

## Request for Decision

### Pedestrian Crossing - Brady Street at Shaughnessy Street

Presented To:	Operations Committee
Presented:	Monday, Nov 18, 2013
Report Date	Thursday, Nov 07, 2013
Type:	Presentations

### Recommendation

THAT, to improve pedestrian safety, the City of Greater Sudbury maintain and enhance the pedestrian crossing on the west approach of Brady Street at Shaughnessy Street by installing zebra style pavement markings as well as "Yield to Traffic" signs at both ends of the crossing with funding from the 2014 Operating Budget and;

THAT the City of Greater Sudbury install a fence and/or planters along the Brady Street median to reduce jay-walking and funnel pedestrians to the enhanced crossing in the 2015 construction season and funded from the 2015 Capital Budget.

### Finance Implications

If approved, the zebra style pavement markings and the signage will be funded by the 2014 Operating Budget and the fencing and/or planters will be funded from the 2015 Capital Budget.

## Background

See attached report entitled Pedestrian Crossing Policy and Recommendations.

#### Signed By

**Report Prepared By**

Dave Kivi  
Co-ordinator of Transportation & Traffic  
Engineering Services  
*Digitally Signed Nov 7, 13*

**Division Review**

David Shelsted  
Director of Roads & Transportation  
Services  
*Digitally Signed Nov 7, 13*

**Recommended by the Department**

Tony Cecutti  
General Manager of Infrastructure  
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*Digitally Signed Nov 7, 13*

**Recommended by the C.A.O.**

Doug Nadorozny  
Chief Administrative Officer  
*Digitally Signed Nov 9, 13*

## BACKGROUND

At the Operations Committee Meeting held on March 5, 2012, City Staff and staff of HDR Corporation presented a new Pedestrian Crossing Policy for the City as well as the results of site assessments for three pedestrian crossing locations in downtown Sudbury (see Exhibit "A"). The Operations Committee approved the Pedestrian Crossing Policy, but directed Staff to review and report on other options for the Brady Street pedestrian crossing.

### Existing Conditions

This unprotected pedestrian crossing is located adjacent to Tom Davies Square on the west leg of the intersection of Brady Street and Shaughnessy Street (see Exhibit "B"). It is approximately 95 metres west of Paris Street and 90 metres east of Minto Street. Brady Street is posted at 50 km/h and carries an AADT of approximately 15,900.

Based on a traffic count conducted on November 12, 2012, there were 187 pedestrians that crossed Brady Street on the west side of Shaughnessy Street and 72 pedestrians crossed on the east side during the afternoon peak period between 4:00 p.m. and 5:00 p.m. Although the pedestrian volumes are high in the peak periods, they are insufficient throughout the day to meet the thresholds required in the Ontario Traffic Manual for traffic signals. The spacing of this location to the adjacent traffic signals does not meet the minimum spacing guidelines of 215 metres between signals. The 215 metre guideline is intended to reduce the potential for driver confusion when approaching closely spaced signals. In this situation drivers may focus on downstream signals rather than the impending intersection.

A review of the City's collision information revealed that there were no collisions involving pedestrians in the last three years in this area of Brady Street.

Based on the above information, HDR Corporation recommended that the existing unprotected mid-block crossing be maintained and enhanced to accommodate this pedestrian desire line. Recommended crossing enhancements to the mid-block crossing include the application of Zebra style pavement markings similar to those used along Elm Street, as well as the addition of "Yield to Traffic" signs at both ends of the crossing.

In order to eliminate jay-walking at random locations across Brady Street, it was recommended that median enhancements be installed along Brady Street to discourage jay-walking and funnel pedestrians to the enhanced pedestrian crossing. Median enhancements can include the installation of a fence and/or planters similar to the median enhancements applied along Elm Street at the Elm Street crossing.

### Alternatives

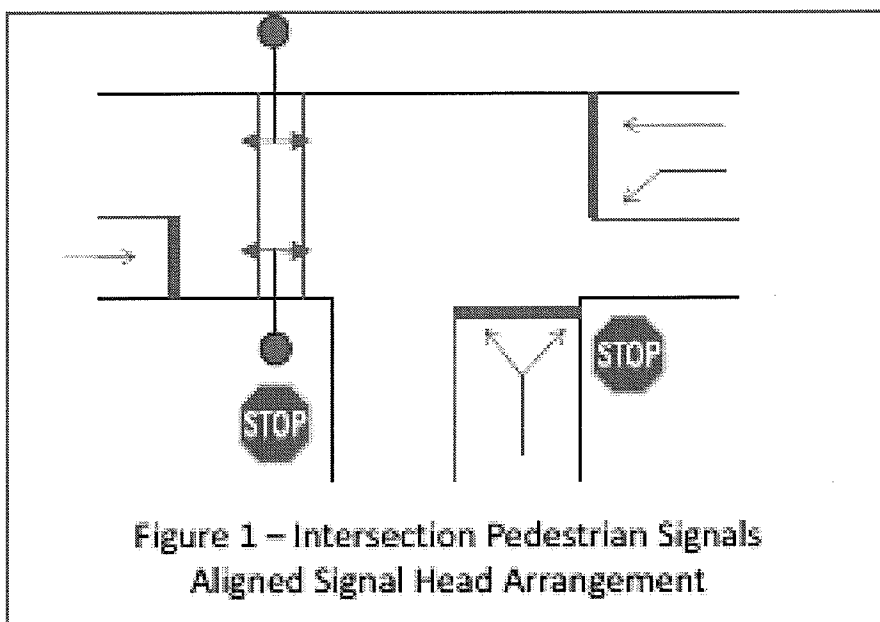
To address the request of the Operations Committee to review other options for Brady Street, the City retained HDR Corporation. HDR has reviewed the following three options for providing a protected pedestrian crossing at the Brady Street and Shaughnessy Street intersection.

1. Intersection Pedestrian Signals with an aligned signal head arrangement
2. Intersection Pedestrian Signals with a conventional signal head arrangement
3. Full Traffic Control Signals with a conventional signal head arrangement

A summary of the alternatives that were reviewed is provided below. The full memorandum from HDR can be found in Exhibit "C".

### **Option 1 - Intersection Pedestrian Signals with an Aligned Signal Head Arrangement**

In this option, intersection pedestrian signals are installed on the west leg of the Brady Street and Shaughnessy Street intersection. The west leg is selected to avoid impeding on the westbound left turn storage area. A schematic of this option is shown in Figure 1.



This type of intersection pedestrian signal is very similar to the signalized crossing on Paris Street at the Southwind Retirement Residence. The estimated cost to install this option is \$100,000 to \$125,000.

Most agencies in Ontario run IPS's in an uncoordinated (or free) operation. This mode of operation minimizes the delays to pedestrians as they are generally serviced immediately. The alternative (coordinated mode of operation) has the potential to introduce a delay before servicing the pedestrian. The concern with this delay is that pedestrians may not wait and cross the road before getting the right-of-way particularly since there are no other signal indications that would give the pedestrian the sense that the signals are actually cycling.

As a result, and for the purposes of this evaluation, it is assumed that the City would operate the signals shown in Figure 1 in free mode. There are both advantages and disadvantages of this option.

#### **Advantages:**

- Traditional design for intersection pedestrian signals
- Fewer poles required
- Lower cost than a full set of signals,
- Typically responds quickly to pedestrian demands by running free

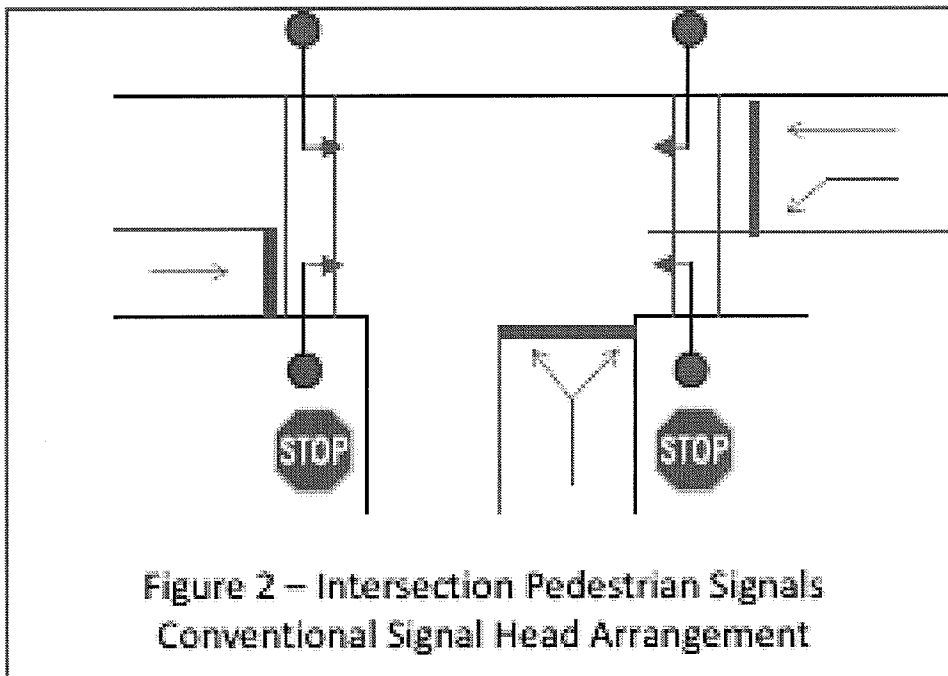
Disadvantages:

- Free operation results in the potential to interrupt signal coordination along Brady Street
- Optically programmed signal displays on Brady Street may confuse drivers (and pedestrians)
- on Shaughnessy Street since the heads will appear dark
- This orientation results in a repositioning of the stop bar for eastbound traffic some 15 meters further to the west, resulting in an even shorter signal spacing with signals at Minto Street

**Option 2 - Intersection Pedestrian Signals with a Conventional Signal Head Arrangement**

The second option considered an intersection pedestrian signal but using a four-pole, conventional signal head arrangement. This option is considered to allow the eastbound stop bar to be positioned closer to the Shaughnessy Street intersection than in Option 1. Additionally, to address the pedestrian demand crossing the east leg, this Option introduces a second crosswalk on Brady Street. It is schematically illustrated in Figure 2.

The cost to implement this option is significantly higher due to the additional poles and conduit that is required. The estimated cost is \$170,000 to \$190,000.



Again, there are advantages and disadvantages of this option.

Advantages:

- Allows for optional second Brady Street crossing
- Compresses the intersection and maximizes spacing between stop bars
- Typically responds quickly to pedestrian demands by running in free

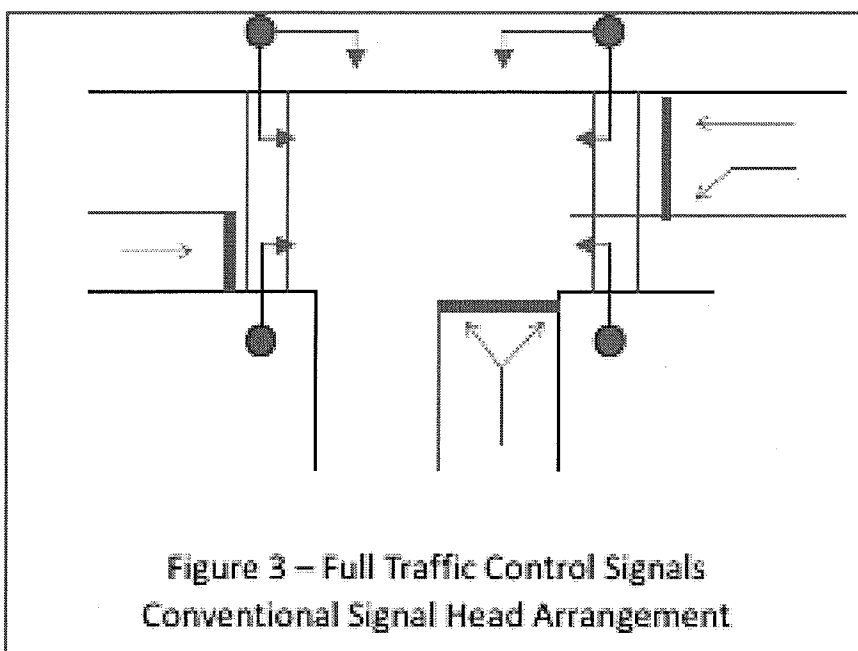
Disadvantages:

- Non-traditional design
- More costly than Option 1
- Free operation results in a potential loss of coordination on Brady Street
- May result in confusion for drivers (and pedestrians) on Shaughnessy Street particularly with optically programmed signal displays on Brady Street

### **Option 3 - Full Traffic Control Signals with a Conventional Signal Head Arrangement**

Option 3 was identified as a means of reducing the confusion to drivers waiting on Shaughnessy Street and re-introducing progression along Brady Street. It consists of a full set of traffic signals. The schematic for this option is shown in Figure 3.

The estimated cost to implement full signals is not much higher than Options #2 at \$180,000 to \$200,000.



Once again, there are advantages and disadvantages of this option.

Advantages:

- This option uses a traditional design
- Minimizes driver confusion on Shaughnessy Street
- Coordination maintained along Brady Street
- Compresses the intersection and maximizes spacing between stop bars
- Safer operations during pre-emption

Disadvantages:

- Longer delay to pedestrians and traffic on Shaughnessy Street
- More costly than Option 1 and marginally more costly than Option 2
- May set a precedent of installing signals where they do not fully comply with the Warrant

Another disadvantage of this option is that full traffic signals will attract additional traffic to Shaughnessy Street to turn left onto Brady Street. This will increase congestion and conflicts between turning traffic and pedestrians.

### **Median Enhancements**

Enhancements to the existing median along Brady Street should be considered with all options in an effort to limit the amount of “jay-walking” across the street and to force pedestrians crossing the street to use the signals at Shaughnessy Street. Median enhancements could include the addition of added landscaping / planting or a fence along the median to limit the potential for pedestrians to cross at various locations between Paris and Minto Streets.

### **RECOMMENDATIONS**

While cost and mobility are important criteria for the City, pedestrian safety is paramount. HDR’s original recommendation of maintaining a marked, uncontrolled crossing is still the preferred result. As indicated previously, there have been no collisions involving pedestrians within the last three years at this location. However, should the option of signalization be selected, Option 3 is recommended as it is expected to result in the highest compliance rate for pedestrians while servicing pedestrians on both the east and west legs. It also offers the advantages of signal progression on Brady Street and the ability to provide optically programmed signal displays with minimal confusion to motorists and pedestrians.

A median consisting of raised planters and/or a fence should be constructed to discourage pedestrians from crossing mid-block.



## Request for Decision

### Pedestrian Crossing Policy and Recommendations

Presented To: Operations Committee

Presented: Monday, Mar 05, 2012

Report Date Wednesday, Feb 22, 2012

Type: Presentations

### Recommendation

That the Operations Committee adopt the Pedestrian Crossing Policy prepared by HDR Corporation dated February 2012, and;

That the recommendations contained in the Pedestrian Traffic Study – Crossing Review prepared by HDR Corporation dated February 2012 with respect to the pedestrian crossing on Elm Street between the Transit Depot and the Rainbow Value Centre be approved, and;

That the recommendations contained in the Pedestrian Traffic Study – Crossing Review prepared by HDR Corporation dated February 2012 with respect to the pedestrian crossing on Brady Street at Shaughnessy Street be approved, and;

That HDR Corporation complete the development of an educational brochure and that Staff undertake an educational campaign regarding pedestrian crossings all in accordance with the report from the General Manager of Infrastructure Services dated February 22, 2012.

#### Signed By

##### Report Prepared By

Dave Kivi  
Co-ordinator of Transportation & Traffic  
Engineering Services  
*Digitally Signed Feb 22, 12*

##### Division Review

David Shelsted, MBA, P.Eng.  
Acting Director of Roads &  
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##### Recommended by the Department

Greg Clausen, P.Eng.  
General Manager of Infrastructure  
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*Digitally Signed Feb 22, 12*

##### Recommended by the C.A.O.

Doug Nadorozny  
Chief Administrative Officer  
*Digitally Signed Feb 28, 12*

## Background

The City's Roads and Transportation Services Division retained HDR Corporation to develop a Pedestrian Crossing Policy to assist the City in determining how and when to implement pedestrian crossings (see **Exhibit A**).

HDR Corporation was also asked to undertake an assessment of three (3) specific pedestrian crossings in downtown Sudbury. The pedestrian crossing locations included as part of the assessment are:

1. Ste. Anne Road crossing at the Radisson Inn
2. Elm Street crossing at the Rainbow Value Centre
3. Brady Street crossing at Shaughnessy Street

The results of the assessments are contained in **Exhibit B, Pedestrian Traffic Study – Crossing Review**.

# **Pedestrian Crossing Policy**

The Pedestrian Crossing Policy has been developed in light of the benefits of improving both driver and pedestrian awareness and understanding of rules of right of way. Research into the development of the policy has included a review of the practices of other jurisdictions, generally accepted and published best practices in Ontario, original research into traffic safety, and legislative references such as the Ontario Highway Traffic Act. However, as this is a City of Greater Sudbury Policy, it has been developed in recognition of the specific roadway environment in the City of Greater Sudbury, existing pedestrian crossing features, and existing driver expectancy with the City.

Some of the key recommendations contained in the policy include the following:

1. Continue to follow the Ontario Traffic Manual Warrants and Methodologies for implementing protected pedestrian crossings using traffic control signals, mid-block pedestrian signals and intersection pedestrian signals.
2. Consider pedestrian grade separation within the context of potential benefits and costs at locations where other forms of protected crossings are warranted, but cannot be reasonably, economically and practically implemented.
3. With the exception of supervised school crosswalks, marked crosswalks will be discouraged.
4. Utilize warning signs, pedestrian refuge islands and other measures such as reflective delineator posts at unprotected crossings to draw driver's attention to the possible presence of pedestrians.
5. Consider removing crosswalk markings at unprotected crossings on high speed or high volume multi-lane roads.
6. Proactively address pedestrian safety needs and establish a program for reviewing pedestrian crossings.

## **Pedestrian Traffic Study – Crossing Review**

The City of Greater Sudbury has been responsive to the need to better accommodate the safety and security of pedestrians in the roadway environment. To this end, the City initiated a pedestrian crossing policy study and reviews of pedestrian safety and accommodation of "in-service roads". This study is an assessment of these specific pedestrian crossings in downtown Sudbury.

It was the objective of the study to assess the appropriateness of the existing forms of pedestrian crossings. The study provides an inventory of existing conditions and identifies opportunities to improve pedestrian crossing safety. For the recommended measures, an implementation strategy is also identified.

It should be noted that this study commenced in 2006. Since then, some of the recommendations identified in the draft report have been implemented. Other changes that have occurred at the study sites since 2006 have also been noted in report.

The following is a summary of the major findings and recommendations for the three (3) existing pedestrian crossing locations:

### **1. Ste. Anne Road Crossing at the Radisson Inn**

It was concluded that the presence of senior and student crossings at this unprotected marked crossing adjacent to a horizontal curve is not desirable. It was also noted that based on current counts that pedestrian and vehicle volumes approach Ontario Traffic Manual warrants for signals at the crossing and that warrants would likely be met during high volume (spring time) conditions. On this basis, it was recommended that traffic control signals be implemented in the vicinity of the existing crosswalk, coordinated with the adjacent driveways.



The pedestrian signals were installed in 2010.

## **2. Elm Street Crossing at the Rainbow Value Centre**

It is concluded that the pedestrian demand of the current crossing is a function of existing land use (Rainbow Value Centre and the Transit terminal) and that there is no simple solution to change pedestrian desire lines. The location of existing signals does not permit a protected (signalized) crossing with adequate sight distance.

It is recommended that the existing unprotected pedestrian crossing point be retained. The zebra markings offer greater benefit in terms of driver awareness of crossing pedestrians than any existing confusion it may represent in terms of pedestrian and driver right of way. Existing pedestrian signage, which addresses the need to alert pedestrians of the fact that they do not have the right of way and encourages caution, should also remain.

It is also recommended that an educational campaign be implemented to remind drivers and pedestrians of the rules of right of way.

## **3. Brady Street Crossing at Shaughnessy Street**

Considering the high pedestrian volumes that cross Brady Street throughout the day, and the strong pedestrian desire line between the numerous pedestrian generators along Shaughnessy Street and City Hall and the Police station, it is recommended that the existing unprotected mid-block crossing be maintained and enhanced to accommodate this desire line. Recommended crossing enhancements to the mid-block crossing include the application of Zebra style pavement markings similar to those used along Elm Street, as well as the addition of "Yield to Traffic" signs at both ends of the crossing.

In order to eliminate jay-walking at random locations across Brady Street, it is recommended that median enhancements be installed along Brady Street to discourage jay-walking and funnel pedestrians to the enhanced pedestrian crossing. Median enhancements can include the installation of a fence and / or planters similar to the median enhancements applied along Elm Street at the Elm Street crossing.

## **Educational Campaign**

As part of the HDR Corporation's assignment, they will develop an educational brochure regarding pedestrian crossings. In addition to the publication and distribution of the educational brochure it is recommended that Staff, with the support of the Corporate Communications Section, undertake an educational campaign on the rules of right of way. Staff will work with groups such as the Sustainability Mobility Advisory Panel in the promotion of pedestrian safety.

# EXHIBIT B



Tom Davies Square

Brady Street

Minto Street

Public  
Parking Lot

Shaughnessy Street

Sudbury  
Theatre Centre

Paris Street

# EXHIBIT C



HDR Corp  
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Toronto, ON M5H 1X9  
Tel: (416) 777-4900  
Fax: (647) 777-4901  
[www.hdrinc.com](http://www.hdrinc.com)

File: 2.0  
Project # 6583

## Memorandum

**To:** Dave Kivi – City of Greater Sudbury  
**Cc:** Dave Shelsted – City of Greater Sudbury  
**From:** Sasha Naylor – HDR  
Chris Philp – CIMA  
**Date:** September 27, 2013  
**Re:** **Design Considerations for an IPS at Brady Street and  
Shaughnessy Street**

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### 1. BACKGROUND

This memo has been prepared in response to the request from the staff of the City of Greater Sudbury for design considerations for a new set of intersection pedestrian signals (IPS) at Brady Street and Shaughnessy Street.

In January of 2012, HDR developed a pedestrian crossing policy for the City and completed a review of three individual locations where the new policy was applied. One of the locations was at Brady Street and Shaughnessy Street. The resulting report concluded that a controlled crossing (i.e. a pedestrian signal) was not warranted according to the justification requirement of the Ontario Traffic Manual Book 12 and that signal spacing between Shaughnessy Street and the signals at Minto Street and Paris Street were of concern. As a result, a marked, uncontrolled crossing should be maintained. Specifically, the recommendations stated:

*Considering the high pedestrian volumes that cross Brady Street throughout the day, and the strong pedestrian desire line between the numerous pedestrian generators along Shaughnessy Street and City Hall and the Police station, it is recommended that the existing unprotected mid-block crossing be maintained and enhanced to accommodate this desire line. Recommended crossing enhancements to the mid-block crossing include the application of Zebra style pavement markings similar to those used along Elm Street, as well as the addition of “Yield to Traffic” signs at both ends of the crossing.*

*In order to eliminate jay-walking at random locations across Brady Street, it is recommended that median enhancements be installed along Brady Street to discourage jay-walking and consolidate pedestrians to the enhanced pedestrian crossing. Median enhancements can include the installation of a fence and / or planters similar to the median enhancements applied along Elm Street at the Elm Street crossing.*

*To ensure pedestrians use the side of the intersection with the crosswalk, no markings should be shown on the east side of the Brady Street and Shaughnessy Street intersections. Further, Ra-9A signs requiring pedestrians to "Cross Other Side" should be posted across this leg of the intersection. It is also recommended that these "Cross Other Side" signs be regularly enforced.*

This recommendation was presented to the City's Operations Committee during a meeting of April, 2012. After some debate, the Committee determined that staff should investigate a controlled (i.e. signalized) crossing at the Brady Street / Shaughnessy Street location. Given the concerns associated with signal spacing and insufficient justification of the warrant, signals at this location must be planned carefully. This memo provides some considerations and recommendations for the design of IPS's at this location.

## **2. EXISTING CONDITIONS**

An unprotected pedestrian crossing is currently located on the west leg of the Brady Street / Shaughnessy Street intersection, at approximately 95 metres west of the Paris Street intersection and 90 metres east of Minto Street intersection. Brady Street is posted at 50 km/h and carries an AADT of approximately 15,900. There is a fire hall located on Shaughnessy Street, south of Van Horne Street.

The traffic signals at Minto and Paris Streets run coordinated using a 110 second cycle time throughout the day. The storage area for the eastbound left turn lane at Brady Street and Paris Street extends back to the Shaughnessy intersection. Queuing was observed in previous safety reviews to extend from Paris Street beyond Shaughnessy Street in the PM peak hour.

The volume of pedestrians crossing Brady Street at Shaughnessy Street was observed during a traffic count undertaken on November 13, 2012. The count shows that the peak period of the day is between 4:00 and 5:00 pm. During that peak period, 187 pedestrians crossed Brady Street on the west side and 72 crossed Brady Street on the east side for a total of 259 pedestrians per hour.

The November 13, 2012 count also shows that the volumes on Shaughnessy Street are insufficient to meet the thresholds required in the Ontario Traffic Manual for signalization. Furthermore, the spacing to the adjacent intersections violates the minimum spacing guidelines of 215 metres spacing between signals. The 215 metre guideline was selected to reduce the potential for driver confusion when approaching closely spaced signals. In this situation, drivers may focus on downstream signals rather than the signals at the impending intersection.

### 3. ALTERNATIVES

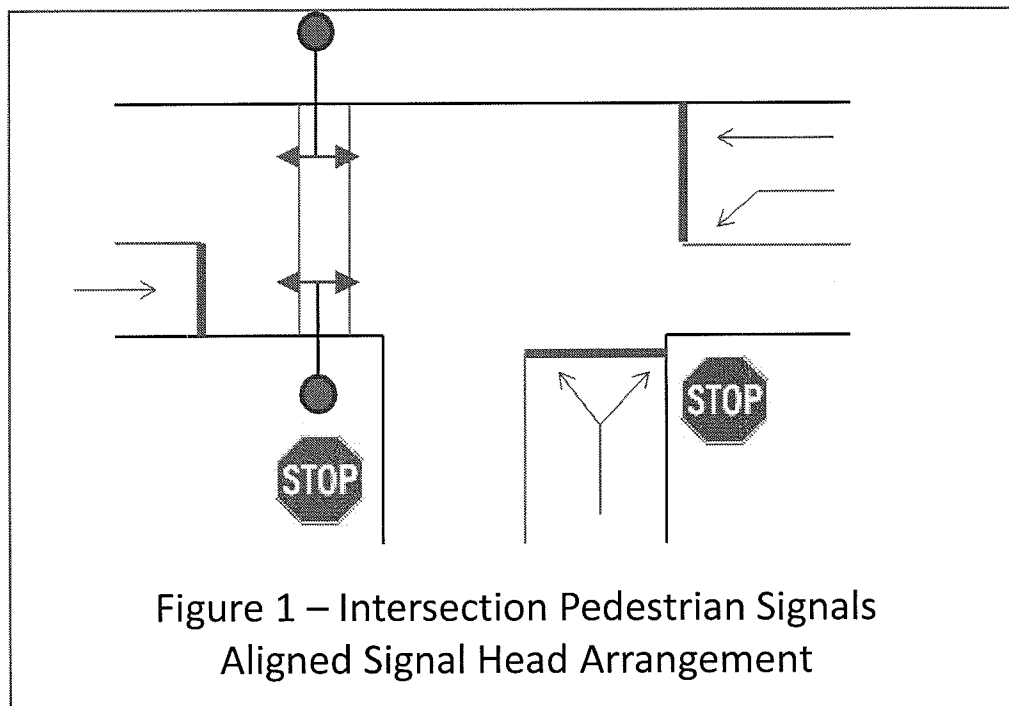
To address the potential for driver confusion, optically programmable signal indications (OPSI) are recommended. OPSI's allow the signal indication to be focussed on a specific footprint on the roadway. With this intended operation, drivers will not see the indication upstream of this footprint area and therefore will not confuse the indication at one intersection with another.

To address the request of the City's Operations Committee and in light of the tight spacing between the proposed IPS and the signals up and down stream, three options were considered for a protected crossing at the Brady Street and Shaughnessy Street intersection:

1. Intersection Pedestrian Signals with an aligned signal head arrangement
2. Intersection Pedestrian Signals with a conventional signal head arrangement
3. Full Traffic Control Signals with a conventional signal head arrangement

#### **Option 1 - Intersection Pedestrian Signals with an Aligned Signal Head Arrangement**

In this option, intersection pedestrian signals are installed on the west leg of the Brady Street and Shaughnessy Street intersection. The west leg is selected to avoid impeding on the westbound left turn storage area. A schematic of this option is shown in Figure 1.



Most agencies in Ontario run IPS's in an uncoordinated (or free) operation. This mode of operation minimizes the delays to pedestrians as they are generally serviced immediately. The alternative (coordinated mode of operation) has the potential to introduce a delay before servicing the pedestrian. The concern with this delay is that pedestrians may not wait and cross the road anyway before getting the right-of-way particularly since there are no other signal indications that would give the pedestrian the sense that the signals are actually cycling.

As a result, and for the purposes of this evaluation, it is assumed that the City would operate the signals shown in Figure 1 in free mode. There are both advantages and disadvantages of this option.

**Advantages:**

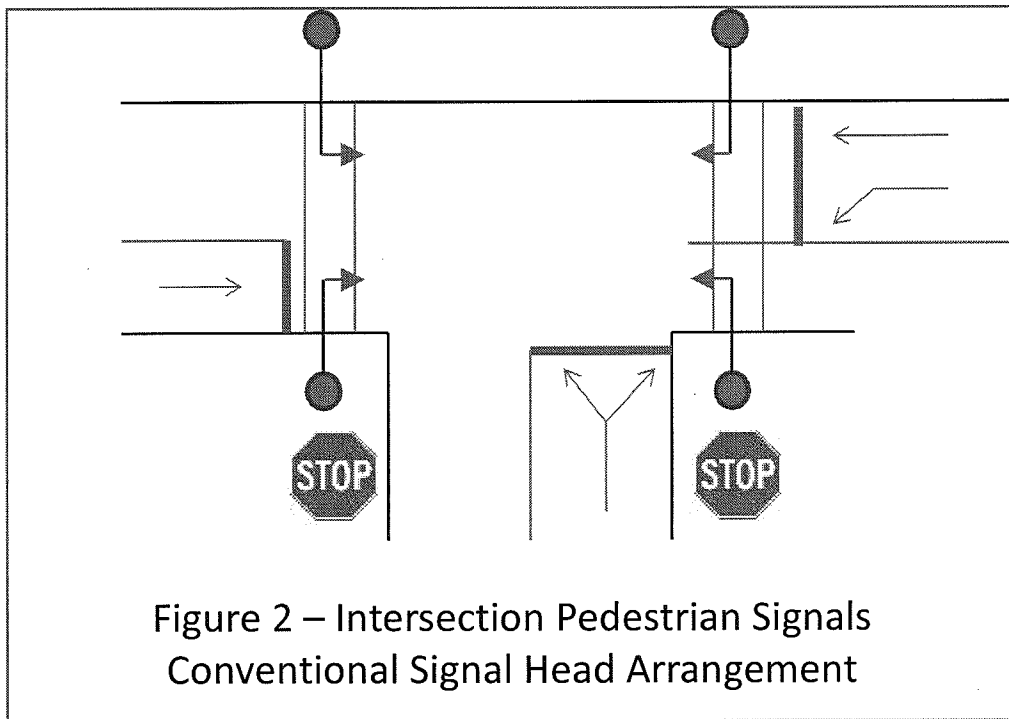
- Traditional design for intersection pedestrian signals
- Fewer poles required
- Lower cost than a full set of signals,
- Typically responds quickly to pedestrian demands by running free

**Disadvantages:**

- Free operation results in the potential to interrupt signal coordination along Brady Street
- OPSI's on Brady Street may confuse drivers (and pedestrians) on Shaughnessy Street since the heads will appear dark
- This orientation results in a repositioning of the stop bar for eastbound traffic some 15 meters further to the west, resulting in an even shorter signal spacing with signals at Minto Street

## **Option 2 - Intersection Pedestrian Signals with a Conventional Signal Head Arrangement**

The second option considered an intersection pedestrian signal but using a four-pole, conventional signal head arrangement. This option is considered to allow the eastbound stop bar to be positioned closer to the Shaughnessy Street intersection than in Option 1. Additionally, to address the pedestrian demand crossing the east leg, this Option introduces a second cross-walk on Brady Street. It is schematically illustrated in Figure 2.



Again, there are advantages and disadvantages of this option.

**Advantages:**

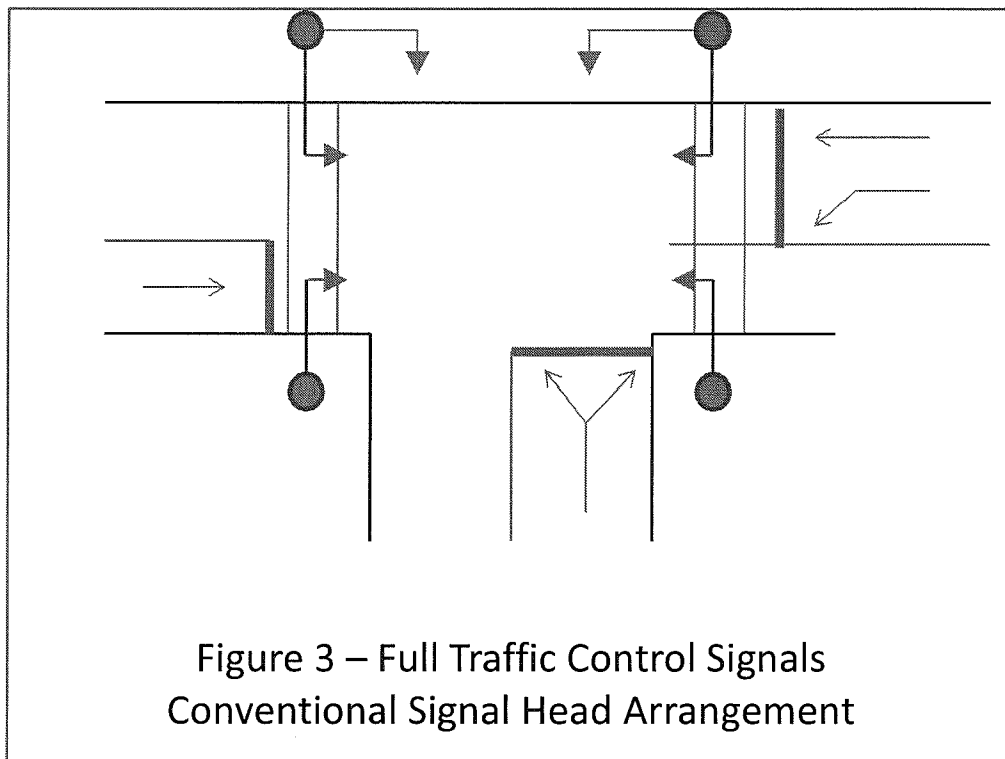
- Allows for optional second Brady Street crossing
- Compresses the intersection and maximizes spacing between stop bars
- Typically responds quickly to pedestrian demands by running in free

**Disadvantages:**

- Non-traditional design
- More costly than Option 1
- Free operation results in a potential loss of coordination on Brady Street
- May result in confusion for drivers (and pedestrians) on Shaughnessy Street particularly with OPSI's on Brady Street

**Option 3 - Full Traffic Control Signals with a Conventional Signal Head Arrangement**

Option 3 was identified as a means of reducing the confusion to drivers waiting on Shaughnessy Street and re-introducing progression along Brady Street. It consists of a full set of traffic signals. The schematic for this option is shown in Figure 3.



Once again, there are advantages and disadvantages of this option.

**Advantages:**

- This option uses a traditional design
- Minimizes driver confusion on Shaughnessy Street
- Coordination maintained along Brady Street
- Compresses the intersection and maximizes spacing between stop bars
- Safer operations during pre-emption

**Disadvantages:**

- Longer delay to pedestrians and traffic on Shaughnessy Street
- More costly than Option 1 and marginally more costly than Option 2
- May set a precedent of installing signals where they do not fully comply with the warrant

**Median Enhancements**

Enhancements to the existing median along Brady Street should be considered in an effort to limit the amount of “jay-walking” across the street and to force pedestrians crossing the street to use the signals at Shaughnessy Street. Median enhancements could include the addition of added landscaping / planting or a fence along the median to limit the potential for pedestrians to cross at various locations between Paris and Minto Streets.



### **Other Considerations**

Consider pedestrian buttons that give audible and visual feedback that the call has been acknowledged.

## **4. RECOMMENDATIONS**

While cost and mobility are important criteria for the City, pedestrian safety is paramount. HDR's original recommendation of maintaining a marked, uncontrolled crossing is still the preferred result. However, should the option of signalization be selected, Option 3 is recommended as it is expected to result in the highest compliance rate for pedestrians while servicing pedestrians on both the east and west legs. It also offers the advantages of signal progression on Brady Street and the ability to provide OPSI's with minimal confusion to motorists and pedestrians.

A median consisting of raised planters should be constructed to discourage pedestrians from crossing mid-block.