



City of
Peterborough

To: **Members of the Committee of the Whole**

From: **W.H. Jackson, Director of Utility Services**

Meeting Date: **May 29, 2017**

Subject: **Report USDIR17-004
Streetscape and Public Realm for Charlotte Street from Aylmer
Street to Park Street**

Purpose

To present the recommended streetscape and public realm plan for Charlotte Street from Aylmer Street to Park Street.

Recommendations

That Council approve the recommendations outlined in Report USDIR17-004 dated May 29, 2017 of the Director of Utility Services as follows:

- a) That the presentation by AECOM regarding the proposed streetscape and public realm improvements to Charlotte Street between Aylmer Street and Park Street be received for information;
- b) That the Enhanced Pedestrian Realm with Enhanced Commercial Features and Parking Streetscape (Concept No. 3) as shown in Report USDIR17-004 be approved for Charlotte Street from Aylmer Street to Park Street;
- c) That the undergrounding of the electrical distribution system along Charlotte Street between Aylmer Street and Park Street be included in the concept identified in Recommendation b); and
- d) That a King Street Cycling Lane Concept Design Study be included in the 2018 Capital Budget with a work plan to undertake public consultation and prepare a design for implementation as funding permits.

Budget and Financial Implications

The budget implications of the Charlotte Street (Aylmer Street to Park Street) Streetscape Plan detailed in Report USDIR17-004 were identified and adopted by Council at its meeting of November 14, 2016 during consideration of Report USDIR16-012.

To underground the electrical distribution system on Charlotte Street will cost an additional \$850,000 beyond the cost shown in Report USDIR16-012. Based on the present construction schedule, these funds will be required in 2019. The additional electrical distribution undergrounding funds do not include burying the overhead crossings at Park, Reid, Rubidge, Stewart, Bethune, and Aylmer streets. Any undergrounding of the cross electrical distribution at these intersections would be designed and constructed at extra cost.

Background

City Council, at its meeting of November 14, 2016, in considering Report USDIR16-012 requested:

- a) That staff report to Council on the matter of undergrounding the existing overhead electrical distribution system on Bethune Street from Townsend Street to Dublin Street and on Charlotte Street from Aylmer Street to Park Street.

The intent of this report is to provide Council with:

- A detailed streetscape and public realm design recommendation on Charlotte Street West between Aylmer Street to Park Street; and,
- To provide the results of the investigation into the proposed undergrounding of the existing overhead electrical distribution system on Charlotte Street between Aylmer Street and Park Street.

1. Streetscape Planning Process

A new storm sewer will be installed on Charlotte Street between Park Street and Aylmer Street as part of the larger Bethune Street project. Similar to Bethune Street, staff believe the streetscape of Charlotte Street should be considered carefully prior to reinstating the road.

The streetscape planning process involved a number of steps. Existing conditions had to firstly be ascertained. The planning process was developed to ensure maximum stakeholder input and dissemination of information. A number of streetscape alternatives were then developed and evaluated resulting in the Recommended Plan.

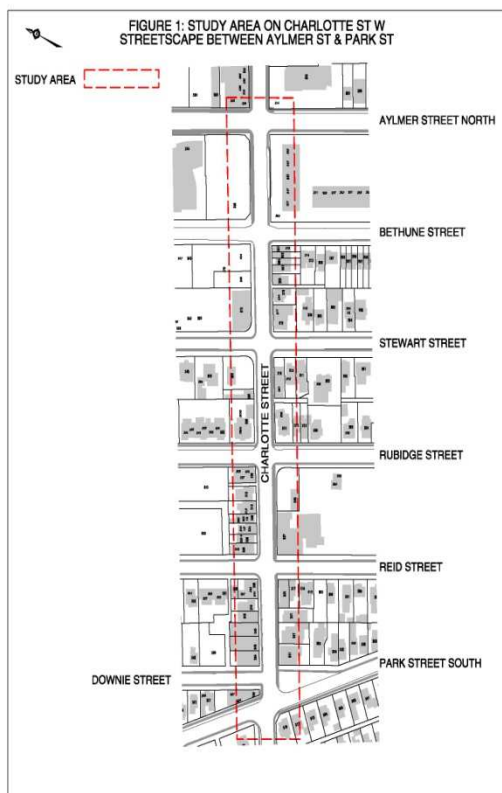
1.1 Existing Conditions

The subject section of Charlotte Street is designated as the “Charlotte Street West Business District”. The study area is shown in Figure 1.

Charlotte Street is constrained by a 20m right-of-way with many existing buildings built up to the right-of-way boundary with no setback. Parking in the area is limited especially with the projected loss of parking on Louis Street, the Louis Street parking lot and Bethune Street.

Charlotte Street is the primary east-west commercial street within the downtown. Beginning near the Otonabee River, it continues west as a commercial street for nine blocks before transforming into a residential street at Park Street.

All stakeholder groups including pedestrians, cyclists, motorists, and transit users were considered in the development of streetscape options for this section of Charlotte Street.



1.2 Cumulative Effects on Parking

Charlotte Street is just one of the projects in the immediate area that will have an impact on the availability of parking. The Bethune Street reconstruction and streetscape plan together with the Urban Park (Louis Street Parking Lot), Louis Street and the section of Charlotte Street west of Aylmer Street are other areas where existing on or off street parking is expected to be reduced. It is important to acknowledge and understand this cumulative effect in the development and evaluation of streetscape alternatives for Charlotte Street.

1.3 Streetscape Concepts Considered

The following three streetscape and public realm concepts were evaluated for Charlotte Street between Aylmer Street and Park Street (Charlotte Street West):

- Concept 1: Enhanced Bicycle Realm – Painted On-Street Bike Lanes;
- Concept 2: Enhanced Bicycle Realm – Protected Bike Lanes; and,
- Concept 3: Enhanced Pedestrian Realm – Enhanced Commercial Features and Parking.

Appendix A provides the detailed concepts, project context, transportation issues, consultation and evaluation of the three concepts.

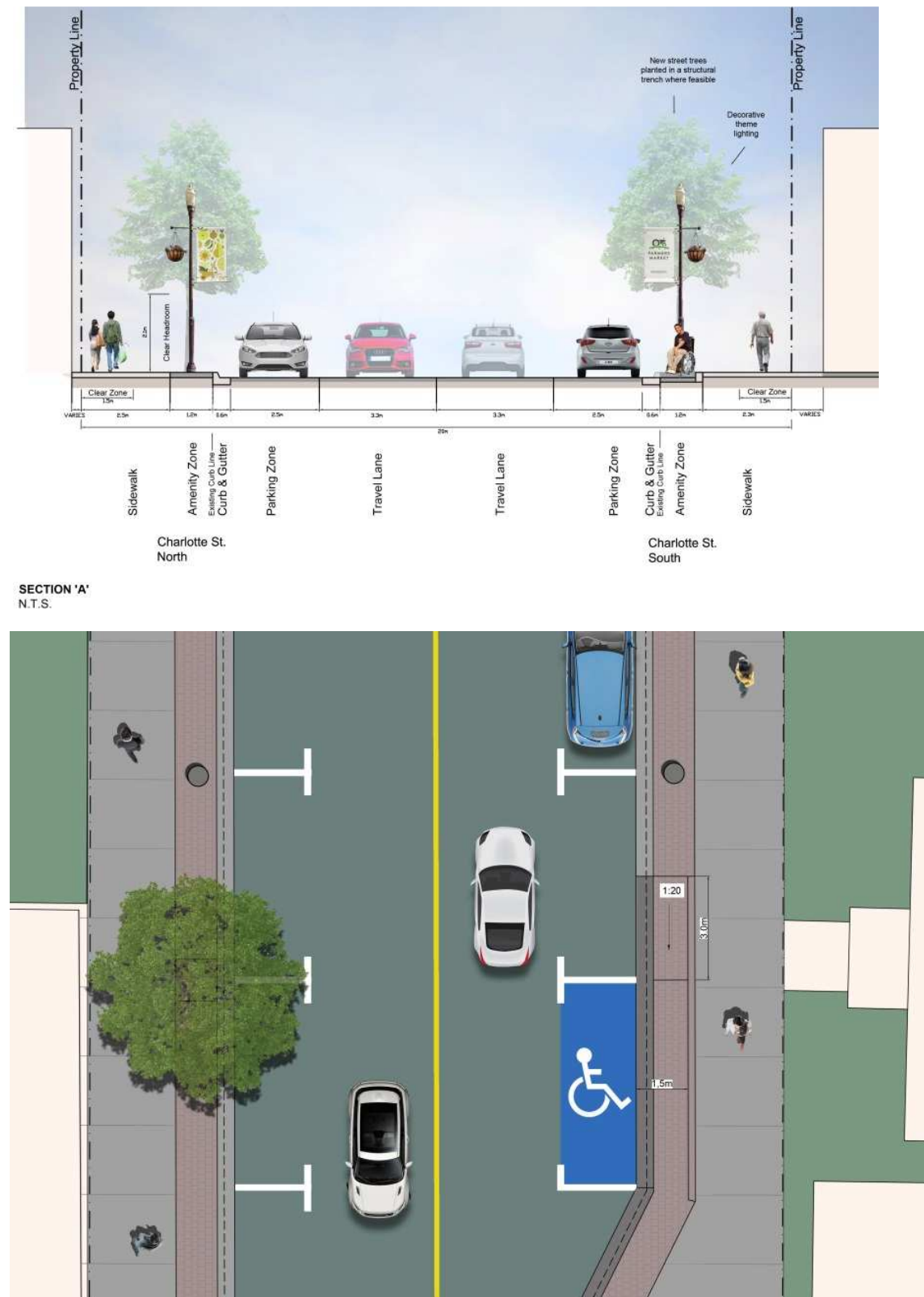
Concepts 1 and 3 were the initial options presented at the original PIC but, in response to comments received requesting protected bicycle lanes on Charlotte Street, Concept 2 was developed.

The proposed streetscape designs for Charlotte Street West were presented at the Public Information Centres (PICs) 1, 2 and 3 for the Bethune Street Project during 2016 and also at the PIC for the Urban Park/Charlotte Street East on December 8, 2016.

2. Recommended Streetscape Plan for Charlotte Street from Aylmer Street to Park Street

The recommended option for Charlotte Street West is Concept 3: Enhanced Pedestrian Realm – Enhanced Commercial Features and Parking as shown in Figure 2.

Figure 2: Recommended Streetscape Plan for Charlotte Street from Aylmer Street to Park Street



3. Discussion Regarding Cycling on Charlotte Street

The Comprehensive Transportation Plan (2012) identified both Charlotte Street and King Street as having potential to accommodate cycling facilities for east-west cycling movements in the downtown core. In response to some comments received at the PIC's requesting protected cycling lanes on Charlotte Street, a high-level analysis of the feasibility of this type of facility was undertaken. The analysis indicated that Charlotte Street is not well suited for protected cycling facilities and suggests King Street would be a more appropriate and preferred alternative to provide protected bicycle lanes. Likewise, the traffic mix and volume along Charlotte Street would indicate shared cycle lanes would not be the best practice solution for this condition.

Based on the available information, it would be more advantageous to cyclists if the City's bicycle network included King Street as the preferred route between Millennium Park and Park Street or even as far as Monaghan Road and beyond. More work is required to ascertain the viability of this option and staff is of the opinion this study (King Street Cycling and Concept Design Study) should be undertaken in 2018 so that implementation might occur at the same time that Charlotte Street is reconstructed.

4. Costs for Undergrounding of Electrical Distribution Network

The estimated cost to underground the existing electrical distribution network on Charlotte Street between Aylmer Street and Park Street is \$850,000. Additional costs would be incurred at intersections for the north-south intersecting electrical supply lines if these lines were also to be buried.

From a land-use/urban design perspective, Charlotte Street is the City's main east-west street with a variety of commercial buildings constructed to the street-line. It is a primary gateway into the Downtown, capable of offering unencumbered views to the City's iconic Clock Tower. As well, the Official Plan Update proposes to extend the Core Area to include Charlotte Street, west to Park Street. In consideration therefore, staff believe the conversion of the overhead utilities to underground on Charlotte Street in order to "clean-up" the air space, allowing for the installation of ornamental street lighting, street trees and the construction of new commercial buildings to the street-line, is in keeping with the streetscape improvements completed in the past in the Downtown on Hunter Street, George Street and Water Street.

Summary

Three design concepts/options for the future streetscape and public realm of Charlotte Street between Aylmer Street to Park Street were presented and evaluated. Concept 3: “Enhanced Pedestrian Realm – Enhanced Commercial Features and Parking” is the alternative that is recommended for adoption.

As part of the evaluation process, it was determined that the provision of protected cycling infrastructure is best done on King Street and a future study has been suggested so that design concepts can be developed for presentation, public consultation and implementation as funding permits.

An estimated cost to underground the electrical distribution system on Charlotte Street from Aylmer Street to Park Street is provided and based on this estimate, it is recommended that undergrounding of the electrical distribution system be undertaken on Charlotte Street. This is a business/commercial area that could benefit from undergrounding the electrical distribution system and it would be in keeping with previous Downtown streetscape improvements completed on George Street, Hunter Street and Water Street.

Submitted by,

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Appendices:

Appendix A: Charlotte Street West, Streetscape and Public Realm

Appendix B: Charlotte Street, Transportation Assessment

APPENDIX A

Charlotte Street West, Streetscape and Public Realm

The Project Context

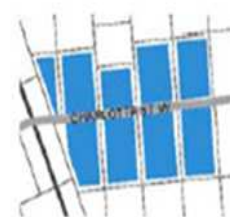
The Bethune Street Project includes the detailed design of a new streetscape for Charlotte Street between the east side of Park Street and the west side of Aylmer Street. This streetscape construction opportunity arose because of the need for a new 100-year storm sewer underneath Charlotte Street. Extensive public consultation provided a wide range of comments, preferences and concerns which have been considered in the development of options and the recommended scenario. The key consideration introduced into this design exercise was the integration of a formal bicycle route along Charlotte Street between Park Street and Aylmer Street. The design team expanded the scope of the investigation to consider this integration in order to reach a consensus on the preferred streetscape concept for Charlotte Street.

Designs for Charlotte Street from Aylmer to Park Streets (referred to as Charlotte Street West) were presented at all the public information centres for the Bethune Street Project – PIC 1, PIC 2 and PIC 3 – during 2016. They were also presented on December 8, 2016 at the public information centre for the Urban Park and Charlotte Street East. Included in the December 8, 2016 session was an in-depth public survey, both hard copy and on-line, which explored the public's preference for the streetscape design and traffic flow along Charlotte Street. In response to the public's strong desire for a formalized cycling route into and out of downtown, the design team investigated the feasibility of cycling along Charlotte Street.

The scope of this design assignment did not include transportation planning, including active transportation and bicycle network planning. However, to ensure the best streetscape design was developed, further investigation and consideration was given to Charlotte Street (between Park Street and Aylmer Street) as a formal cycling route.

Due to right-of-way width restrictions and this area's designation as the "Charlotte Street West Business District" the design team focused on defining the transportation operational parameters and resultant impacts to the public realm. In addition to the physical constraints along the corridor, current City policies and initiatives informed the investigation and assessment of traffic along Charlotte Street. The design process included reference to background Information, such as the Central Area Master Plan, the City of Peterborough Official Plan, as well as the City of Peterborough's Municipal Cultural Plan. Also included as input and consideration was the information of the Comprehensive Transportation Plan (2012) which included cycling in downtown Peterborough.

**Charlotte Street
West Business
District**



The Central Area Master Plan and Official Plan identify Charlotte Street as a separate, pedestrian, small-scale Business District with a unique character that forms an extension of the Commercial Core. Development should feature uses that generate pedestrian traffic (especially retail) at grade and buildings designed to ensure continuity of facades and heights of buildings in the vicinity. Charlotte Street also serves as a gateway to downtown.

Schedule B(a), Bikeway Network of the Official Plan of the City of Peterborough identifies Charlotte Street between Park Street and Bethune Street as an On-Road Bikeway. Section 5.6 of the Official Plan of the City of Peterborough addresses the Bikeway Network, and includes the following objectives:

- Provide bikeways and support facilities, in accordance with Schedule B(a) of the Official Plan and the 2012 Comprehensive Transportation Plan;
- Incorporate appropriate design measures to improve conditions for accommodating non-motorized forms of travel; and,
- Wherever possible, bicycle and pedestrian networks will be separated from each other, physically and/or through use of surface markings and signage, to avoid potential conflicts.

The City of Peterborough's Comprehensive Transportation Plan (2012) includes the following guidelines:

- The east-west cycling network in the downtown is planned on McDonnell Street (now existing), Hunter Street (now existing), Charlotte Street, King Street, and Wolfe Street (connecting to the rail bridge trail);
- The proposed cycling network does not provide an indication of the facility type (e.g. shared-use facilities, cycling lanes, cycling tracks, etc.); and,
- It is recommended that a Downtown Cycling Master Plan be developed to identify issues and opportunities to work around challenging segments in the downtown area requiring special attention.

In response to the public interest in cycling infrastructure along Charlotte Street, a more in-depth investigation and assessment was undertaken and Appendix B (Charlotte Street, Transportation Assessment) provides a summary of issues and opportunities in this regard. The investigation determined the traffic mix and volume along Charlotte Street precludes shared cycle lanes as a viable option. Shared cycle lanes are not the best practice solution for this condition.

Other Developments in the Downtown: Parking Impacts

Other City projects including Charlotte Street East, the Urban Park at Louis Street and the Bethune Street Project are all in close proximity to each other and will result in alterations and impacts in the downtown. The cumulative impact of these projects on parking could be substantial. The following changes are being proposed to parking in the downtown area:

- Bethunescape will result in approximately 56 fewer on-street parking spaces;
- The Louis Street parking lot will be replaced, resulting in the removal of approximately 85 regular parking spots along with 3 accessible parking spots;
- Transformation of Louis Street into the new park will result in 11 fewer parking spaces; and
- The streetscape proposals for Charlotte Street both east and west of Aylmer Street will most likely result in less on-street parking spaces than presently exist.

In summary, parking in the area could be reduced by upwards of 155 spaces before any alterations are considered for the Charlotte Street West area. The City is presently engaged in a Parking Study of the downtown core. The impacts of these various projects will be factored into the work that is being undertaken in the Parking Study.

Consultation, Collaboration and Conceptual Design Process

The following Public Information Centres took place along with meetings between municipal staff and officials from AECOM:

- Bethune Street Project Public Information Centers 1, 2 and 3 included design discussion focusing on Charlotte Street West;
- The December 8, 2016: Public Information Centre for Charlotte Street West and East and Urban Park;
- On February 15, 2017, City of Peterborough staff along with AECOM representatives met to review preferred streetscape concepts; and,
- March 9, 2017, City of Peterborough staff along with AECOM representatives conducted a workshop to explore best practice for bicycle infrastructure along Charlotte Street.

Streetscape Concepts

For Charlotte Street West between Aylmer Street to Park Street, the following three streetscape concepts were explored:

- Concept 1: Enhanced Bicycle Realm – Painted on-street Bike Lanes;
- Concept 2: Enhanced Bicycle Realm – Protected Bike Lanes; and
- Concept 3: Enhanced Pedestrian Realm – Enhanced Commercial Features and Parking

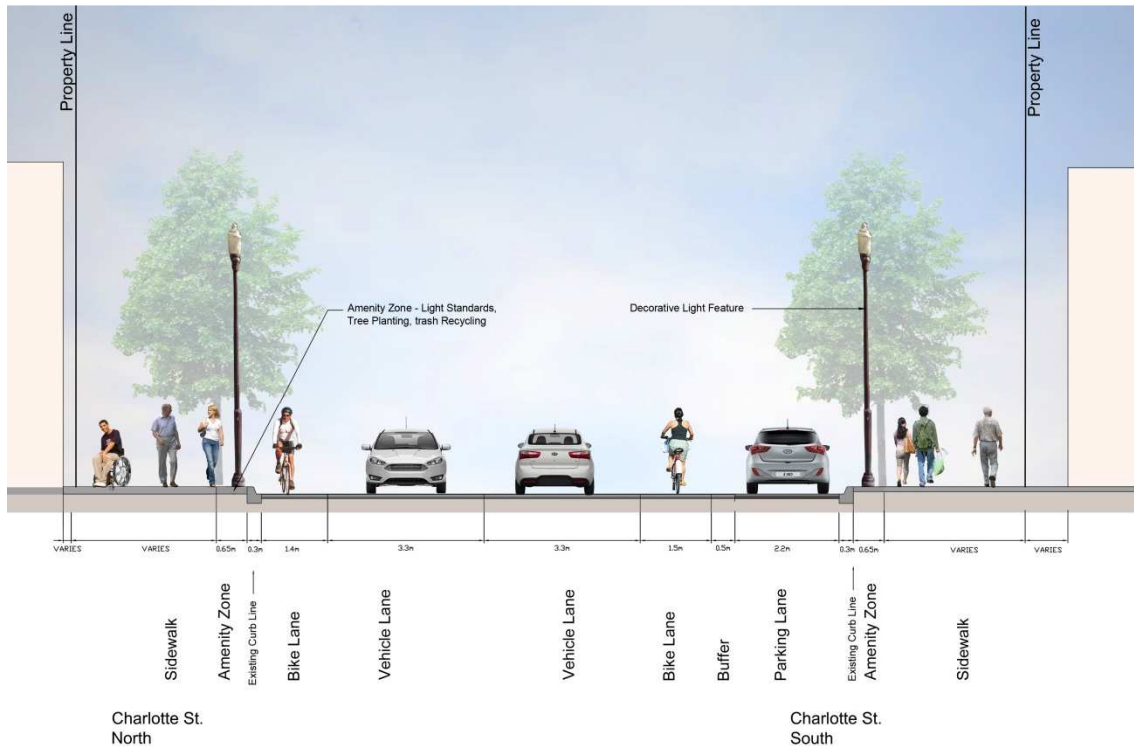
Charlotte Street is constrained by a 20m right-of-way with many existing buildings built up to the right-of-way boundary with no setback. It is not possible to fully satisfy all concept principles (see Appendix B) however, the three concepts attempt to partially satisfy nearly all principles and improve conditions for vehicles, public transit, pedestrians and cyclists while optimizing amenities for either cyclists or pedestrians.

Key Components of the Concepts

The most important components of the concepts are:

- Reconstruction of sidewalks to accommodate a clear zone and additional landscaping;
- Two vehicle lanes, one in each direction;
- Integration of separated cycling infrastructure;
- Majority of parking maintained;
- Introduction of new street trees and decorative light fixtures;
- Enhancements to sidewalk and public realm along the amenity zones; and,
- Enhanced connection to the proposed Louis Street Urban Park.

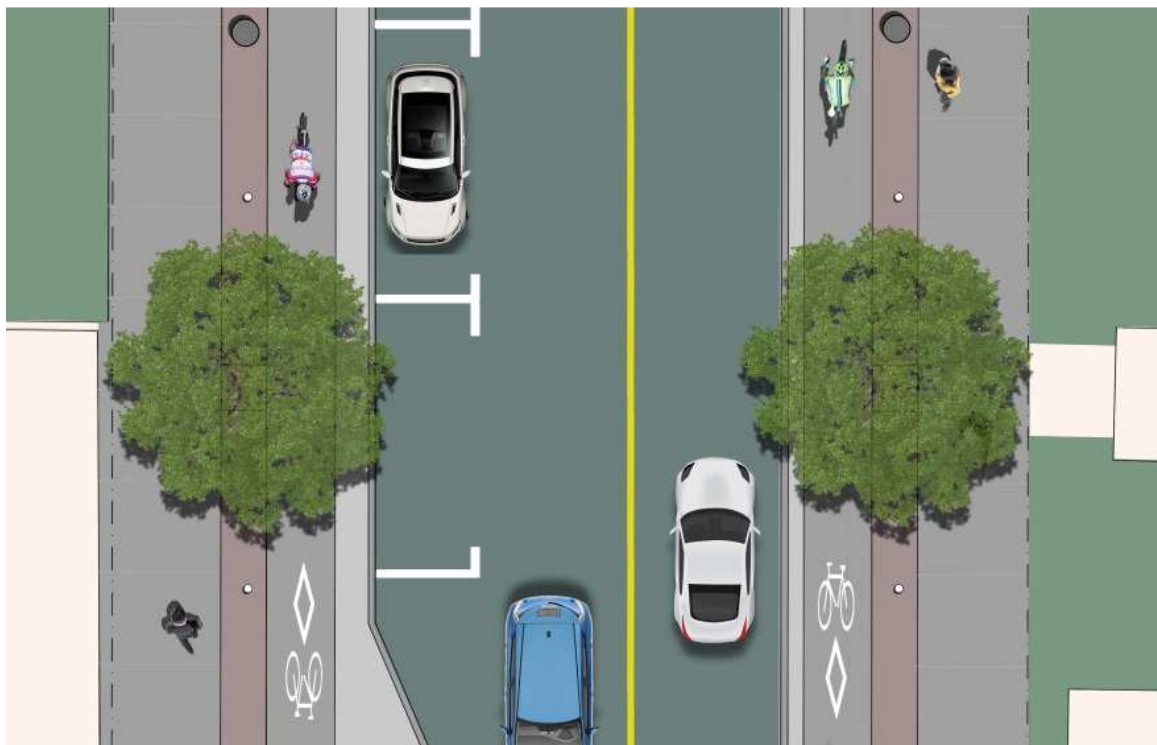
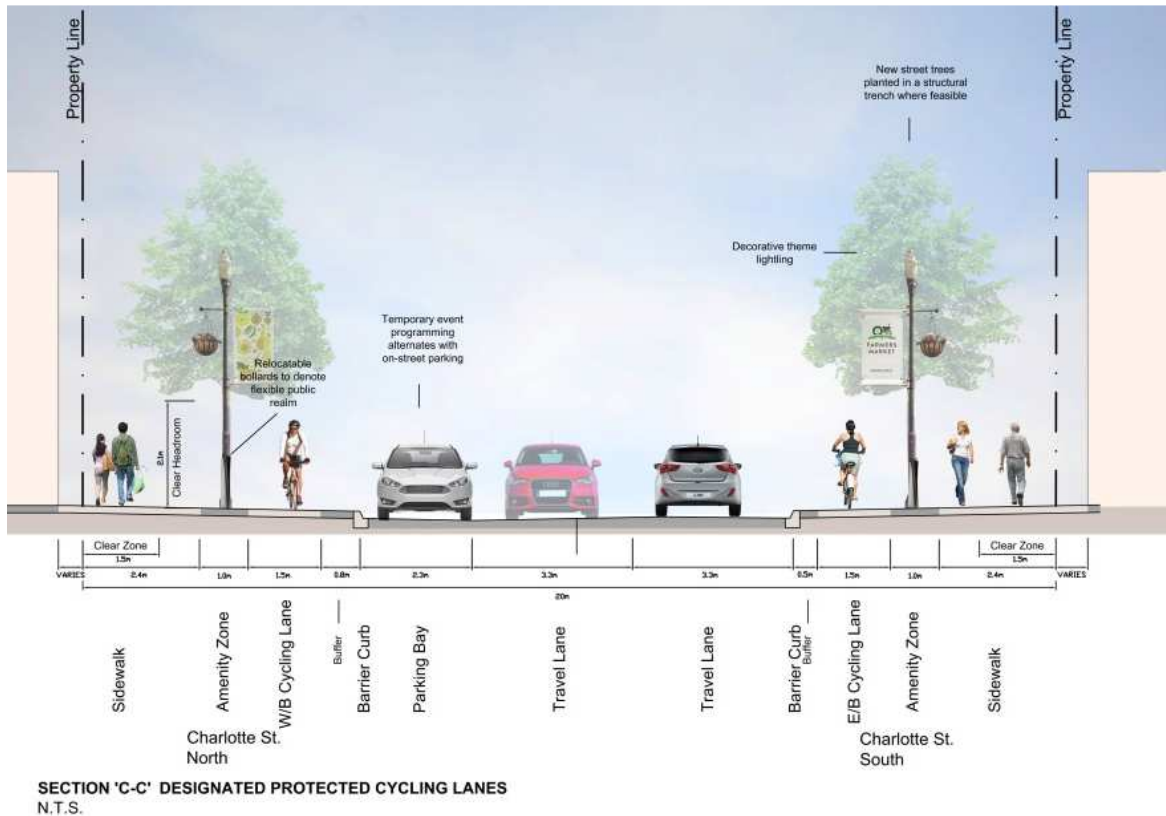
Concept 1: Enhanced Bicycle Realm – Painted On-Street Bike Lanes



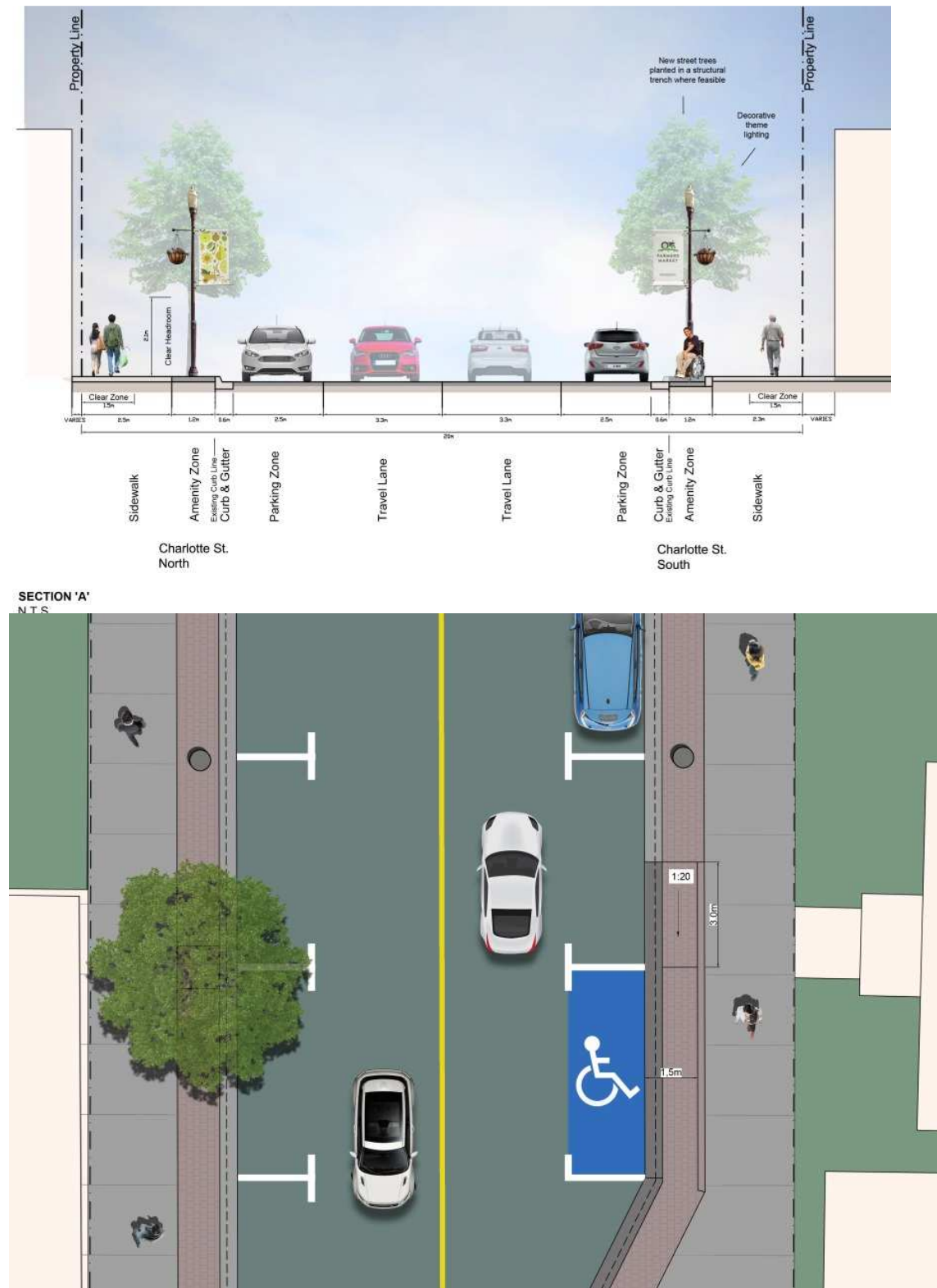
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Concept 2: Enhanced Bicycle Realm – Protected Bike Lanes



Concept 3: Enhanced Pedestrian Realm – Enhanced Commercial Features and Parking



Evaluation of Streetscape Concepts along Charlotte Street West

Table A.1 - Charlotte Street West, Evaluation of Streetscape Concepts includes a quantitative and qualitative inventory and assessment of the three concepts that were explored. For comparison purposes, the current condition is also included.

Table A.1 – Evaluation of Charlotte Street West Streetscape Concepts

Streetscape Characteristic	Current Condition	Concept 1: On-street Bike Lanes	Concept 2: Protected Bike Lanes	Concept 3: Enhanced Pedestrian
On-street parking spaces	58	17	15	47
On-street accessible parking spaces	0	3	3	7
Total Parking spaces	58	20	18	54
Street trees	2	44	41	38
Loading Zones	0	1	1	1
Decorative light fixtures	3	28	26	24
Re-locatable bollards	no	no	no	no
Transit Stops	4	4	4	4
Benches	2	10	10	10
Café areas	no	no	no	yes
Shortened Pedestrian Crossings	no	no	no	yes
Clear Delineation between Cyclists and Pedestrians	yes	Not at intersections	Not at intersections	yes
Best Practice for Cycling Infrastructure	no	no	yes	no
AODA Compliant within ROW	no	yes	yes	yes

Following thorough analysis and investigation, the design team came to a clearer understanding of the transportation and traffic characteristics of the Charlotte Street West design so that the parameters could be clarified and refined. Charlotte Street is the major east-west transportation route into and out of downtown Peterborough and, as such, carries a high volume of mixed-use traffic throughout the day. In addition, pedestrian traffic is maintained by on-street parking, providing convenient access to street-front businesses and four transit stops. Given this operation, best practices for the provision of cycling infrastructure along Charlotte Street points to an alternative to the provision of on-street bike lanes, necessitating further right-of-way changes while impacting other uses. In response, the design team explored two bicycle enhancement options and one pedestrian enhancement option.

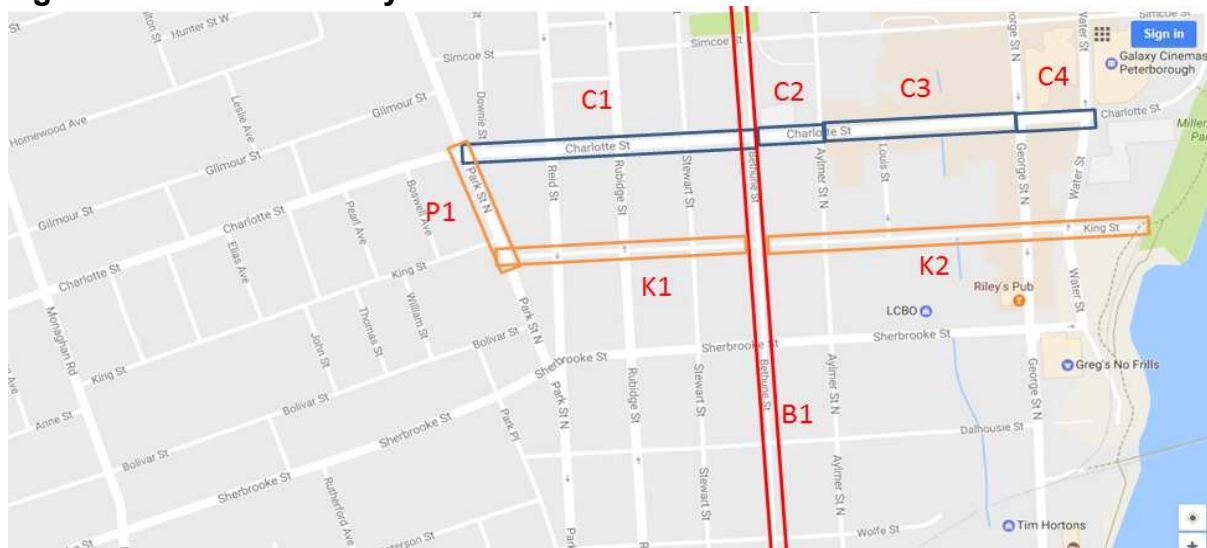
On-street bicycle lanes are not considered a best practice solution due to the high volume of vehicular traffic along Charlotte Street West, between Park and Aylmer Streets. The best practice solution is to introduce protected bike lanes, separate from the travelled roadway by a physical barrier. The right-of-way width cannot accommodate the best practice solution of protected bike lanes without significant impacts to the commercial viability of the street, e.g., reduction in parking, confusing bicycle and pedestrian movements with potential conflicts at crossings as well as with reduced pedestrian zones.

The streetscape concept/design recommended and that which best suits the advancement of the “Charlotte Street West Business District” is Concept 3: Enhanced Pedestrian Realm with Enhanced Commercial Features. This concept enhances pedestrian comfort and minimizes on-street parking loss. This recommendation was made following a thorough analysis and evaluation of the various concepts/options, best practices and all relevant considerations given. However, the public consultation process also identified the very strong desire to formalize an east-west bicycle route into and out of downtown Peterborough.

Accommodating Cyclists in the Downtown

In consideration of the strong desire for a formal east-west bicycle route to and from the downtown, the design team promotes the completion of a comprehensive downtown bicycle network master plan. This plan is also recommended within the City’s Transportation Master Plan.

Figure A.1 - Potential Bicycle Networks and Corridors



Promote a Comprehensive Downtown Bicycle Network Master Plan

Charlotte Street West, between Aylmer Street and Park Street has a high volume of vehicles and cannot accommodate the best practice solution of protected bike lanes without significant impacts to the commercial viability of the street, e.g., reduction in parking, confusing bicycle and pedestrians movements with potential conflicts at crossings as well as reduced pedestrian zones. Current investigation suggests a bicycle network should be introduced along King Street (K1 and K2) between Millennium Park and Park Street, or possibly Monaghan Road, and beyond, as shown in Figure A.1.

APPENDIX B

Charlotte Street Transportation Assessment

Introduction

Charlotte Street is the primary east-west commercial street within downtown Peterborough. Beginning near the Otonabee River, it continues west as a commercial street for nine blocks before transforming into a residential street at Park Street. A portion of Charlotte Street, from Aylmer Street to Park Street, will need to undergo construction concurrently with Bethune Street for the installation of a new storm sewer main. The reconstruction of Charlotte Street presents an opportunity to reconfigure the street and improve streetscaping. It also presents an opportunity to tie into the streetscaping plan being developed for the new urban park at Louis Street, which includes streetscaping improvements along Charlotte Street from Aylmer Street to Water Street.

Concept Principles

The project team received input from the public and stakeholders on the reconfiguration of Charlotte Street during the consultation sessions that occurred during the project.

Key messages included:

- Increase the width of sidewalks and improve the quality of the sidewalk surface;
- Add trees and other landscaping to visually break up the wall-to-wall hardscape spanning the right-of-way;
- Implement exclusive cycling infrastructure; some respondents noted a preference for a physically separated cycle track;
- Optimize on-street parking to provide space for other uses, while maintaining accessible on-street parking and loading spaces where appropriate;
- Maintain transit operations through the corridor and improve the amenities provided at bus stops;
- Investigate the feasibility of raising the street to eliminate steps into existing buildings; and
- Create a gateway feature at the Park Street intersection, consistent with previous downtown gateway planning studies.

The key messages were used to guide concept development but the messages are not all mutually exclusive and, accordingly, not every message could be accommodated. Additionally, since the scope of reconstruction on Charlotte Street is less intensive than Bethune Street, it has been assumed (to minimize cost) that the existing lane configuration would remain, with no addition or removal of turn lanes wherever possible. Turn lane lengths have been maintained at existing lengths where feasible. The only

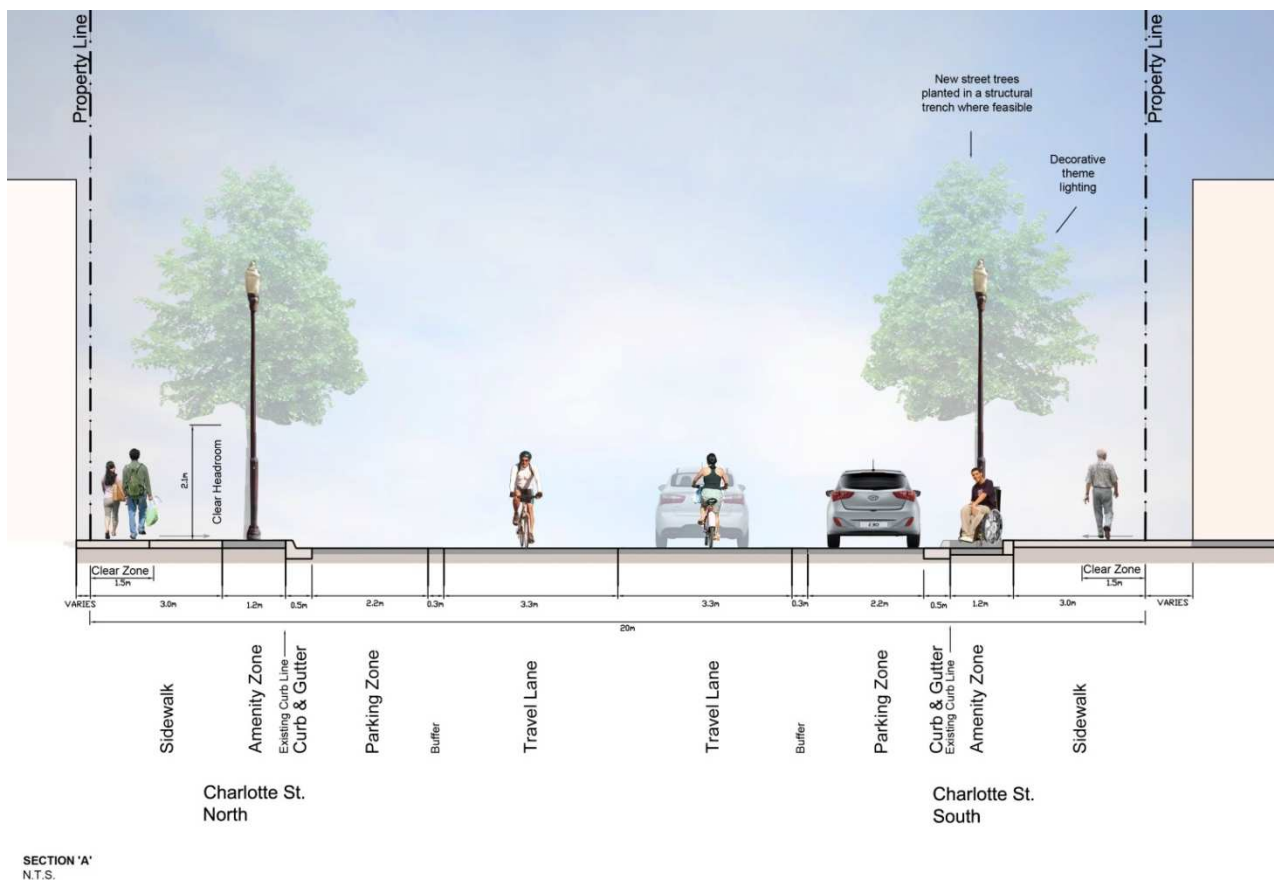
change to signalization would occur at Bethune Street, where signals will be installed to facilitate north-south pedestrians and cyclists on Bethune Street. It was also desired that existing curb lines be maintained as close to their existing locations as possible.

Overview of Recommended Concept

Charlotte Street is constrained by a 20 m right-of-way with many existing buildings built up to the right-of-way boundary with no setback. It is not possible to fully satisfy all concept principles described in the previous section. However, the recommended concept does at least partially satisfy nearly all principles and improves conditions for vehicles, public transit and pedestrians.

A midblock cross section of the recommended Charlotte Street concept is shown in **Figure B.1**.

Figure B.1: Midblock Cross Section of Charlotte Street Concept



Key components of the recommended concept include:

- Reconstruction of the sidewalks to accommodate additional landscaping;
- Two vehicle lanes, one in each direction;
- Majority of parking maintained, several accessible parking spaces added;
- Elevated intersection platforms and sidewalk bump-outs to signify pedestrian priority zones and reduce time for pedestrians to cross Charlotte Street;
- Enhancements to the sidewalk and public realm; and
- Enhanced connection to the proposed Charlotte Street East and Louis Street Urban Park projects.

Concept Features and Operations

The following subsections describe the features and operations of the recommended Concept in more detail.

Pedestrians

The existing sidewalks will be reconstructed where required to improve their condition and provide for additional landscaping and a clearly demarcated amenity zone between the sidewalk and the remainder of the street. Midblock, the existing widths will generally be maintained. At bus stops, the parking bays will be discontinued and the sidewalk will be widened. Also, at intersections without left turn lanes, the parking bays may be discontinued and the freed space will be allocated to sidewalk bump-outs. During the detailed design phase of the project, care will be taken to ensure that the cross walks and parking bays comply with AODA requirements and are clearly delineated from the sidewalk through tactile paving and other measures. The signalization of the Bethune Street intersection would provide an additional controlled crossing point across Charlotte Street. Wherever feasible, existing signalized intersections would be reconstructed so that crosswalks intersect perpendicular to the curb instead of on the curved corner of the sidewalk, aiding navigation of the intersection by people with visual impairments or users of mobility devices.

Cyclists

The preferred Charlotte Street concept acknowledges that the “best practice” solution for cycling on Charlotte Street requires a protected and separate cycle track on each side of the street. Constraints related to right-of-way width throughout the study area do not allow for separated facilities without reductions in sidewalk width or removal of one side of parking. Concepts with on-street bike lanes and protected bike lanes were investigated for implementation along Charlotte Street but were discounted due to the reduction in available parking required for a satisfactory bicycle facility to be developed. More specifically, physically separated facilities were investigated for potential implementation within the study area since some participants in the public and stakeholder consultation sessions expressed a preference for this type of infrastructure.

Suggestions included unidirectional cycle tracks on either side of the street or a bidirectional cycle track on one side of the street.

Well-designed unidirectional cycle tracks would require additional width compared to conventional bicycle lanes. With conventional bicycle lanes, a faster cyclist may use the vehicle lane to pass a slower cyclist in the bicycle lane. As cycle tracks are physically separated, using the vehicle lane to pass is much more difficult or impossible.

Therefore, the cycle track must be wider than a bicycle lane to accommodate cyclists of all abilities. This width is not available unless all parking was removed from Charlotte Street or sidewalks were narrowed from existing widths.

Though sufficient space is available for a bidirectional cycle track with a reduction in parking, it is not a desirable facility type along Charlotte Street. Bidirectional cycle tracks along two-way streets have more conflicts at intersections and driveways compared to unidirectional cycle tracks or bicycle lanes. Given the frequency of intersections and driveways along this section of Charlotte Street (intersections are spaced approximately 90 m apart) and the lack of space available for dedicated turn lanes for conflicting movements (which would enable protected signal phasing), a bidirectional cycle track is not recommended.

Transit

Existing transit operations along Charlotte Street will be maintained or enhanced at the discretion of the City. Vehicle lanes of 3.3 m width provide sufficient width to accommodate transit buses. As discussed above, the sidewalk may be widened at bus stops, providing space for additional amenities. The concept design has assumed that all bus stops would remain at their existing locations. Further work should be undertaken in future stages of design to investigate whether bus stops should be relocated and/or consolidated to provide more space for other uses or be designed as in-lane transit stops as part of a strategy to improve transit schedules.

Handi-Van service is also available on an appointment basis for qualifying residents. Handi-Van trips may begin or end on Charlotte Street depending on the needs of the user.

Vehicles

Though a detailed traffic analysis has not been completed for Charlotte Street, it is anticipated that impacts to vehicular traffic operations will be minor compared to existing conditions. Existing turn lanes and signalization would be retained. The additional signal at Bethune Street may slightly add to delay for through vehicles on Charlotte Street, though this signal would be coordinated with other signals along Charlotte Street to support progression along the corridor. The through lane widths of 3.3 m will be sufficient for larger vehicles and the left turn lane widths of 3.0 m is consistent with other urban intersections in Peterborough and elsewhere in Ontario.

Some of the existing parking spaces will be removed to create space for other uses. Due to turn lanes, bus stops, and frequent intersections, the amount of parking on Charlotte Street is currently limited on each block. Though there is a substantial amount of public and private parking available within downtown Peterborough, some businesses have limited off-street parking available and may be disproportionately impacted by the reduction of on-street parking.

Other proposed development projects in the study area are also scheduled to reduce the amount of surface parking quite significantly. These projects include the Bethune Street project, the Louis Street Urban Park and Charlotte Street east. Further consideration of on-street parking impacts, refinement of the parking bays included within the concept, accessible on-street parking designs, and vehicle loading bays should be performed as the design progresses.

Conclusion

Charlotte Street from Aylmer Street to Park Street will be reconstructed as part of the larger Bethune Street Reconstruction Project. This affords an opportunity to reconfigure Charlotte Street so that it provides a better environment for motorists, walking and cycling. Key components of the recommended Charlotte Street concept include:

- Reconstruction of sidewalks to accommodate additional landscaping;
- Two vehicle lanes, one in each direction;
- Majority of parking maintained, several accessible parking spaces added;
- Elevated intersection platforms and sidewalk bump-outs to signify pedestrian priority zone and reduce time for pedestrians to cross Charlotte Street;
- Enhancements to sidewalk and public realm; and
- Enhanced connection to the proposed Charlotte Street East and Louis Street Urban Park projects.