peak hour two-way entry/exit traffic volumes while Figure 8 and Table 3 provide circulating traffic volumes observed in the Rawlins Cross area.

The traffic data collected shows that total traffic volumes entering/exiting the area decreased after the implementation of the pilot project by a bit less than 10%. This magnitude of variation can be typical of daily traffic fluctuations. Some of this decrease, particularly during September of 2018, could be related to construction interruptions in the area while some drivers may have changed their travel patterns to avoid the pilot project area.

The observed increase in peak hour traffic on the Rennie's Mill Road approach between September 2018 and May 2019 with a corresponding decrease in volume on Monkstown Road supports the assumption of influence by construction on Portugal Cove Road.

Circulating volumes on the one-way segments of Rennie's Mill, Monkstown, and Queen's Road increased post-conversion by about 200 to 400 vehicles per hour during the morning peak and between 300 to 540 vehicles per hour during the evening peak. These increases are in line with the expected volume of traffic from the centre segment of Military Road reassigned around the circulating streets as a result of the detour.

Overall there are no significant causes for concern based on the evaluation of traffic volumes.

Figure 7: Rawlins Cross Entry/Exit Traffic Volumes

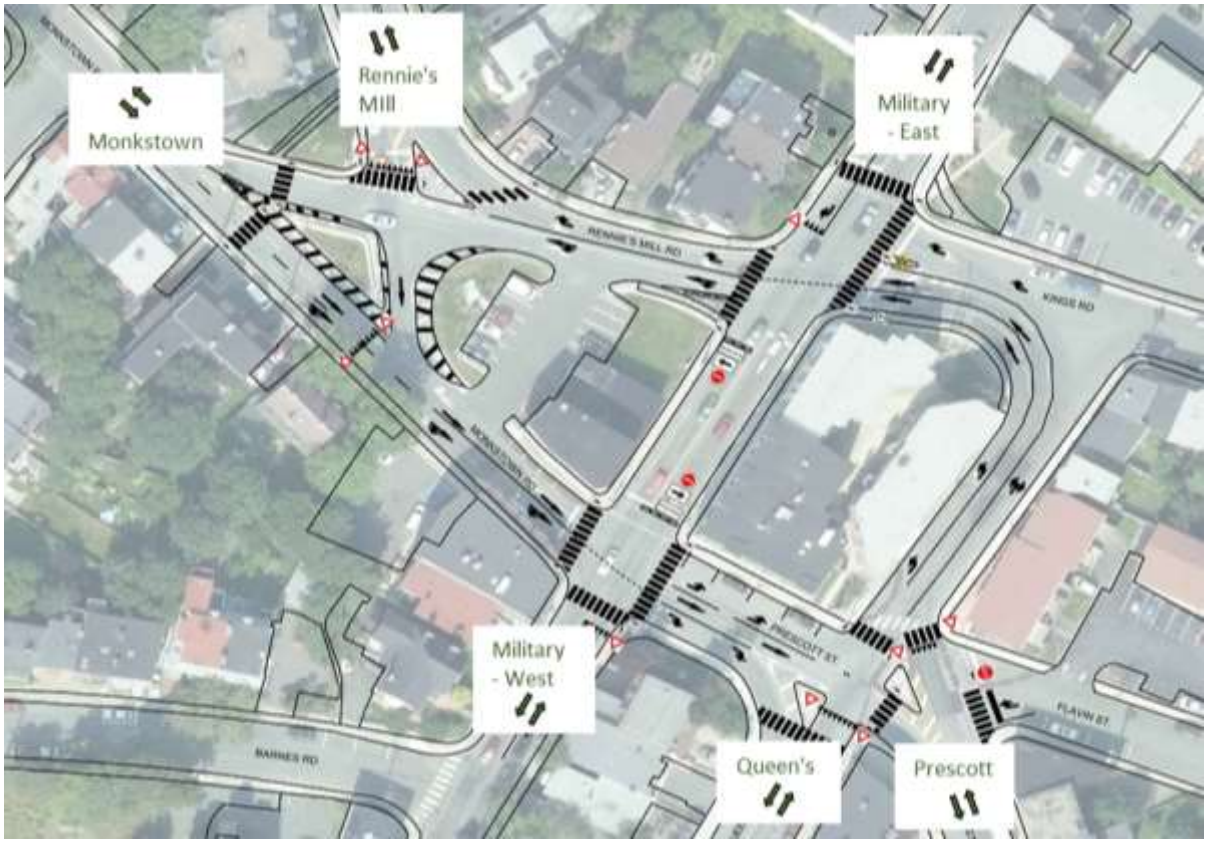


Table 2: Two-way Entry/Exit Volumes (vehicles/hour)

AM Peak Hour							
Count Date	**Military West**	**Queen's**	**Prescott**	**Military East**	**Rennie's Mill**	**Monkstown**	**TOTAL**
Mar-18	1048	731	416	944	674	653	4466
Sep-18	837	772	340	910	348	771	3978
May-19	879	851	312	853	615	580	4090
PM Peak Hour							
Count Date	**Military West**	**Queen's**	**Prescott**	**Military East**	**Rennie's Mill**	**Monkstown**	**TOTAL**
Mar-18	1090	753	435	1043	682	492	4495
Sep-18	826	811	389	988	386	675	4075
May-19	799	878	355	998	638	460	4128

Figure 8: Rawlins Cross Circulating Traffic Volumes

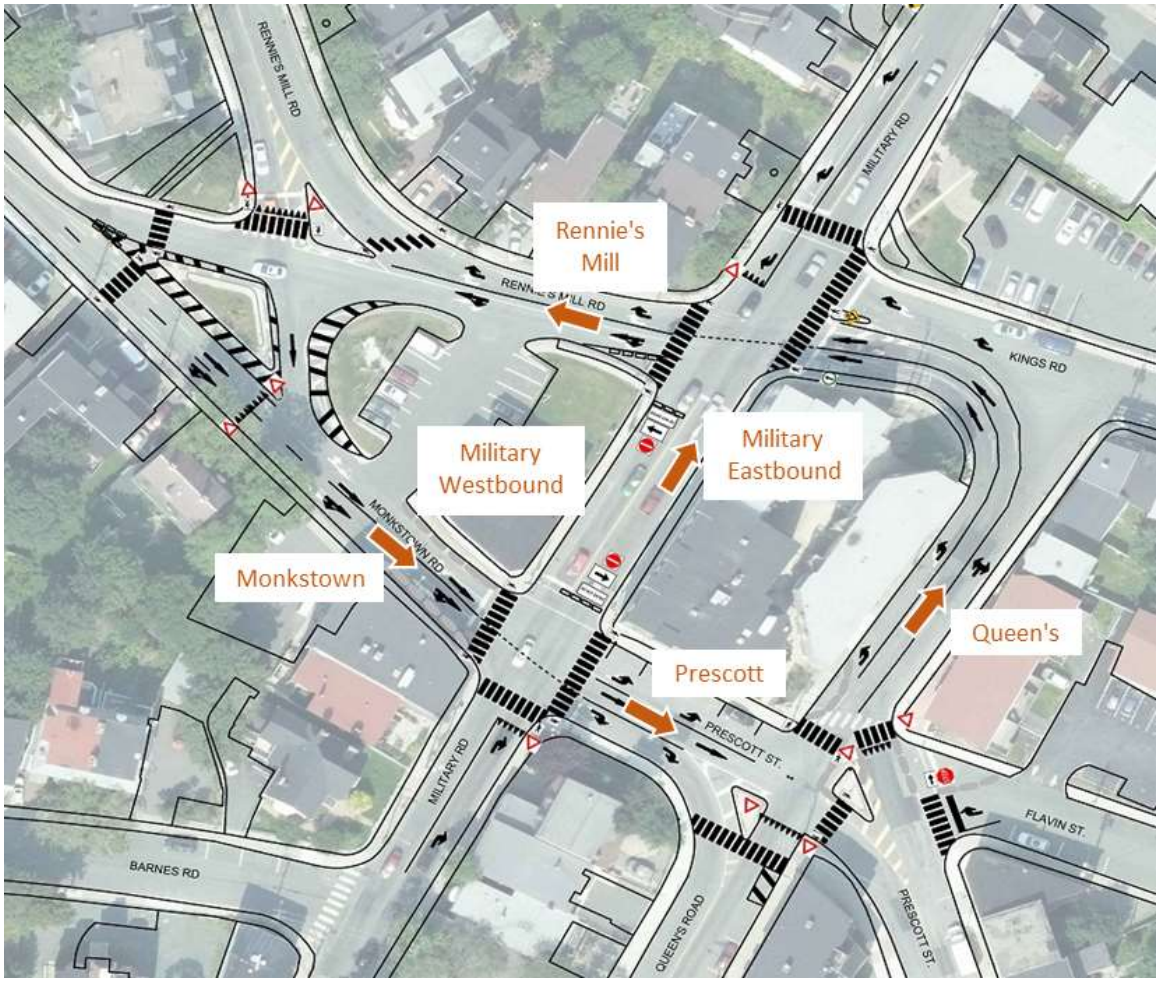


Table 3: Circulating Volumes (vehicles/hour)

AM Peak Hour						
Count Date	**Rennie's Mill**	**Monkstown**	**Prescott**	**Queen's**	**Military Westbound**	**Military Eastbound**
Mar-18	559	747	630	736	474	305
Sep-18	905	1044	893	937	n/a	n/a
May-19	948	1155	904	935	n/a	n/a
PM Peak Hour						
Count Date	**Rennie's Mill**	**Monkstown**	**Prescott**	**Queens**	**Military Westbound**	**Military Eastbound**
Mar-18	568	654	626	771	512	370
Sep-18	1034	1051	951	1013	n/a	n/a
May-19	1106	1015	934	1109	n/a	n/a

Figure 9 summarizes the 7-hour pedestrian volumes counted at area crosswalks before and after the pilot project was implemented.

The total number of pedestrian crossings in the area remained relatively consistent between the March 2018 count and the count completed after the project installation in September 2018 while crossing volumes in the area increased in May 2019 by about 14%. The weather during the counts was generally mild for those dates with some light rain showers observed during the September count. One of the primary causes of variations in pedestrian activity is seasonality. It is not uncommon to see large fluctuations in pedestrian volumes depending on the weather and environmental conditions. The increase in pedestrian activity between September 2018 and May 2019 could be typical and due to better weather.

Pedestrian volumes crossing Military Road (crosswalks D and J) decreased after the pilot project installation. There is a somewhat corresponding change in crossing pattens for Monkstown and King's along Military (crosswalks I&K and C&E). This indicates support for the observation that some pedestrians who need to cross Military Road are choosing to do so in the area of Military Road that was closed to vehicle traffic. However, the drop in volume on Military East (crosswalk D) in particular, suggests that this location has experienced a change that can't be so easily explained. Some feedback also indicated that this crossing is felt to be less safe than previously. Special attention to the design of this crosswalk would be required to address these concerns if the pilot configuration were to be made permanent.

It should be noted that the post-conversion pedestrian counts were completed before the installation of the RRFB equipment on the Monkstown at Military West and the Kings at Military East crosswalks.

Figure 9: Rawlins Cross 7-Hour Pedestrian Crossing Volumes

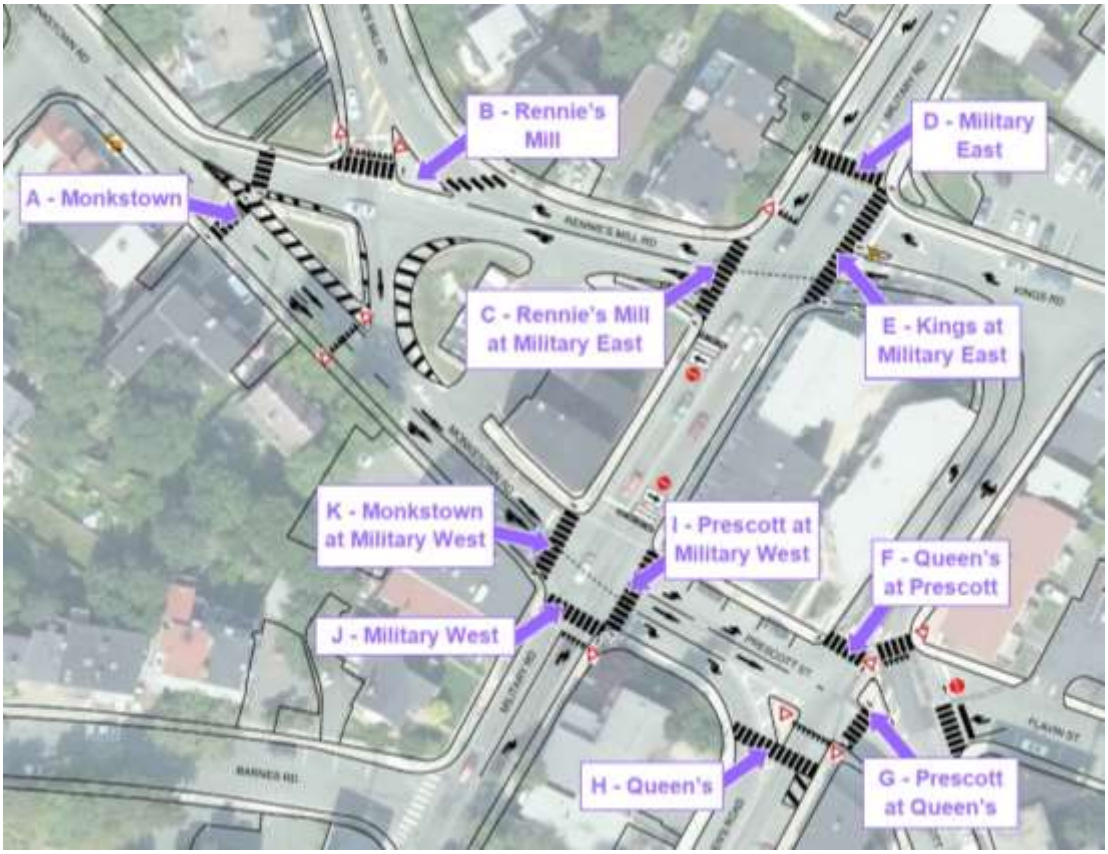


Table 4: 7-Hour Pedestrian Crossing Volume

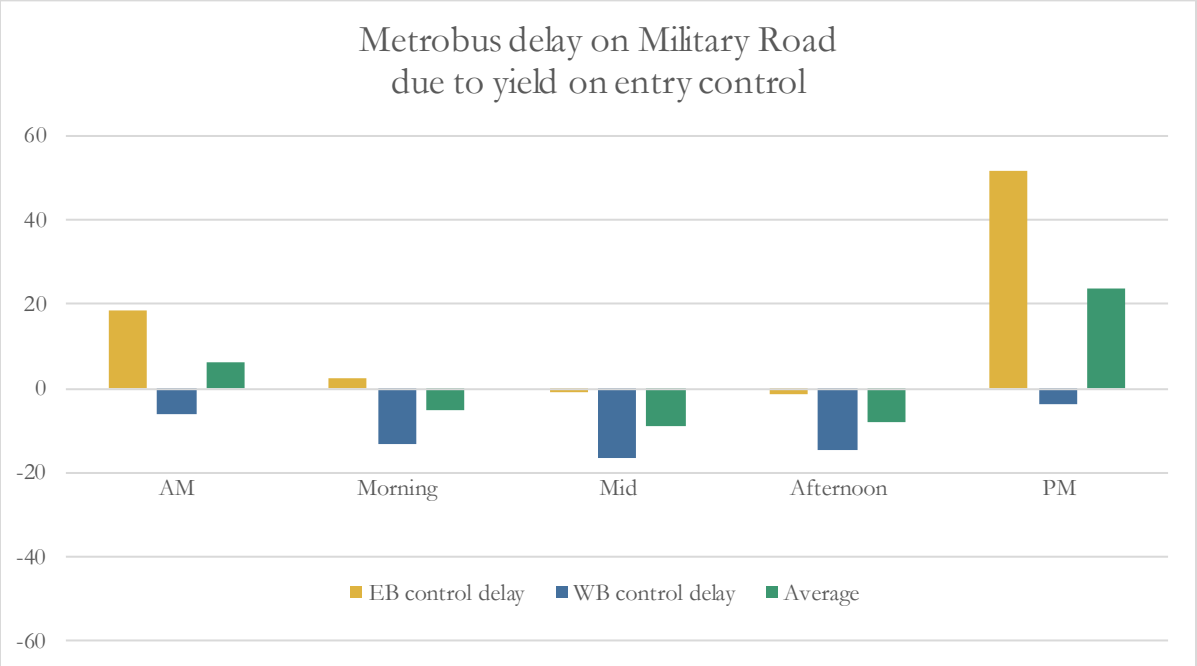
Counted 8:00 - 9:00 AM, 11:00 AM - 1:00 PM, and 2:00 - 6:00 PM	Before	After	
	March 2018	September 2018	May 2019
A - Monkstown	23	99	134
B - Rennie's Mill	126	144	182
C - Rennie's Mill at Military East	151	137	156
D - Military East	125	54	84
E - Kings at Military East	147	161	167
F - Queen's at Prescott	79	58	66
G - Prescott at Queen's	44	41	79
H - Queen's	143	139	155
I - Prescott at Military West	140	132	133
J - Military West	169	151	154
K - Monkstown at Military West	198	210	236
Area Total	1345	1326	1546

Metrobus GPS Data

In order to measure the change in delay for vehicles travelling through Rawlins Cross, GPS data from Metrobus was used as a surrogate. Time stamps from buses that stopped on either side of Rawlings Cross were paired and compared for before and after periods. The difference in travel time before and after was then adjusted to account for the slightly longer travel path that is taken going around the traffic circle as opposed to through. The final result was an increase (or decrease) in the time taken to travel through the Rawlins Cross area that can be attributed to the change from traffic signals to the yield on entry traffic circle.

Figure 10 shows the additional delay experienced on average at different key times of day. Westbound generally experienced less delay during the pilot than before the change. Eastbound experienced a small reduction in travel time during the less busy times of day but saw an increase during the busiest times of day. This supports the observation of longer queues eastbound on Military Road during the evening commute, and to a lesser extent other times of day.

Figure 10: Vehicle Delay



While this data only covers the two Military Road approaches, observations and feedback point to:

- delays continuing (or increasing) at peak times on the Queen's Road approach
- fewer delays on Prescot, Rennie's Mill, and Monkstown approaches
- fewer delays in general outside the busy commuter periods.

Traffic Speeds

Speed data was collected on Wednesday, May 1, 2019 after pilot project implementation to determine the operating speeds of vehicles travelling within the traffic circle. Locations on Monkstown Road and Rennie's Mill Road, as shown in Figure 11, were selected as the road alignment is relatively straight and vehicles can accelerate to near their maximum speed while in Rawlins Cross at these points.

The speed data collected, Table 5, indicates that typical operating speeds in these areas where vehicles are approaching the crosswalks along Military Road are in the low 30 km/hr range.

Vehicle speeds play a critical role in the safety of our streets. Reduced vehicle speed increases safety for all road users: drivers, pedestrians and cyclists alike. When drivers are moving more slowly there are several benefits:

- objects at 40m distant appear to be four times larger within the visual field than objects at 80m
- breaking distances are shorter giving driver more time to see and react to their surroundings and avoid potential collisions, see Table 6
- drivers are perceptive to a larger visual field, see Figure 12
- in the event of a collision, the slower the vehicle is travelling the greater the chance of survival and reduced injury severity for those involved, particularly for cyclists and pedestrians who are vulnerable road users, see Figure 13

Table 5: Typical vehicle speeds in Rawlins Cross

Count Location	Operating speed (85th Percentile Speed)	Average Speed (Mean)	Vehicles >50km/hr
Monkstown Road	33 km/hr	28 km/hr	less than 1%
Rennie's Mill Road	31 km/hr	24 km/hr	less than 1%

Figure 11: Speed survey locations

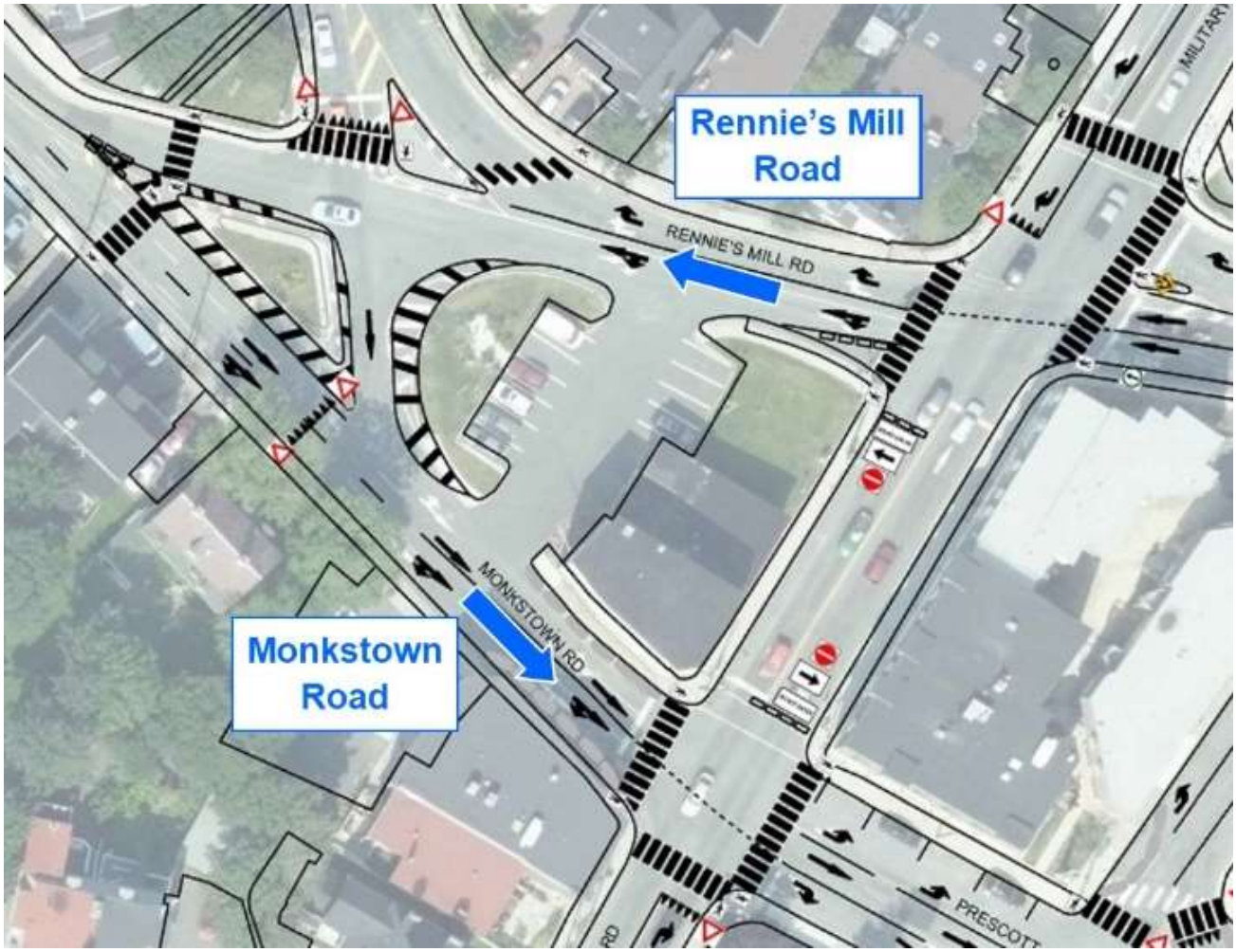


Table 6: Stopping Sight Distance

Design speed	Stopping distance used in design	Comparison to object size
20 km/hr	20m	
30 km/hr	35m	size at 40m is four times
40 km/hr	50m	
50 km/hr	65m	
60 km/hr	85m	larger than size at 80m

Figure 12: Driver visual field and attention[1]

16-24 km/hr	
32-40 km/hr	
48-56 km/hr	
>64 km/hr	

[1] Adapted from NACTO Urban Streets Design Guide

Figure 13: Survival Rates of Exposed Persons Struck by Motor Vehicle

Prior to the pilot reconfiguration, vehicles travelling through the area along Military Road with a green light had opportunity to reach speeds above the posted 50 km/hr limit. The change in traffic control to yield on approach and the geometry of the Rawlins Cross reconfiguration requires vehicles to reduce speed in order to navigate through the intersections.

Collision Data

Collision data was assessed over an 8-year period from January 2012 to December 2019. Data from January 2012 to August 2018 falls into the before category (a total of 80 months). Data from September 2018 to December 2019 falls into the after category (a total of 16 months). Ideally, 3 to 5 years worth of “after” data would be assessed in order to provide as robust an evaluation as possible. The nature of a short term pilot project precludes such a long data collection period.

Figure 14 shows the number of collisions that occurred in each month for the 8 years assessed. In all there were a total of 148 collisions before (1.850 per month) and 14 after (0.875 per month). This total includes four pedestrian collisions before, and one pedestrian collision after the pilot configuration was implemented.

Weather often plays a roll in the number of collisions experienced. Figure 15 shows the average number of collisions that occurred at Rawlins Cross during each month over the entire 8 year period assessed. It also shows the general pattern of fewer collisions in the summer.

The severity of collisions is recorded in one of three ways “Property Damage Only” (PDO), “Non-fatal Injury” (INJ), and “Fatal”. Thankfully there were no fatalities at Rawlins Cross in this data set. The proportion of INJ collisions to PDO collisions, as shown in Figure 16, is an indicator of collision severity overall at a given location. With the traffic circle configuration, we see the injury rate fall by 25%. Put another way, 7% of all collisions no longer involve an injury.

Figure 14: Number of collisions in each month

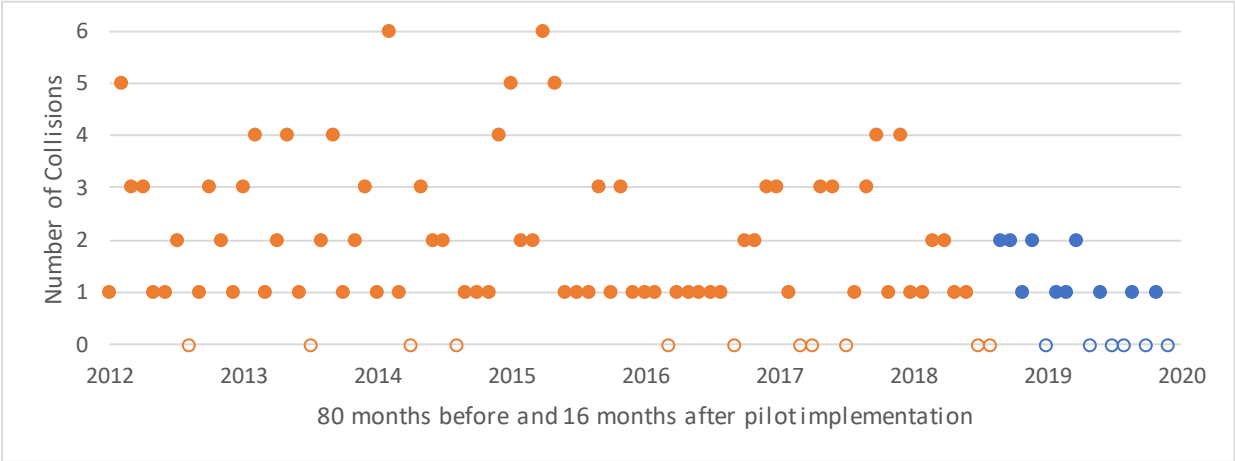


Figure 15: Average number of collisions in each month of the year

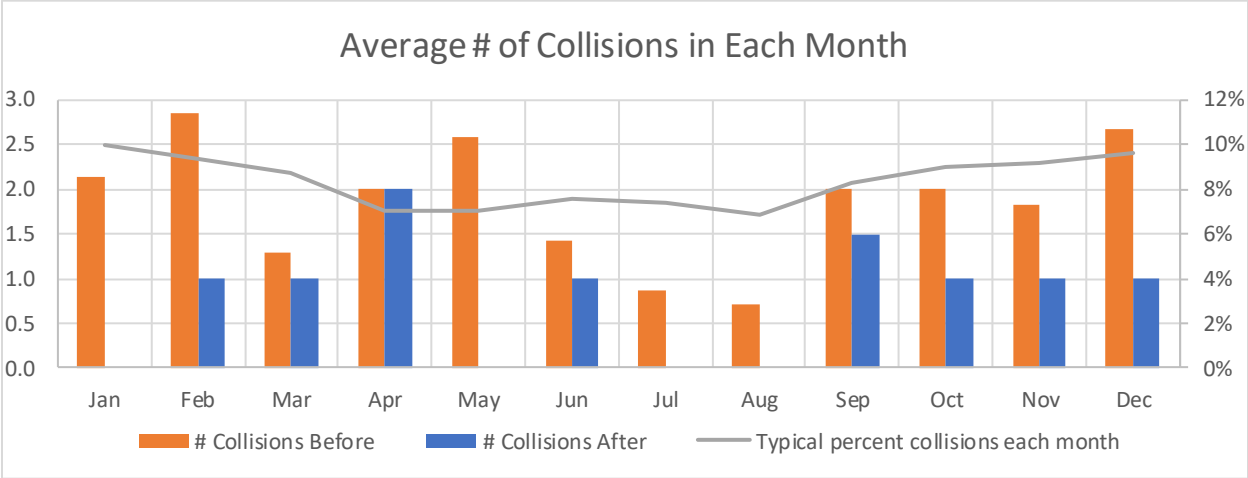
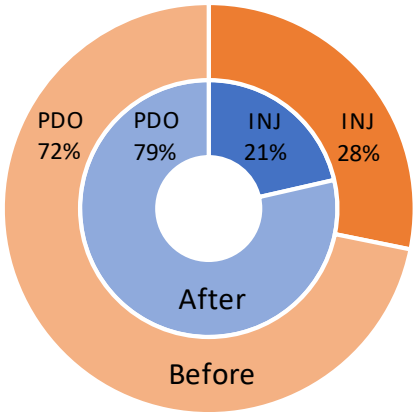


Figure 16: Proportion of injury collisions



It is important to recognize that minor incidents do happen that are not reported to the police or do not warrant a police file. These incidents are considered “not reportable” and are absent from both the before and after data. Unfortunately, many anecdotes about safety rely on these unreported incidents. Because nothing is reported there can be no objective conclusions drawn from anecdotes such as this. While not part of the data analysis, the experience of individuals involved in unreported incidents is valid and should not be dismissed.

The information presented above supports the conclusion that there are fewer collisions at Rawlins Cross and that the collisions that do happen are less severe. This is quantified with the collision rates presented in Table 7.

Table 7: Collision rates

Intersection	Estimated annual traffic	Average collisions per year#	Collisions per million entering vehicles (MEV)
Rawlings Cross (Before)	8,560,000	22.2	2.59
Rawlings Cross (After)	7,520,000	10.5	1.40

When assessing the value of collision mitigation measures a value is assigned to different collision types. These values vary and can include “direct costs”, “human capital costs”, and “willingness to pay” values. A robust study from Alberta published in 2018[2] determines the average values indicated in Table 8 in 2017 dollars.

Table 8: Collision values from research

Type	**Direct Costs**	**Human Capital**	**Willingness to Pay**
Fatal	$225,558	$2,224,580	$6,707,228
Injury	$48,341	$89,408	$158,654
Property Damage Only	$14,065	$0	$0

Fatal collision rates have not been developed for Rawlins Cross but the value of INJ and PDO collisions can be used to estimate the costs that would be justified to realize the collision reduction observed. Adjusting for inflation Table 9 gives a range of values that are appropriate for this type of analysis with a base year of 2020.

[2] P de Leur, Collision Cost Study Update FINAL Report, Capital Region Intersection Safety Partnership, 2018

Table 9: Collision values used for analysis

Type	Direct	Direct + Human Capital	Direct + Willingness to Pay
INJ	$51,000	$146,000	$219,000
PDO	$15,000	$15,000	$15,000

Finally, Table 10 assesses the improvement in safety at Rawlins Cross based on the change in INJ and PDO collisions experienced as part of this pilot project. This shows that, depending on how you value collisions, between $300,000 and $1M is saved each year

Table 10: Value of collisions mitigated annually

Type	Before	After	Change	Value D	Value D+HC	Value D+WtP
INJ	6.3	2.3	-4.0	$204,000	$585,000	$878,000
PDO	15.9	8.3	-7.7	$115,000	$115,000	$115,000
Total	22.2	10.5	-11.7	$319,000	$700,000	$993,000

The present value of these savings over a 20-year project lifetime at 2% assumed inflation is between $5M and $16M.

Public and Stakeholder Feedback

Public Opinion Survey

The online pilot project feedback survey included questions for folks who have experienced the Rawlins Cross pilot project as pedestrians, as cyclists, and as drivers. The survey asked up to a total of 67 questions to participants regarding Rawlins Cross, depending on how they said they had experienced the project. Of these questions, 20 were specific to cyclist experience, 26 were specific to pedestrian experience, and 16 were specific to driver experience. The survey was structured so that people would see questions relevant to the different travel modes they had experienced. All respondents were given an open-ended opportunity to provide more information in their own words on their experience.

Approximately 2,150 survey participants indicated they wished to provide feedback on the Rawlins Cross pilot project through the online survey. Of these participants, 95% had travelled through the project area as a driver, 44% as a pedestrian, and 5% riding a bike. Participants were asked questions about their travel patterns, when they typically make trips through the area, and if their feeling of safety and travel time has changed. Figure 17 provides the number of responses in each group of travel mode. Table 1Table 11 gives the overall response for each of these groups totalling a 63.7% preference for permanent installation.

Figure 17: Number of respondents by travel mode

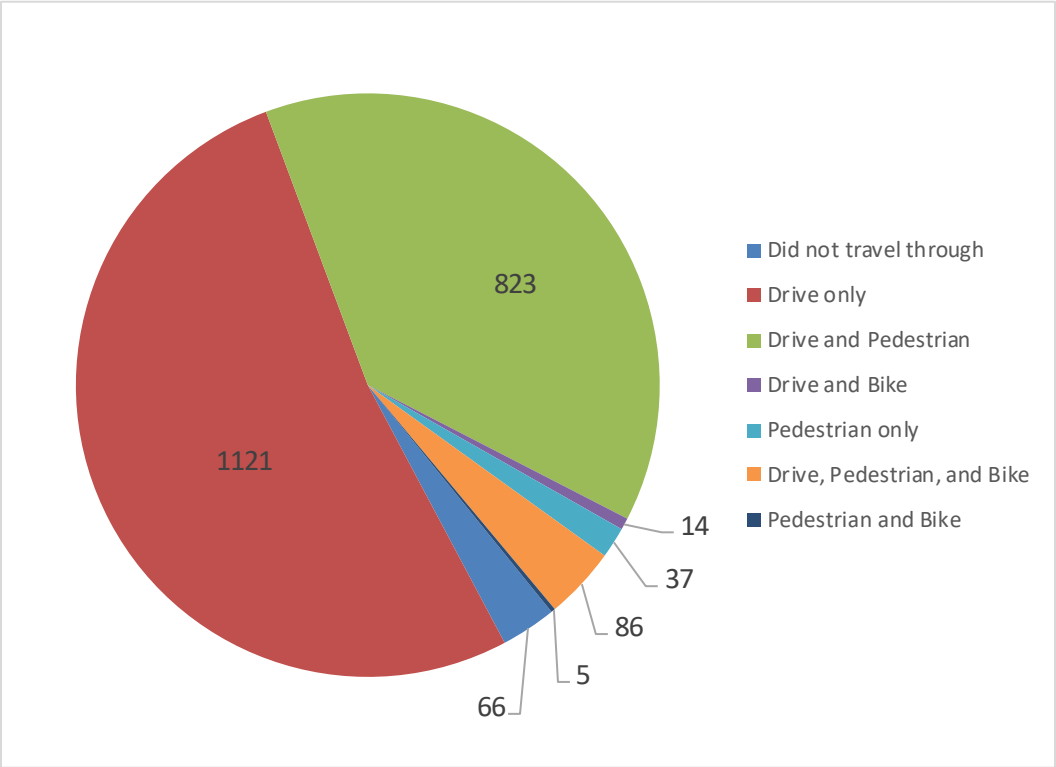


Table 11: Overall response to pilot by travel mode

Travel mode	Number of responses	Yes, a permanent design should be implemented.	No, we should return to the old design (with traffic signals).
Did not travel through	11	36.4%	63.6%
Drive only	1,020	62.4%	37.6%
Drive and Bike	11	81.8%	18.2%
Drive and Pedestrian	688	65.3%	34.7%
Pedestrian only	30	40.0%	60.0%
Drive, Pedestrian, and Bike	74	78.4%	21.6%
Pedestrian and Bike	4	50.0%	50.0%
Grand Total	**1,838**	**63.7%**	**36.3%**

Cyclist Feedback

Of the participants who identified as having ridden a bike through the area, 66% said they do so on the road while 23% said their route includes a combination of crosswalks and on-road riding and 12% said they used crosswalks to travel through the area.

When making trips through the area on their bike, respondents said their feeling of safety stayed the same or improved for 49% of trips and that 51% of trips felt less safe. Overall, respondents said the time it takes to travel through the area has decreased for about 57% of trips.

When asked what features could be added to the design of the area to improve how they travel through on their bike some respondents mentioned the addition of a bike lane, increasing the awareness of drivers to share the road, and improving the road surface.

Overall, cyclists were 78% in favour of the pilot configuration becoming permanent.

Pedestrian Feedback

Survey respondent who identified as travelling through the area as a pedestrian were asked about their experience in terms of both safety and travel time at each of 13 different crossing locations.

Overall 54% of responses indicated a feeling of being less safe. This was strongly correlated with overall opinion on the project with only 34% of responses indicating feeling less safe among those who ultimately were in favour of the project and 87% of responses indicating feeling less safe among those who ultimately were opposed to the project.

The crosswalks along Military Road at Monkstown and at Kings were consistently reported as feeling the least safe among all crosswalks. These two locations were provided with rapid flashing beacons in December 2019.

As expected, reports on travel time were more positive with 69% of responses indicating that travel time about the same or faster. Again, this was skewed with 85% of responses reporting about the same or faster among those who ultimately were in favour of the project and only 42% of responses being about the same or faster among those who ultimately were opposed to the project.

The crosswalks along Military Road at Monkstown and at Kings were consistently reported as taking longer to cross as well. The feeling of less safety likely contributed to people waiting longer for an acceptable opportunity to cross.

At various times throughout the pilot project period there has been significant concerns raised by residents about pedestrian safety in particular at Rawlins Cross. Specific concerns raised often include:

- Failure of drivers to yield (note that under the HTA drivers are not required to yield to a pedestrian until they are within the crosswalk).
- Failure of drivers in the second lane to yield when a driver has already stopped to allow a pedestrian to cross. This occurs most commonly at Military crossing Monkstown. In this case the driver not yielding is committing an offense under the HTA.
- Poor visibility of pedestrians, particularly at the southwest corner of King's and Military.

Of the 311 calls that were received pertaining to the Rawlins Cross pilot project, the majority expressed concern for safety in the area with particular concern for pedestrians.

It is important to recognize that the feeling of safety and the experience of being safe are not the same thing. In fact, people often behave more carefully in situations that feel less safe resulting in a paradoxical increase in real safety. That said, it can not be overstated how strongly some people feel pedestrian safety has diminished with the traffic circle in place. These are valid feelings and should not be dismissed out of hand. Rather, these feelings should be weighed against the data collected in context.

Driver Feedback

Survey respondents who identified as travelling through the area as a driver were asked about their experience in terms of both safety and travel time for up to three typical trips entering Rawlins Cross at one of 7 locations.

Overall most people (54%) indicated that they felt as safe or safer travelling through the area. This varied based on location. Those locations where drivers would be expected to yield more often (Military Road or northbound on Prescott) generally indicated feeling less safe while those with less yielding expected (Rennie's Mill or Queen's) indicated feeling safer.

As expected drivers felt that overall, they were able to navigate through the area with less delay than with the traffic signals in place. Drivers reported about the same or less delay for 73% of their trips through Rawlins Cross. This also varied as low as 65% at Military Road eastbound which matches the results of the Metrobus GPS data analysis.

Specific concerns raised by drivers include:

- Signage remains unclear
- Some residential driveways are more difficult to enter/exit
- Attention to the driving task is insufficient among many
- The concept of making Rennie's Mill and Monkstown a one-way pair. This was considered but is not feasible given the importance of the Rennie's Mill Road / Portugal Cove Road connection in the city street network.

Metrobus

Metrobus was asked to provide feedback on the Rawlins Cross pilot project reconfiguration. Metrobus staff did not have any issues with the new configuration or the further addition of the flashing crosswalk beacons. Bus operators said that they felt the new configuration is working better than the previous signalized intersections. They expressed that in off-peak times the flow of traffic through the area is much smoother and takes less time to get through. They observed that initially after the reconfiguration there was some confusion for other vehicles entering/exiting the area but over time this has been resolved as people have gotten used to the reconfiguration.

Emergency Services

While feedback from emergency services has been positive, no official statement has been provided.

RNC

The RNC has indicated that they are not in a position to provide an official statement at this time. They have however, cooperated greatly with City staff to provide the details and commentary necessary to ensure our evaluation of safety is as accurate as can be.

Bishop Feild Elementary

Bishop Feild Elementary is located nearby Rawlins Cross on Bond Street. The school has been closed and under repair since October 2017, before the pilot project began. School operation have been temporarily moved to the former School for the Deaf on Topsail Road. As of writing, the school is expected to reopen for September 2020. The catchment area of Bishop Feild is such that only students who opt in (for French Immersion or other reasons) may need to pass through Rawlins Cross.

The City met with concerned parents of students who attend the school as well as representatives of the School Council to discuss the project. Concerns regarding pedestrian safety, particularly once school is back in session on Bond Street, were raised by some of the parents.

An information note[3] was presented to Committee of the Whole on December 11 to discuss the concerns and demands raised. As part of this note a commitment was made to meet with the school council in the new year.

Although school has not been in session at the Bond Street location during the pilot project, families that live in the area of Rawlins Cross that attend Bishop Feild elementary have likely had some experience of the reconfiguration while travelling through their neighbourhood. The students that are currently bussed from the Bond Street school to the Topsail Road location may have also had experience with the reconfiguration during their trips to/from school. While the re-opening of the Bond Street school will have some influence on travel patterns in the Rawlins Cross area, the majority of the additional trips to/from the school will fall primarily outside of the typical daily peak traffic hours.

On February 18, 2020 City staff and Councillors met with the school council to answer questions and listen to feedback. The primary concerns remain the safety of school children as they travel between home and school. Discussion of next steps, the types of improvements that would be made if the traffic circle became permanent, and preliminary findings of the before and after evaluation were well received and satisfied many present. There is however a continued desire for further changes to be made such as additional beacons and a crossing guard. The crossing of Military at King's and Rennie's Mill was noted as being of particular concern. (This intersection ranked 9th out of 13 as being a safety concern in the public opinion survey.)

Inclusion Advisory Committee

On August 29, 2018 a media briefing was held to provide an opportunity for local media to experience and understand the pilot configuration of Rawlings Cross. Following this, concerns were raised that the temporary configuration of the pilot project did not include a new curb ramp to accompany the crosswalk that was added on Monkstown Road. The City responded quickly and on September 4, 2018 construction work was undertaken to add a curb ramp to the new crosswalk on Monkstown Road.

On September 10, 2018 Transportation Engineering and Community Services staff met with representatives from City Council and CNIB. This meeting reviewed concerns about the overall accessibility of the reconfiguration.

One of the lessons learned through this pilot installation was that earlier consultation with the inclusion community would have benefited the project. The City has since

[3] https://pub-stjohns.escribemeetings.com/filestream.ashx?DocumentId=4150

adopted a policy to ensure that the Inclusion Advisory Committee is informed of and consulted on relevant major projects before any physical work is undertaken.

Transportation Engineering staff have also provided updates to the Inclusion Advisory Committee over the course of the pilot period. As part of this, staff have been able to share information on the ongoing operations and to discuss how best to improve accessibility in the area depending on the outcome of the project.

On November 21, 2019 Transportation Engineering and Community Services staff again met with representatives from City Council and CNIB to discuss the status of Rawlins Cross and the steps that were planned to improve accessibility, particularly for those with vision loss.

Key 2 Access technology is currently being piloted at enhanced crosswalks in the City. The opportunity to expand this pilot to the crosswalks in Rawlins Cross where flashing beacons were installed in December of 2019 has been explored. If the reconfiguration is approved for permanent installation, Key 2 Access could be added at these two crosswalks at a cost of approximately $2,700 plus installation costs. This improvement could be made in the short term in advance of the detailed design for a permanent reconfiguration.

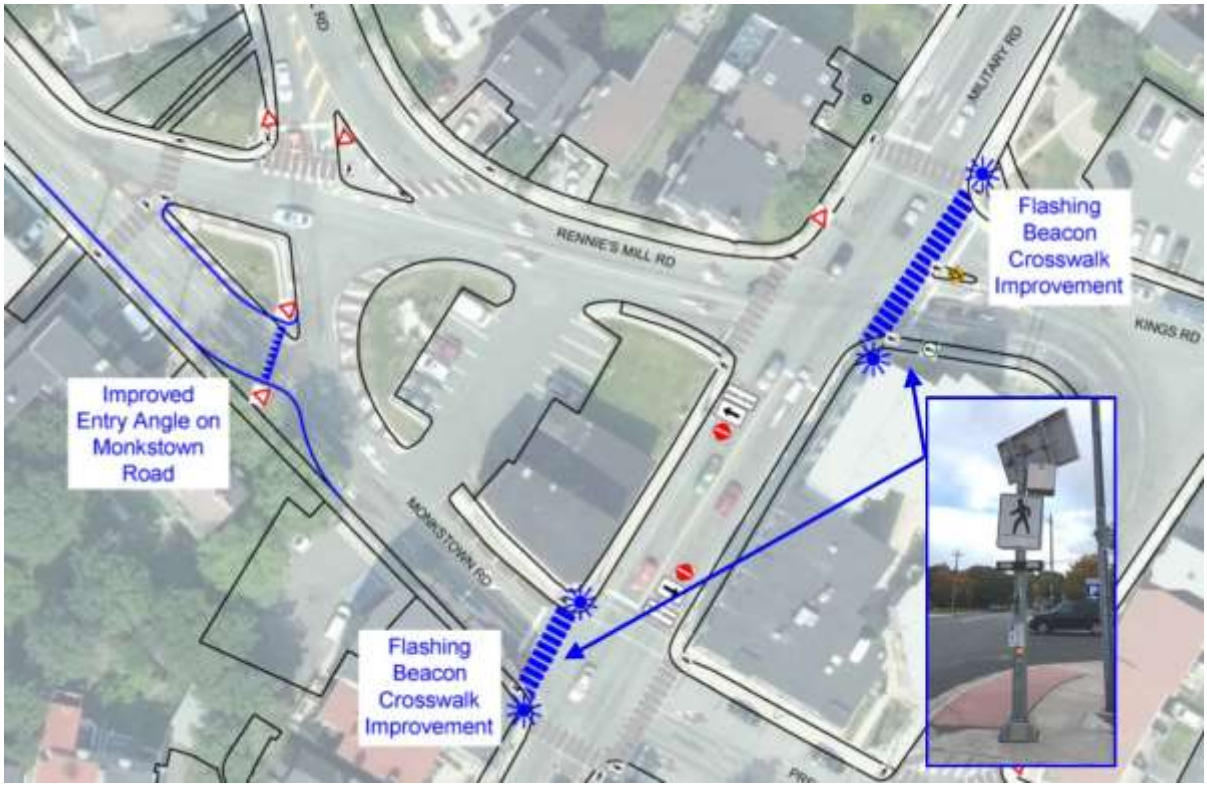
If the pilot reconfiguration is approved for permanent installation, the City will engage with the Inclusion Advisory Committee as part of the detailed design process. The City will continue to look for opportunities to improve accessibility in the Rawlins Cross area regardless of the outcome of the pilot project.

On March 5, 2020 City staff presented the results of this report to the Inclusion Advisory Committee. The committee passed a resolution endorsing the recommendation to pursue a permanent installation of the traffic circle with two caveats related to continued consultation and winter maintenance.

Considerations for a permanent installation

In the public opinion survey, respondents were asked if they would like to see two short term changes if the pilot configuration were approved for permanent installation. These were an improved entry angle on Monkstown Road and flashing crosswalk beacons along Military Road (both shown in Figure 18) as well as a redesigned centre plaza area. Overall 73% of responses were in favour of making these improvements as soon as possible. Both those in favour of a permanent installation (79%) and those opposed to permanent installation (61%) preferred to see these changes made early if the project proceeds. As mentioned above the flashing beacons were installed in December 2020.

Figure 18: Key improvements for implementation as soon as possible



Other considerations include:

- Coordinating needed civil upgrades and street rehabilitation in the area.
- Considering the bicycle route on Military Road identified as part of the Bike Master Plan network.
- Including public engagement/consultation as part of the design process, particularly for the public space.
- Adding the existing green space and parking lot in the center of Rawlins Cross to the subject area for the public space.
- Making changes where possible at crosswalks such as:
    - Reducing exposure (shorten crossings)
    - Improving visibility of pedestrians by drivers
    - Providing crossing enhancements (such as flashing beacons)

Conclusion

This pilot demonstrated that significant safety benefits are possible with a traffic circle configuration. By working to further improve the design, especially with respect to accessibility and pedestrian accommodation, a traffic circle would be a sound transportation safety investment and is recommended for permanent installation.

Lessons Learned

The 2018 projects were the second round of traffic pilot installations attempted in the City of St. John's. Lessons learned from the first round of pilot installations in 2017 were considered to improve on the delivery of these new projects. Changes made included:

- More public information in advance of the pilot implementation
- More pre-work to make the changeover happen faster with less interruption of normal traffic flow.

A new challenge posed for the 2018 projects was Council's decision to keep the trial reconfigurations in place until their evaluation was completed and a final decision was made regarding their permanent installation. The pilot projects had to be completed with semi-permanent materials that would stand up to winter conditions and maintenance but would not carry a big capital cost for installation and could still be removed at the end of the trial period. This meant that temporary mobile signage, cones, barrels, and delineators were no longer appropriate materials for the project designs and needed to be replaced with measures that were more permanent and durable. This decision also required communication with the public that, unlike the past year's projects, the 2018 pilot projects would remain in place longer term.

Over the course of the pilot period more lessons were learned in addition to those experienced in 2017 that will contribute to more successful pilot projects in the future including:

- Maintenance needs of the semi-permeant materials and configurations
- Implementation timelines and resources required for longer-term installations
- Communication regarding changes to the project timelines and cancellation of planned projects
- Accessibility considerations and engagement for longer-term installations
- Determining ideal locations for pre and post installation data collection

To further elaborate this last point, a comparison of the speed data on Ladysmith indicated that the installation of the pilot project has had little influence on speeds at the location where the data was collected. There was a small reduction in the measured speeds of vehicles travelling away from the pilot intersection. It is noted that the chosen point of data collection was approximately 100m away from the crosswalk. If vehicles are slowing at the intersection closer to the point of the crosswalk as a result of the pilot curb extensions this would not be reflected in this data. Traffic calming measures such as the curb extensions used often lose their effectiveness within 100m to 200m.