CHAPTER 4. ALTERNATIVES AND SELECTION OF THE RECOMMENDED ALTERNATIVE

4.1 PRELIMINARY DEVELOPMENT OF ALTERNATIVES

Given the existing and future land uses east and west of Howard Avenue and the location of significant natural heritage features, new roadway alignment alternatives were not considered to be reasonable. Therefore the development of alternatives focussed on the existing Howard Avenue corridor. Given the different characteristics and varying issues along the corridor, Howard Avenue was reviewed in the following four sections:

- Highway 3 to Dougall Parkway (South Section)
- Dougall Parkway to Cabana Road (Central Section)
- Cabana Road to Division Road (North Section)
- Division Road to Grand Marais Road

Concurrently to the development of Howard Avenue corridor alternatives, separate improvement alternatives were examined for the Dougall Parkway Interchange and the South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex.

The preliminary alternatives that were developed for review with the public and agencies are identified on Exhibits 4.1, 4.2 and 4.3 and are described in the following sections.

4.1.1 Highway 3 to Dougall Parkway (South Section)

Through this section, the grade of Howard Avenue is generally flat within the 26 m right-of-way (ROW). Based on the results of traffic analysis and the existing conditions, 4 and 5 lane options were considered:

- Option S4 – 4-lane urban (curb and gutter) cross-section; within the existing 26 m ROW; 1.5 m wide on-street bike lanes; boulevard-separated east and west sidewalks
- Option S5A – 5-lane urban cross-section to accommodate left turn lanes at intersections and provide a continuous centre two-way left turn lane (TWLTL) and refuge for those houses with driveway access onto Howard Avenue; within a 28.5 m ROW; 1.5 m wide on-street bike lanes; boulevard-separated east and west sidewalks
- Option S5B – 5-lane urban cross-section with a centre TWLTL and reduced widths for cross-sectional elements to remain within the existing 26 m ROW; 1.5 m wide on-street bike lanes; boulevard-separated west sidewalk, curb-face east sidewalk
- Option S5C – 5-lane urban cross-section with a centre TWLTL and reduced widths for cross-sectional elements to fit within a 26.5 m ROW; road centreline offset to the east of the existing; 1.2 m wide on-street bike lanes; boulevard-separated west sidewalk, curb-face east sidewalk

4.1.2 Dougall Parkway to Cabana Road (Central Section)

Through this section, the grade of Howard Avenue is generally flat within the narrow 19 m ROW. Based on the results of traffic analysis and the existing conditions, 3, 4 and 5 lane options were considered:

- Option C3 – 3-lane urban cross-section with a centre TWLTL and road centreline offset to the east of existing road centreline with reduced widths for cross-sectional elements to remain within the existing 19 m ROW; 1.5 m wide on-street bike lanes; curb-face east and west sidewalks
- Option C4A – 4-lane urban cross-section with road centreline offset to the east of existing road centreline and standard widths for cross-sectional elements, within a 25 m ROW; 1.5 m wide on-street bike lanes; boulevard-separated east and west sidewalks
- Option C4B – 4-lane urban cross-section with road centreline offset to the east of existing road centreline and reduced widths for cross-sectional elements, within a 21.6 m ROW; 1.2 m wide on-street bike lanes; curb-face east and west sidewalks
- Option C5A – 5-lane urban cross-section with a centre TWLTL and the road centreline offset to the east of existing road centreline; standard widths for cross-sectional elements, within a 29 m ROW; 1.5 m wide on-street bike lanes; boulevard-separated east and west sidewalks
- Option C5B – 5-lane urban cross-section with a centre TWLTL and the road centreline offset to the east of existing road centreline; reduced widths for cross-sectional elements, within a 25.1 m ROW; 1.2 m wide on-street bike lanes; curb-face east and west sidewalks

4.1.3 Cabana Road to Division Road (North Section)

Through this section, the grade of Howard Avenue is generally flat within the 23 m ROW. Based on the results of traffic analysis and the existing conditions, 3, 4 and 5 lane options were considered:

- Option N3 – 3-lane urban cross-section with a centre TWLTL and standard widths for cross-sectional elements all within the existing 23 m ROW; 1.5 m wide on-street bike lanes; boulevard-separated east and west sidewalks
- Option N4 – 4-lane urban cross-section with standard widths for cross-sectional elements all within the existing 23 m ROW; 1.5 m wide on-street bike lanes; boulevard-separated east and west sidewalks
- Option N5A – 5-lane urban cross-section with a centre TWLTL and standard widths for cross-sectional elements, within a 29 m ROW; 1.5 m wide on-street bike lanes; boulevard-separated east and west sidewalks
- Option N5B – 5-lane urban cross-section with a centre TWLTL and reduced widths for cross-sectional elements, within a 25.1 m ROW; 1.2 m wide on-street bike lanes; curb-face east and west sidewalks

4.1.4 Division Road to Grand Marais Road

Based on the traffic analysis it was shown that the existing 6-lane road will operate adequately up to 2021. Therefore, no road widening was proposed for this section.

EXHIBIT 4.1A HOWARD AVENUE WIDENING ALTERNATIVES – SOUTH SECTION

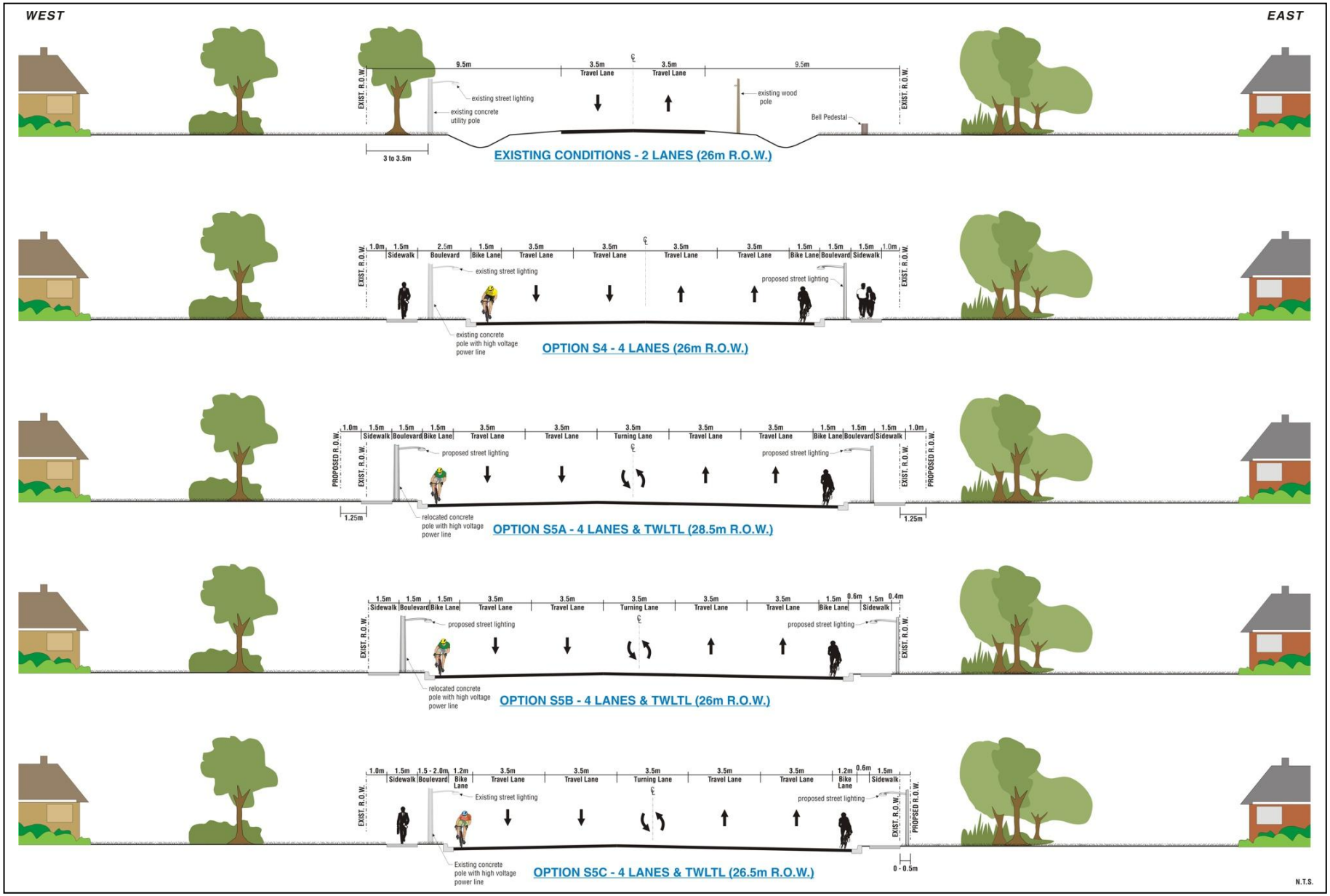


EXHIBIT 4.1B HOWARD AVENUE WIDENING ALTERNATIVES – CENTRAL SECTION

EXHIBIT 4.1C HOWARD AVENUE WIDENING ALTERNATIVES – NORTH SECTION

4.1.5 Dougall Parkway Interchange

Based on the signage and geometrics analysis undertaken, it was determined that both short-term and long-term interchange improvements were needed. The short-term improvements consisted solely of signage changes and are discussed as part of the recommended improvements in Section 5.2.4. The long-term improvements involve a reconfiguration of the south side of the interchange. Two improvement options were considered, as shown in Exhibits 4.2a and 4.2b:

- Option 1 (Exhibit 4.2a) – a proposed partial cloverleaf (Parclo A) type interchange with a single exit from eastbound Dougall Avenue to Howard Avenue; a direct ramp from northbound Howard Avenue to eastbound Dougall Parkway; and an inner loop ramp for southbound Howard Avenue to eastbound Dougall Parkway. Parclo A-type interchanges are the most common urban interchange configuration being constructed in Ontario today.

  All Howard Avenue to Dougall Parkway moves would be accomplished by right side exits. The Dougall Avenue off-ramp would terminate at a signalized intersection (T-intersection) at Howard Avenue in order to facilitate left turn movements to Howard Avenue NB and right turn movements to Howard Avenue SB. Due to the proximity of the Dougall Avenue exit ramp to (Old) Dougall Avenue in the SW quadrant, a screen wall is proposed for the section of ramp adjacent to (Old) Dougall Avenue. Any weaving concerns between the proposed T-intersection and the southern North Talbot Road intersection would be minimized due to the platooning effect created by the ramp terminal signals. These improvements would remove all interchange traffic from Tuson Way and (Old) Howard Avenue.

- Option 2 (Exhibit 4.2b) – similar to Option 1, however it moves the Dougall Avenue to Howard Avenue exit ramp further away from (Old) Dougall Avenue. This is accomplished by the removal of the southbound Howard Avenue to eastbound Dougall Parkway inner loop ramp. This move would be accomplished via a left turn at the proposed south ramp terminal intersection to the aforementioned SE quadrant direct ramp. Due to the relatively low volumes performing the southbound Howard Avenue to eastbound Dougall Parkway move, this left turn would not significantly affect operations. Landscaping would be installed in between (Old) Dougall Avenue and the Dougall Avenue-Howard Avenue exit ramp.

Both options would require additional properties in the SW and SE quadrants. The properties required are owned by the Province of Ontario and have been declared surplus lands. Each option would require the closures of (Old) Howard Avenue at Dougall Parkway, and Darcey Street at Dougall Avenue (due to the required extension of the Dougall Avenue to Howard Avenue speed change lane).

EXHIBIT 4.2A DOUGALL PARKWAY INTERCHANGE OPTION 1 – PARTIAL CLOVERLEAF

EXHIBIT 4.2B DOUGALL PARKWAY INTERCHANGE OPTION 2 – DIAMOND

4.1.6 South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex

To improve the existing safety and operational concerns at this location, seven improvement options were considered, of which, five were at-grade and two were grade separated. These are discussed below and in Exhibit 4.3 on the following pages.

- Option 1 – Separate Howard Avenue/Division Road and South Cameron Boulevard/Division Road intersections. Howard Avenue intersects with Division Road at existing Sydney Avenue/Division Road T-intersection. Two at-grade rail crossings.
- Option 2A – Howard Avenue intersects with Division Road at existing Sydney Avenue/Division Road T-intersection. South Cameron Boulevard extended south along Howard Avenue right-of-way to intersect with Howard Avenue. One at-grade rail crossing.
- Option 2B – Howard Avenue/Division Road intersection in existing location. Howard Avenue (south) extended north along South Cameron Boulevard right-of-way to improve Howard Avenue/Division Road intersection skew angle. One at-grade rail crossing.
- Option 3 – Howard Avenue intersects with Division Road at existing Sydney Avenue/Division Road T-intersection. South Cameron Boulevard extended south along Howard Avenue right-of-way to intersect with Howard Avenue at a roundabout. One at-grade rail crossing.
- Option 4 – Howard Avenue/Division Road intersection in existing location. Howard Avenue (south) extended north along South Cameron Boulevard right-of-way to improve Howard Avenue/Division Road intersection skew angle. South Cameron Boulevard extended south through the under-construction Hamner Circle subdivision to intersect with Howard Avenue. One at-grade rail crossing.
- Option 5 – Howard Avenue and Division Road lowered to grade-separate the rail line. Howard Avenue intersects with Division Road at a realigned intersection with Sydney Avenue. South Cameron Boulevard terminates at Kenilworth Place. The rail line is slightly realigned to offset the Howard Avenue/Division Road intersection.
- Option 6 – Howard Avenue is lowered to be grade-separated with both the rail line and Division Road. Howard Avenue intersects with a new north-south connector road between Sydney Avenue and Devonshire Mall. South-to-north Howard Avenue access is via right turns to Sydney Avenue and then to Division Road. North-to-south Howard Avenue access is via a dedicated ramp that intersects with Howard Avenue in between the rail and Division Road bridges. South Cameron Boulevard terminates at Kenilworth Place.

EXHIBIT 4.3A SOUTH CAMERON BOULEVARD/DRTP RAIL/DIVISION ROAD INTERSECTION COMPLEX OPTION 1

EXHIBIT 4.3B SOUTH CAMERON BOULEVARD/DRTP RAIL/DIVISION ROAD INTERSECTION COMPLEX OPTION 2A

EXHIBIT 4.3C SOUTH CAMERON BOULEVARD/DRTP RAIL/DIVISION ROAD INTERSECTION COMPLEX OPTION 2B

EXHIBIT 4.3D SOUTH CAMERON BOULEVARD/DRTP RAIL/DIVISION ROAD INTERSECTION COMPLEX OPTION 3

EXHIBIT 4.3E SOUTH CAMERON BOULEVARD/DRTP RAIL/DIVISION ROAD INTERSECTION COMPLEX OPTION 4

EXHIBIT 4.3F SOUTH CAMERON BOULEVARD/DRTP RAIL/DIVISION ROAD INTERSECTION COMPLEX OPTION 5

EXHIBIT 4.3G SOUTH CAMERON BOULEVARD/DRTP RAIL/DIVISION ROAD INTERSECTION COMPLEX OPTION 6

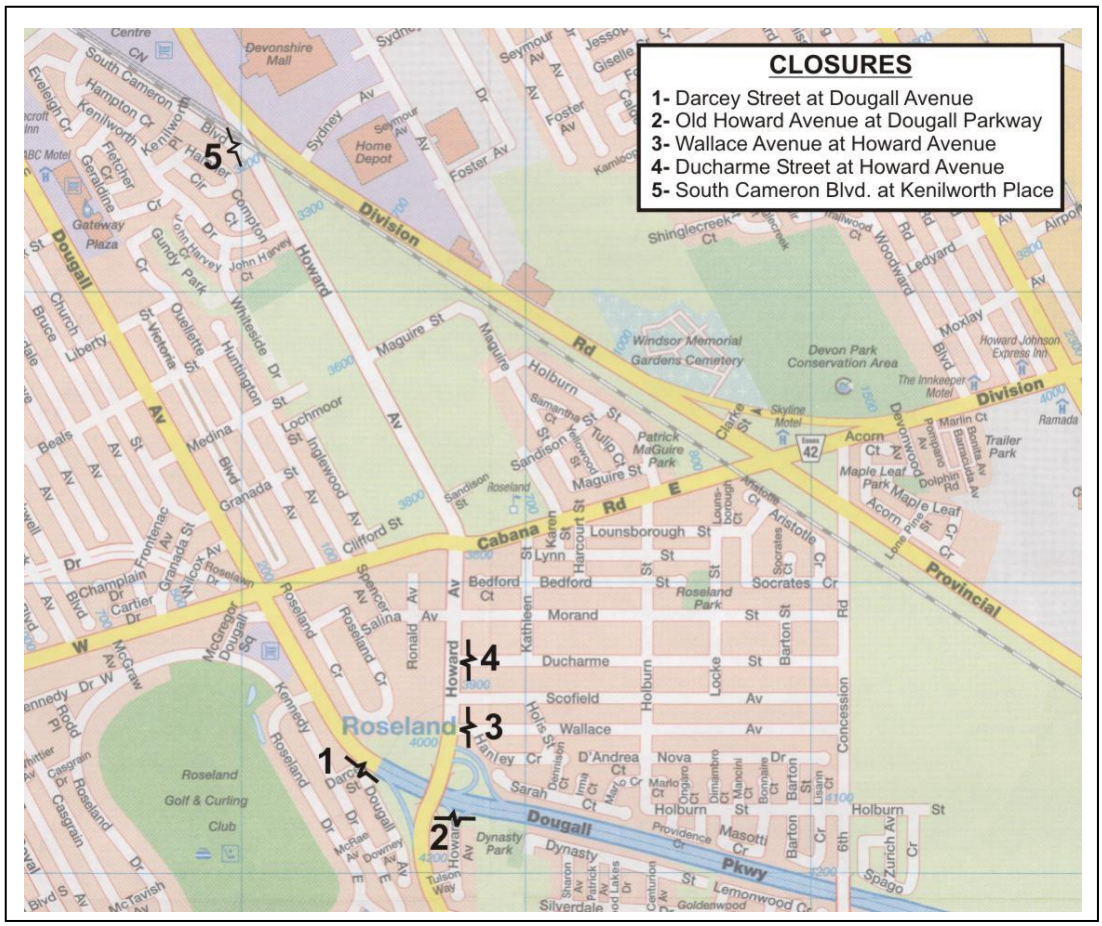
4.1.7 Candidate Street Closures

To further improve upon the previously discussed alternatives, several candidate street closures are proposed:

1. Darcey Street at Dougall Avenue – to improve safety by eliminating conflict with the exit ramp to Howard Avenue.
2. (Old) Howard Avenue at Dougall Parkway – connection to Dougall Parkway would become redundant since a separate direct ramp is proposed for long-term improvements.
3. Wallace Avenue at Howard Avenue – to improve safety by eliminating conflict with the interchange ramp terminal immediately south on Howard Avenue.
4. Ducharme Street at Howard Avenue – to improve Howard Avenue safety and operations by reducing intersection turns on Howard Avenue (Note: access improvement on the 6th Concession Road corridor will be provided by the new Dougall Parkway/6th Concession Road Interchange).
5. South Cameron Boulevard at Howard Avenue – proposed only for Options 5 and 6 of the South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex improvements.

These are shown in Exhibit 4.4, below.

EXHIBIT 4.4 CANDIDATE STREET CLOSURES



4.2 REVIEW OF STUDY ALTERNATIVES

The alternatives developed by the Study Team were reviewed with various parties at different points throughout the Study. The purpose of the reviews was to liase with stakeholders and interested parties and to obtain input and feedback on the alternatives.

4.2.1 Study Commencement and November 6, 2001 Public Information Centre 1

The study commencement notice was placed in the Windsor Star on September 28, 2001. A copy of the notice is provided in Appendix D. Copies of the notice were mailed to:

- City Councillors
- Committees appointed by Council and interest groups including:
  - ENWIN Power Lines
  - Bell Canada
  - Union Gas
  - Cogeco Cable
  - Hydro One
  - Windsor Utilities Commission
  - BP Canada Energy
- Technical agencies, municipalities and utilities with a potential interest in the study (Exhibit 1.4)
- property owners within the study area (approximately 245)
- Team Ducharme ratepayers group
- CHAT ratepayers group

The first Public Information Centre was held on November 6, 2001. The purpose of the first Public Information Centre was to review and obtain public comments about the existing conditions, the identified problems and the preliminary improvement options under consideration.

The notice of the first Public Information Centre (see Appendix E) was placed in Saturday, October 22, 2001 edition of the Windsor Star and also on the Project Website. The same information was mailed to:

- property owners within the study area plus mailed to those who responded to the Notice of Study Commencement (hand delivery)
- Councillors
- Committees of Council
- interest groups
- technical agencies
- adjacent municipalities
- utilities

The information centre was held at the Roseland Golf & Curling Club and was arranged as an open house/drop-in centre from 3:00 p.m. to 8:30 p.m. The information centre was well attended with 73 members of the public signing the attendance sheet. A Summary

Report of the information centre including a copy of the display panels and summary of verbal comments are provided in Appendix E. Following the information centre, 40 written comments were received.

The main comments are summarized as follows:

- General recognition of the problem being addressed with many people indicating their recognition of the need for capacity improvements to Howard Avenue, while many recognize the need for improvements, some would prefer three lanes only or as an initial stage.
- Improve Cabana Road, North Talbot, South Cameron Boulevard/Division Road and Maguire Street intersections.
- Generally opposed to four lanes.
- Signing improvements, particularly at Dougall Parkway
- Overall, the key issues were:
  - Concern with truck traffic in general through the City of Windsor and on Howard Avenue.
  - Traffic calming, reduce speed limit.
  - Timing and costs of improvements to Howard Avenue.
  - Provide bike lanes and sidewalks.

Copies of the written comments received following the first information centre and the response letters from the City of Windsor are provided in Appendix E.

4.2.2 Meeting with DRTP (formerly Borealis Infrastructure Management)

A meeting was held on November 9, 2001 with DRTP (formerly Borealis Infrastructure Management) representatives to discuss the proposed truck/rail corridor (see Appendix A).

The proposed truck corridor would start from Highway 401 at the Highway 401/Provincial Road Interchange, then following the existing CN Rail corridor to the existing rail tunnel under the Detroit River.

The truck roadway and the rail line would be located within the existing CN right-of-way, with the rail relocated to the east side to make room for the truck roadway. Grade-separations would be required at existing at-grade intersections such as 6th Concession, Cabana Road and Howard Avenue. Interchanges with Highway 401 and E.C. Row Expressway are also proposed.

The DRTP's proposed CN/Howard Avenue grade-separation shows Howard Avenue crossing under a bridge for the combined truck/rail corridor. No other proposed modifications to the existing roadway configuration were shown.

4.2.3 Review with Division-Cabana Road EA Study Team

- Meetings were held on November 19, 2001 and April 1, 2002 to exchange information on the Howard Avenue EA Study and the Division-Cabana Road EA Study (discussed in Appendix A).

4.2.4 Review with CN Rail

A meeting was held on February 28, 2002 with a CN Rail representative to discuss the proposed improvement alternatives for the Howard Avenue/DRTP (formerly CASO Subdivision) rail crossing (as discussed in Appendix A).

The discussion focussed on Option 1 (refer to Exhibit 4.3A), as being representative of the other at-grade alternatives. It was noted that the proposed Howard Avenue/Division Road intersection would be located very close to the railway tracks and that the desirable distance (according to Transport Canada Standards) is 30 m between the edge of an intersection and a rail line for train speeds exceeding 15 mph. It was also noted that the train speed crossing Howard Avenue is 15 mph. It was confirmed that the signals at the railway crossing and at the proposed intersection would have to be integrated.

4.2.5 April 9, 2002 Public Information Centre 2

The purpose of the second Public Information Centre was to review and obtain public comments about the alternatives being considered and the preliminary identified impacts.

The notice of the second Public Information Centre (see Appendix F) was placed in the Windsor Star on April 3, and April 6, 2002, and also on the Project Website. The same information was mailed to:

- property owners within the study area plus those who responded to the Notice of Study Commencement (hand delivered)
- Councillors
- interest groups
- technical agencies

The information centre was held at the Roseland Golf & Curling Club and was arranged as an open house / drop-in centre from 3:00 p.m. to 8:30 p.m. The information centre was well attended with approximately 100 members of the public attending. A Summary Report of the information centre including a copy of the display panels and summary of verbal comments are provided in Appendix F. Following the information centre, 24 written comments were received.

The main comments are summarized as follows:

- General
  - Maintain the existing neighbourhood atmosphere.
  - Trucks should be prohibited on Howard due to noise and pollution.
  - Improvements to the Cabana Road intersection are needed immediately.
- South Section Alternatives (Highway 3 to Dougall Parkway)
  - A 4-lane cross-section is preferred (however a 4- or 5-lane road may increase truck traffic)
  - Highway 3, Havens Drive and North Talbot Road intersections need improvements
- Central Section Alternatives (Dougall Parkway to Cabana Road)
  - The road acts like a residential collector, not an arterial
- North Section Alternatives (Cabana Road to Division Road)
  - A 3-lane cross-section is preferred

- Dougall Parkway Interchange Improvements
  - There is need to improve the interchange
  - Option 2 was generally preferred
- South Cameron Boulevard/Division Road/CN Rail (CASO) Intersection Improvement Alternatives
  - There is a strong need to improve this intersection
  - Option 2 was preferred
- Proposed Road Closures
  - South Cameron Boulevard must remain open
  - Support for closing (Old) Howard Ave. at Dougall Parkway.
  - No consensus on other road closures

Copies of the written comments received following the second information centre and the response letters from the Study Team are provided in Appendix F.

4.2.6 Review with Concerned Howard Avenue Taxpayers (CHAT)

Following the Public Information Centre 2, an informal backyard meeting was arranged and held on June 6, 2002 with 8 residents in attendance from the three Howard Avenue sections where widening was proposed. The project representative that was in attendance provided additional explanation and opportunity for these residents to clarify their understanding of the process and advantages and disadvantages of the various options under consideration.

Questions included:

- Provide basis for 'arterial' designation of Howard Avenue in the Windsor Official Plan. Does it fit the classification?
- In the central section, can trees be maintained on the east side?
- Can the Study Team carry out a preliminary review of the previous Cousineau Road closure?
- Can a similar backyard meeting be scheduled prior to Public Information Centre #3?

CHAT was again consulted prior to Public Information Centre 3, as discussed in Section 4.4.1.

4.3 SELECTION OF THE RECOMMENDED ALTERNATIVE

The determination of the preferred alternative evolved through a series of activities:

- the alternatives were reviewed in light of comments received
- the Study Team reviewed the key technical and environmental considerations related to the alternatives in each section and determined the preferred alternative as discussed below
- the recommended alternative was then reviewed with participating technical agencies, and the public (discussed in Section 4.4)
- the recommended alternative was then reviewed by the Study Team in light of comments received and was modified as described in Section 4.4.4.

4.3.1 Analysis of Alternatives

The Howard Avenue alternatives were developed separately for each corridor section and key intersection. Therefore, the analysis was summarized by alternative sets as follows:

- South Section
- Central Section
- North Section
- Dougall Parkway Interchange
- South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex

The net effects that the alternatives have on the environment were summarized in analysis tables (shown in Exhibits 4.5 to 4.7). The information summarized in the analysis tables was based on the data collected by the Study Team via public and agency input during the study. These tables were developed with an understanding of mitigating measures that have become common practice in municipal Environmental Assessment projects.

The analysis was carried out in such a manner that it could be readily used in the evaluation process.

4.3.2 Evaluation Process

Prior to the actual evaluation conducted by the Study Team, presentations on traffic conditions, highway engineering, and environmental factors were conducted on the existing and future conditions as well as the key issues of the Study Area. These presentations assisted the Study Team to recap and focus on the significance of the Study Area conditions in carrying out the evaluation.

The actual evaluation was carried out as follows:

1. After having reviewed the analysis of the alternatives within the alternative set in detail, each Study Team member stated his individual alternative preference(s) and the rationales for the preference(s). These preferences were noted on a large board and kept for later reference.

2. The individual Study Team members' preferences were then compared and discussed to obtain an identification of the recommended alternative(s). The discussion of the alternatives included an understanding of the technical effects of the various alternatives, the trade-offs, the ability to mitigate and the concerns of external agencies and the public that had been made known to the Study Team.

4.3.3 Evaluation of Alternatives

The following sections summarize how the recommended alternative was determined for each section of Howard Avenue. Following the discussion, tables summarizing the evaluation of the various corridor widening cross-section are presented.

4.3.4 Highway 3 to Dougall Parkway (South Section)

The four alternatives being considered were:

- **S4** – 4 Lanes; 26 m right-of-way; Proposed road centreline close to existing road centreline with standard widths for cross-sectional elements
- **S5A** – 4 Lanes + TWLTL; 28.5 m right-of-way; Proposed road centreline close to existing road centreline with standard widths for cross-sectional elements
- **S5B** – 4 Lanes + TWLTL; 26 m right-of-way; Proposed road centreline close to existing road centreline with reduced widths for cross-sectional elements
- **S5C** – 4 Lanes + TWLTL; 26.5 m right-of-way; Proposed road centreline offset to the east of existing road centreline with reduced widths for cross-sectional elements

All alternatives have an urban cross-section with curb and gutter, on-street bike lanes and east and west sidewalks.

Between S5A, S5B & S5C, S5B was preferred because the tree and property impacts would be the least while other factors are similar.Comparing S5B and S4, while S4 would impact less trees, S5B would provide better traffic operations and level of service. However, S4 was preferred because it would generally be accommodated within the existing Right-of-Way while S5B would have significant additional property and tree impacts along the entire section.

Therefore, S4 was proposed as the recommended alternative.

4.3.5 Dougall Parkway to Cabana Road (Central Section)

The five alternatives being considered were:

- **C3** – 2 Lanes + TWLTL; 19 m right-of-way; Proposed road centreline offset to the east of existing road centreline with reduced widths for cross-sectional elements
- **C4A** – 4 Lanes; 25 m right-of-way; Proposed road centreline offset to the east of existing road centreline with standard widths for cross-sectional elements
- **C4B** – 4 Lanes; 21.6 m right-of-way; Proposed road centreline offset to the east of existing road centreline with reduced widths for cross-sectional elements
- **C5A** – 4 Lanes + TWLTL; 29 m right-of-way; Proposed road centreline offset to the east of existing road centreline with standard widths for cross-sectional elements
- **C5B** – 4 Lanes + TWLTL; 25.1 m right-of-way; Proposed road centreline offset to the east of existing road centreline with reduced widths for cross-sectional elements

All alternatives have an urban cross-section with curb and gutter, on-street bike lanes and east and west sidewalks.

Between C5A & C5B, C5B would be preferred because the property impacts would be less while other factors are similar.

Between C4A & C4B, C4B would be preferred because the tree and property impacts would be less while other factors are similar.

Comparing C4B to C5B, while C5B would provide slightly better traffic operations and level of service, C4B would be preferred because the tree and property impacts, and construction costs would be the least.

Comparing C3 to C4B, while C4B would provide better traffic operations and level of service, C3 is slightly preferred because it would generally be accommodated within the existing Right-of-Way. C4B would require additional property along the entire section and would affect the tight building setbacks in this section.

For C3, the benefits of avoiding significant property impacts outweigh the less desirable traffic operations in this section.

Therefore, C3 was proposed as the recommended alternative.

4.3.6 Cabana Road to Division Road (North Section)

The four alternatives being considered were:

- **N3** – 2 Lanes + TWLTL; 23 m right-of-way; Proposed road centreline centred within Right-of-Way with standard widths for cross-sectional elements
- **N4** – 4 Lanes; 23 m right-of-way; Proposed road centreline centred within Right-of-Way with standard widths for cross-sectional elements
- **N5A** – 4 Lanes + TWLTL; 29 m right-of-way; Proposed road centreline centred within Right-of-Way with standard widths for cross-sectional elements
- **N5B** – 4 Lanes + TWLTL; 25.1 m right-of-way; Proposed road centreline centred within Right-of-Way with reduced widths for cross-sectional elements

All alternatives have an urban cross-section with curb and gutter, on-street bike lanes and east and west sidewalks.

Between N5A & N5B, N5B would be better because the property impacts would be less while other factors are similar.

Comparing N4 to N5B, while N5B would provide the best traffic operations and level of service, N4 would be preferred because the tree and property impacts, and construction costs would be the least.

Comparing N3 to N4, while N3 would impact fewer trees and cost less, N4 is preferred because it would provide better traffic operations and level of service and would still generally be accommodated within the existing Right-of-Way.

Therefore, N4 was proposed as the recommended alternative.

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EXHIBIT 4.5 SOUTH SECTION EVALUATION TABLE

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EXHIBIT 4.6 CENTRAL SECTION EVALUATION TABLE

(11 x 17)

EXHIBIT 4.7 NORTH SECTION EVALUATION TABLE

(11 x 17)

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4.3.7 Dougall Parkway Interchange

Two interchange alternatives were considered as follows:

- Option 1 – Partial Cloverleaf
- Option 2 – Modified Diamond

The key features and impacts of the alternatives are summarized below:

Option 1

- Efficient interchange operations
- Better operations on Howard Avenue over Option 2 (since no left turn from southbound Howard Avenue)
- Additional cost of loop ramp in SW quadrant for southbound Howard Avenue to eastbound Dougall Parkway (minor traffic volumes)
- Eastbound Dougall Avenue exit ramp to Howard Avenue closer to residential area; can be mitigated by screen wall
- Darcey Street to be closed for safety

Summary: Higher cost and additional social impacts would outweigh the benefits of better traffic.

Option 2

- Less efficient interchange operations
- Left turn required from southbound Howard Avenue
- Minimal cost for additional ramp portion in SE quadrant for southbound Howard Avenue to eastbound Dougall Parkway (minor traffic volumes)
- Eastbound Dougall Avenue exit ramp to Howard Avenue farther away to residential area; opportunity for landscaped berm
- Darcey Street to be closed for safety

Summary: Provides adequate interchange and traffic operations with less cost and less social impacts.

Therefore, Option 2 was proposed as the recommended alternative.

4.3.8 South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex

The seven alternatives initially considered were:

- **Option 1** – Separate Howard Avenue/Division Road and South Cameron Boulevard/Division Road intersections.
  - Best overall traffic operations
  - Two at-grade railway crossings
  - Potential operational concerns with DRTP Rail crossing in close proximity of Howard Avenue/Division Road intersection
  - Five private homes displaced
  - Preliminary estimated cost = $5 M

- **Option 2A** – Howard Avenue intersects with Division Road at existing Sydney Avenue/Division Road T-intersection.
  - Good traffic operations (short term)

- One at-grade railway crossing
- Potential operational concerns with DRTP Rail crossing in close proximity of Howard Avenue/Division Road intersection
- Four private homes displaced
- Potential insufficient storage for future left turns on Howard Avenue at Division Road (lane designation signs to be considered)
- Proposed Howard/Division intersection includes connection to local street (Sydney Avenue)
- Preliminary estimated cost = $4.5 M

- **Option 2B** – Howard Avenue/Division Road intersection in existing location with intersection improvements.
  - Good traffic operations
  - One at-grade railway crossings
  - Potential insufficient storage for future left turns on Howard Avenue at Division Road (lane designation signs to be considered)
  - Proposed Howard/Division intersection includes connection to Mall access
  - Preliminary estimated cost = $2.5 M

- **Option 3** – Howard Avenue intersects with Division Road at existing Sydney Avenue/Division Road T-intersection. South Cameron Boulevard extended south along Howard Avenue right-of-way to intersect with Howard Avenue at a roundabout.
  - Insufficient space for a proper sized roundabout
  - One at-grade rail crossing.
  - Possible operational concerns related to the roundabout's close proximity to the DRTP tracks and to the Howard Avenue/Division Road intersection
  - Unconventional traffic operation (particularly at this busy location)
  - 4 private homes displaced

- **Option 4** – Howard Avenue/Division Road intersection in existing location with intersection improvements. South Cameron Boulevard extended south through the under-construction Hamner Circle subdivision to intersect with Howard Avenue. One at-grade rail crossing.
  - Good traffic operations
  - One at-grade railway crossings
  - Major impacts to the Kenilworth subdivision currently under development (16 lots impacted)

- **Option 5** – Howard Avenue and Division Road lowered to grade-separate the rail line. Howard Avenue intersects with Division Road at a realigned intersection with Sydney Avenue.
  - Best traffic operations
  - One grade separation at DRTP Rail crossing
  - Realignment of DRTP Rail to offset Howard/Division intersection
  - New service road provided for access to car dealership
  - Realignment of Sydney Avenue will require the purchase of additional property and buyout of restaurant
  - South Cameron Boulevard terminated at Kenilworth Place

- Six private homes displaced and other significant property impacts along Sydney Avenue
- Preliminary estimated cost = $15.5 M

- **Option 6** – Howard Avenue is lowered to be grade-separated with both the rail line and Division Road. Howard Avenue intersects with a new north-south connector road between Sydney Avenue and Devonshire Mall. South-to-north Howard Avenue access is via right turns to Sydney Avenue and then to Division Road. North-to-south Howard Avenue access is via a dedicated ramp that intersects with Howard Avenue in between the rail and Division Road bridges.

- Discontinuity of Howard Avenue at Division Road
- Two grade-separations at DRTP Rail and Division Road
- Major impacts to Devonshire Mall in terms of traffic flow and future mall expansion
- South Cameron Boulevard terminated at Kenilworth Place
- Three private homes displaced

Options 3, 4 and 6 were not carried forward due to significant impacts. Four alternatives (Options 1, 2A, 2B and 5) were short-listed and presented at the second Public Information Centre.

While Option 5 would provide better traffic operations via a grade-separation with the railway, it is less preferred because its cost is prohibitively expensive.

Comparing Options 1, 2A & 2B, Option 1 would present a simple configuration but would result in one additional at-grade railway crossing than the other alternatives.

Although Option 2A would provide slightly better traffic operations than Option 2B, Option 2B would have less requirements for private properties and would cost about $1.5 M less than Option 2A.

Therefore, Option 2B was proposed as the recommended alternative.

4.3.9 Street Closures

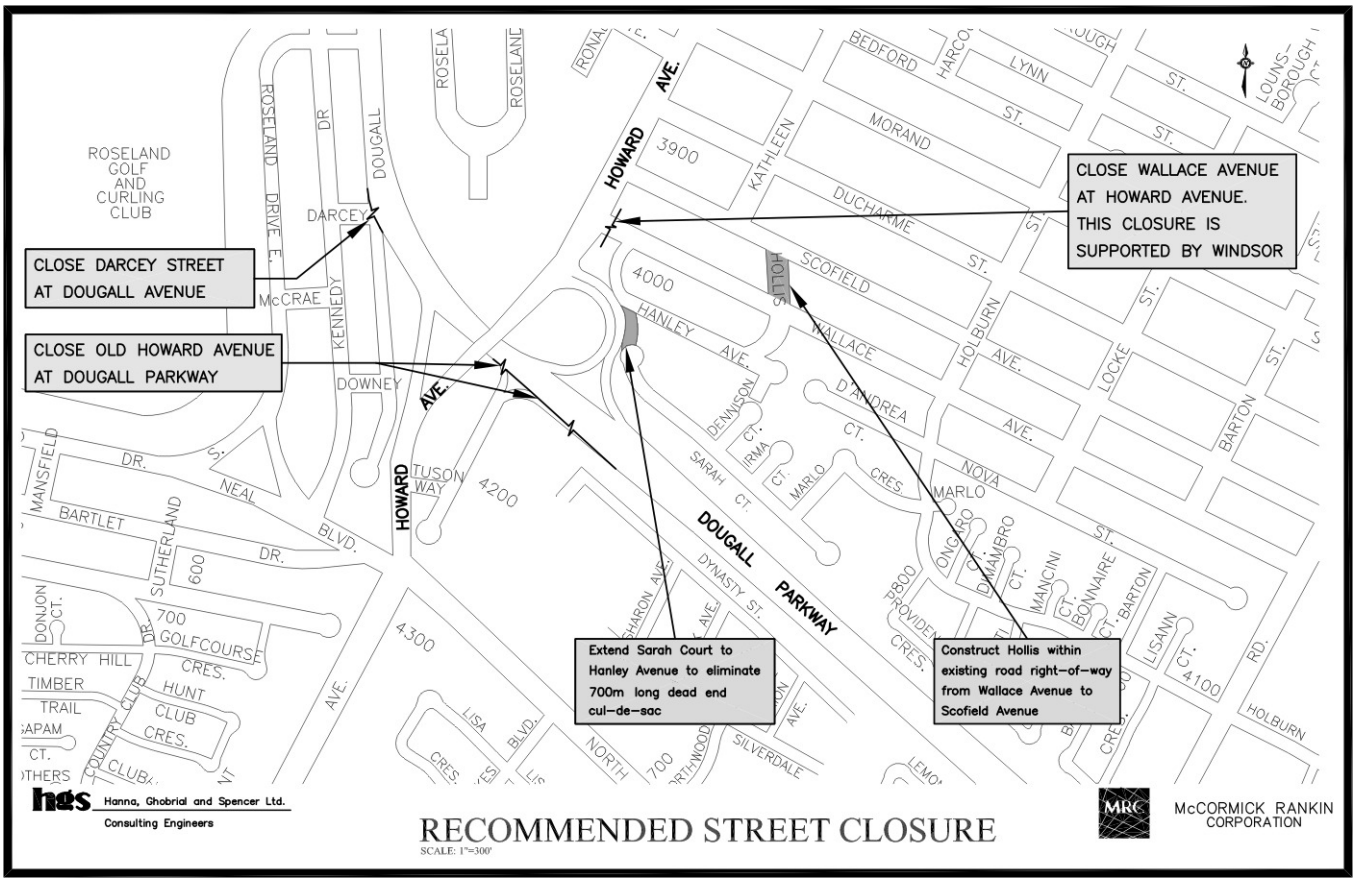
Five candidate street closures were considered for the improvements of Howard Avenue. They are Darcey Street at Dougall Avenue, (Old) Howard Avenue at Dougall Parkway, Wallace Avenue at Howard Avenue, Ducharme Street at Howard Avenue, and South Cameron Boulevard at Kenilworth Place.

Based on the important need to eliminate potential unsafe operations and taking into consideration public comments, the following three street closures are recommended by the Study Team at this stage:

- **Darcey Street at Dougall Avenue**
- **(Old) Howard Avenue at Dougall Parkway**
- **Wallace Avenue at Howard Avenue**

At the same time Wallace Avenue is closed, it is proposed to extend Sarah Court to Hanley Avenue and to construct Holis Street between Wallace Avenue and Scofield Avenue within the existing unused right-of-way. These are shown in Exhibit 4.8.

EXHIBIT 4.8 PROPOSED ROAD CLOSURES AND OTHER STREET CHANGES



4.4 REVIEW OF RECOMMENDED ALTERNATIVE

4.4.1 Review with Concerned Howard Avenue Taxpayers (CHAT)

Prior to Public Information Centre 3, at the request of CHAT, an informal backyard meeting was held on October 17, 2002 with 8 residents in attendance from the three Howard Avenue sections where widening was proposed. The project representative that was in attendance provided each a handout entitled *Summary Feature of the Recommended Alternative*. Additional explanation and opportunity for these residents to clarify their understanding of the recommended design was provided.

Questions included:

- What can be done to express a preference differing from the recommended design?
- How can the issue of truck route be addressed?

4.4.2 October 22, 2002 Public Information Centre 3

The purpose of the third Public Information Centre was to review and obtain public input regarding the recommended alternative and associated mitigating measures.

The notice of the third Public Information Centre (see Appendix G) was placed in the October 19, 2002 edition of the Windsor Star, and also on the project web site. The same information was included in Newsletter #3 (see Appendix G) which was mailed to:

- Hand delivered to the property owners within the study area plus those who attended the first information centre and/or provided written comments
- Councillors
- Committees of Council
- Interest groups
- Technical agencies
- Adjacent municipalities
- Utilities

The information centre was arranged as an open house/drop-in centre from 3:00 p.m. to 8:30 p.m. Approximately 140 members of the public attended. A handout was provided entitled *Summary Feature of the Recommended Alternative*. Minutes of the information centre including a copy of the display panels, the handout sheet and summary of the verbal comments are provided in Appendix G. The main comments received at the information centre included:

- General support for Howard Avenue/Cabana Road intersection.
- Reduce lane widths to discourage trucks.
- Improve 6th Concession and Provincial Road.
- Save as many trees in the detail design phase.
- Many residents prefer 3 lanes to 4 lanes in the south section and would also like to see the speed limit reduced to 50 km/h.

- General acceptance of the 3 lane cross section for the central section of Howard Avenue, however some support for 2 or 4 lanes.
- General acceptance of the 3 lane cross section for the north section of Howard Avenue, however some support for 4 lanes.
- General acceptance of the proposed road closures.
- General acceptance of all proposed intersection improvements, along with support for the improvement of the Dougall Parkway interchange.

Following the information centre, approximately 136 written comments were received. Copies of the written comments received are provided in Appendix G. Response letters are on file with the City of Windsor.

4.4.3 Review with CN Rail

The recommended DRTP Rail crossing alternative was provided to CN Rail for their review and comment prior to the third Public Information Centre. While there were initial concerns with the close spacing of the South Cameron Boulevard and Division Road intersections to the rail crossing, CN Rail and Transport Canada had no objections to the recommended alternative as noted in the December 13, 2002 email (in Appendix A).

4.4.4 Modifications to the Recommended Alternative

Taking into consideration the problem/opportunity being addressed, the environmental considerations, constraints and trade-offs, potential environmental effects and mitigating measures, and comments received from technical agencies, interest groups and the public, the recommended alternative was refined. The main alterations to the recommended alternative were:

- Improving the Howard Avenue/Cabana Road intersection by reducing the proposed Howard Avenue curve through the intersection from a 200 m radius to a 134 m radius to reduce the impacts to properties in the vicinity of the intersection.
- Minor modifications to the southbound Howard Avenue loop ramp to the Roundhouse Centre to accommodate the proposed multi-use path and the Krispy Kreme site.
- Four-to-six-lane transitions on Division Road were moved closer (north) to the Howard Avenue intersection similar to the existing conditions.
- Stop bars were removed from the recommended plan at the Dougall Parkway/Howard Avenue Interchange north ramp terminal to reflect that no signalization is proposed at this intersection.
- Sidewalks as shown on the recommended plan were extended south to intersect with Highway 3.
- Sidewalk locations were also modified to further reduce the preliminary tree impacts.

The revised recommended alternative is shown on the Plates following page 5-26.

CHAPTER 5. PROJECT DESCRIPTION

The main considerations and mitigating measures/commitments to further work associated with the recommended undertaking are described herein. While changes may occur during the detail design stage, any changes should not alter the intent of the recommended undertaking or its components. During detail design, there will be further consultation with technical agencies and affected property owners.

Preliminary plans for Howard Avenue have been developed at a scale of 1:500. Profiles are not necessary as no change to the existing grade is proposed. Preliminary plan plates of the recommended undertaking are provided in the ESR at a scale of 1:1000 following page 5-26.

The recommended undertaking for Howard Avenue includes the following:

- the widening of Howard Avenue to 4 lanes (with turning lanes at signalized intersections) from Highway 3 to Dougall Parkway
- the widening of Howard Avenue to 3 lanes (including a continuous centre two-way left-turn lane) from Dougall Parkway to Cabana Road
- the widening of Howard Avenue to 4 lanes from Cabana Road to Division Road
- the improvement of pedestrian and bicycle facilities between Division Road and Grand Marais Road
- improvements to the Dougall Parkway/Howard Avenue Interchange
- improvements to the South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex
- the addition of sidewalks on the east and west sides and on and off-street bicycle lanes along Howard Avenue between Highway 3 and Division Road

5.1 IMPLEMENTATION AND STAGING

The improvements to Howard Avenue have been identified as being required in the short- to medium term.

Initial Stage:

- intersection improvements at Cabana Road
- intersection improvements at South Cameron Boulevard/Division Road
- signage improvements at Dougall Parkway Interchange

Ultimate Stage:

- other signalized intersections improvements (Highway 3 done by others)
- widening of Howard Avenue including pedestrian and cyclist facilities
    - South Section
    - Central Section
    - North Section
    - Division Road to Grand Marais Road pedestrian and cyclist improvements
- Dougall Parkway Interchange reconfiguration

Overall, the actual timing of improvements to different sections of Howard Avenue is dependent on traffic volume growth.

In addition, the following factors will also affect the timing/staging of construction of the recommended undertaking:

- obtaining the necessary approvals
- obtaining the required funding
- acquiring the necessary land
- designing the roadway in detail

5.2 DESIGN COMPONENTS

5.2.1 Howard Avenue – Highway 3 to Dougall Parkway (South Section)

Design Criteria

Currently Howard Avenue is posted at 60 km/h. As the Central and North Sections are currently posted at 50 km/h, it is proposed to lower the South Section posted speed to 50 km/h. The desirable geometric design standards are listed below:

	Howard Avenue Highway 3 to Dougall Parkway
Design Speed	60 km/h
Posted Speed	50 km/h
No. of Vehicle Lanes(1)	4
Vehicle Lane Width	3.5 m
Bicycle Lane Width(2)	1.5 m
Sidewalk Width	1.5 m
Basic Right-of-Way	26 m

Notes: (1) Additional turning lanes provided at signalized intersections.
(2) Measured from the face of curb.

Typical Cross-Section

Exhibit 5.1 includes a typical proposed section for Howard Avenue from Highway 3 to Dougall Parkway. The proposed cross-section for Howard Avenue includes:

- 4 lanes (2 in each direction), with turning lanes at signalized intersections
- urban section – i.e. curb and gutter with storm sewers
- sidewalks on east and west sides
- dedicated on-street bicycle lanes

Alignment

Currently, Howard Avenue is 2 lanes (rural) between Highway 3 and Dougall Parkway. It is proposed to offset the proposed centreline 0.5 m to the east of the existing. The widening of Howard Avenue will require that the existing wood utility pole line on the east side boulevard be relocated.

Howard Avenue is straight south of North Talbot Road. From south to north, the left and right hand curves over the Dougall Parkway Bridge will be improved (flattened) to 340 m and 330 m radii, respectively.

The existing profile of Howard Avenue is fairly flat between Highway 3 and North Talbot Road. Therefore, grading requirements will be minimal. Between North Talbot Road and the Dougall Parkway Bridge, the Howard Avenue alignment will be improved and therefore additional fill will be required along the east side of the existing roadbed to accommodate the new road alignment rise to the Dougall Parkway Bridge. Additional fill may be required to accommodate the widened Howard Avenue approaches to the bridge.

Drainage/SWM

Existing drainage is by way of roadside ditches. The widening of Howard Avenue will require the removal of the ditches and the installation of underground stormwater sewers and roadside catchbasins. Details of these facilities will be determined during detail design.

Intersections

New left turn lanes are proposed on Howard Avenue at the intersections with Havens Drive, Country Club Drive/Lake Trail Drive and Tuson Way. A southbound through-and-right lane will replace the existing right turn lane to Country Club Drive.

Left turn lanes will be added in the east-west direction at the Howard Avenue/Neal Boulevard/North Talbot Road. The existing Howard Avenue north and south left turn lanes will be lengthened. A right turn lane will also be added to North Talbot Road. The provision of additional right turn lanes will be reviewed during detail design.

The existing signals at the intersections with: i) Country Club Drive/Lake Trail Drive, and ii) Neal Boulevard/North Talbot Road will be reinstated.

Traffic islands will be installed at the Neal Boulevard/North Talbot Road intersection and the existing islands at Country Club Drive/Lake Trail Drive will require minor modifications. Islands will be installed at Tuson Way and these are discussed in Section 5.2.5.

The intersection with Highway 3 will be designed by the MTO based on the recommended design included in the Highway 3 EA Study.

Access

Existing driveway access will be maintained. The existing southbound left turn lane to the Pioneer Gas Station will be removed, as the property impacts to reinstate it would be very significant.

Provision for Pedestrians/Cyclists

There is an existing 1.0 m sidewalk on the west side of Howard Avenue from Highway 3 to Dougall Parkway. This sidewalk will be reconstructed and improved to 1.5 m. A matching eastern sidewalk will be constructed. These sidewalks will be meandered to avoid as many trees as possible. Special sidewalk construction techniques using

geotextiles and/or pavers to reduce excavation requirements (thickness and compaction) will be investigated during detail design to avoid impacting as many trees as possible.

On-street bicycle lanes are proposed as shown on Exhibit 5.1.

Utilities

ENWIN Powerlines has an aerial hydro pole line on the west side of Howard Avenue which will not be affected by the recommended improvements.

Illumination

The existing west side illumination of Howard Avenue between Highway 3 and Dougall Parkway will be improved by the installation of east side illumination. Illumination will be as per City of Windsor standards.

5.2.2 Howard Avenue – Dougall Parkway to Cabana Road (Central Section)

Design Criteria

Currently Howard Avenue is posted at 50 km/h. The desirable geometric design standards are listed below:

	Howard Avenue Dougall Parkway to Cabana Road
Design Speed	60 km/h
Posted Speed	50 km/h
No. of Vehicle Lanes(1)	3
Vehicle Lane Width	3.5 m
Bicycle Lane Width(2)	1.5 m
Sidewalk Width	1.5 m
Basic Right-of-Way	19 m

Notes: (1) Includes a continuous two-way left turn lane (TWLTL). Additional turning lanes provided at signalized intersections.
(2) Measured from the face of curb.

Typical Cross-Section

Exhibit 5.1 includes a typical proposed section for Howard Avenue from Dougall Parkway to Cabana Road. The proposed cross-section for Howard Avenue includes:

- 3 lanes – one in each direction and a continuous two-way left turn lane (TWLTL) with turning lanes at signalized intersections
- urban section – i.e. curb and gutter with storm sewers
- sidewalks on east and west sides
- dedicated on-street bicycle lanes

EXHIBIT 5.1 TYPICAL HOWARD AVENUE SECTIONS - SOUTH, CENTRAL & NORTH

Alignment

Currently, Howard Avenue is 2 lanes (rural) between Dougall Parkway and Cabana Road with the centreline offset to the west within the 19 m right-of-way. It is proposed to centre the roadway within the existing right-of-way. The widening of Howard Avenue will require that the existing streetlighting/utility pole line on the east side boulevard be relocated.

Howard Avenue is straight through the section except at the Cabana Road intersection. The existing left hand curve at this intersection (as viewed from the south) will be improved (flattened) to a 134 m radius.

The corresponding Cabana Road back-to-back curves through the intersection will be improved to 149 m and 121 m radii, respectively. It is noted that 121 m is below the 60 km/h design speed of Cabana Road, however it is above the 50 km/h posted speed.

Sight distance limitations at the Howard Avenue/Cabana Road intersection will require localized lowering of the posted speeds on both Howard Avenue and Cabana Road

The existing profile of Howard Avenue is fairly flat between Dougall Parkway to Cabana Road. Therefore, grading requirements will be minimal. Some fill may be required to accommodate the widened Howard Avenue approaches to the Dougall Parkway Bridge.

Drainage/SWM

Existing drainage is by way of storm sewers. The widening of Howard Avenue will require the installation of new roadside catchbasins. Details of these facilities will be determined during detail design.

Intersections

The TWLTL will provide left turn access to Scofield Avenue, Ducharme Street, Salina Avenue and Morand Street. The existing left turn lanes at the Howard Avenue/Cabana Road intersection will be lengthened and islands will be installed.

The transition from the three-lane central section to the four-lane north section on Howard Avenue occurs on the south side of the Cabana Road intersection. The signing/marking of the additional northbound Howard Avenue lane south of Cabana Road as a right turn lane should be investigated during detail design.

The existing signals at the Howard Avenue/Cabana Road intersection will be reinstated. Due to the limited sight distances, auxiliary signal head arrangements should be investigated during detail design.

The intersection at Wallace Avenue will be closed, as it is too close to the Dougall Parkway north ramp terminal intersection for safe operations. At the same time, it is proposed to extend Sarah Court to Hanley Avenue and to construct Holis Street between Wallace Avenue and Scofield Avenue within the existing unused right-of-way.

Access

Existing driveway access will be reinstated. Driveway access modifications will be required at the properties near the Cabana Road intersection. Details are shown on the recommended plan; however, alternatives should be investigated during detail design.

Provision for Pedestrians/Cyclists

There is an existing 1.0 m sidewalk on the east side of Howard Avenue from Dougall Parkway to Cabana Road. This sidewalk will be reconstructed and improved to 1.5 m. A matching western sidewalk will be constructed. These sidewalks will be meandered to avoid as many trees as possible. Special sidewalk construction techniques using geotextiles and/or pavers to reduce excavation requirements (thickness and compaction) will be investigated during detail design to avoid impacting as many trees as possible.

On-street bicycle lanes are proposed as shown on Exhibit 5.1.

Utilities

ENWIN Powerlines has an aerial hydro pole line on the east side of Howard Avenue, which will require relocation.

Illumination

The existing east side illumination of Howard Avenue between Dougall Parkway to Cabana Road will be improved by the installation of west side illumination. Illumination will be as per City of Windsor standards.

5.2.3 Howard Avenue – Cabana Road to Division Road (North Section)

Design Criteria

Currently Howard Avenue is posted at 50 km/h. The desirable geometric design standards are listed below:

	Howard Avenue Cabana Road to Division Road
Design Speed	60 km/h
Posted Speed	50 km/h
No. of Vehicle Lanes(1)	4
Vehicle Lane Width	3.5 m
Bicycle Lane Width(2)	1.5 m
Sidewalk Width	1.5 m
Basic Right-of-Way	23 m

Notes: (1) Additional turning lanes provided at signalized intersections.
(2) Measured from the face of curb.

Typical Cross-Section

Exhibit 5.1 includes a typical proposed section for Howard Avenue from Cabana Road to Division Road. The proposed cross-section for Howard Avenue includes:

- 4 lanes (2 in each direction), with turning lanes at signalized intersections (section could be constructed with a 3-lane cross-section similar to the Central Section initially and widened to 4 lanes when traffic demand warrants)
- urban section – i.e. curb and gutter with storm sewers
- sidewalks on east and west sides
- dedicated on-street bicycle lanes

Alignment

Currently, Howard Avenue is 2 lanes (rural) between Cabana Road to Division Road with the centreline offset to the west within the 23 m right-of-way. It is proposed to centre the roadway within the existing right-of-way. The widening of Howard Avenue will require that the existing streetlighting/utility pole lines on the east and west side boulevards be relocated.

Howard Avenue is straight through the section except at the Cabana Road and South Cameron Boulevard/DRTP Rail/Division Road intersections. The Cabana Road intersection is discussed in Section 5.2.2 and the South Cameron Boulevard/DRTP Rail/Division Road intersection is discussed in Section 5.2.6.

The existing profile of Howard Avenue is fairly flat between Cabana Road and Division Road. Therefore, grading requirements will be minimal.

Drainage/SWM

Existing drainage is by way of storm sewers. The widening of Howard Avenue will require the installation of new roadside catchbasins. Details of these facilities will be determined during detail design.

Intersections

The existing left turn lanes at the Howard Avenue/Cabana Road intersection will be lengthened and islands will be installed.

Left turn lanes are also proposed at the South Cameron Boulevard and Division Road intersections, details of which are discussed in Section 5.2.6. No left turn lanes are proposed at the mid-block intersections with Sandison and Maguire Streets and Kenilworth Drive, however the provision of left turn lanes should be reviewed during detail design. The provision of right turn lanes at all intersections will be reviewed during detail design.

The existing signals at the Howard Avenue/Cabana Road intersection will be reinstated. Due to the limited sight distances, auxiliary signal head arrangements should be investigated during detail design. The transition from three Howard Avenue lanes in the Central Section to four lanes in the North Section will be accomplished on the south side of the Cabana Road intersection. Given this, the signing/marking of the southbound Howard Avenue right lane as a dedicated right turn lane to Cabana Road in the vicinity of the intersection should be investigated during detail design.

Access

Existing driveway access will be reinstated. Driveway access modifications will be required at the properties near the Cabana Road intersection. Details are shown on the recommended plan; however, alternatives should be investigated during detail design.

Provision for Pedestrians/Cyclists

There is an existing 1.0 m sidewalk on the east side of Howard Avenue from Cabana Road to the DRTP rail crossing. This sidewalk will be reconstructed and improved to 1.5 m. A matching western sidewalk will be constructed. These sidewalks will be

meandered to avoid as many trees as possible. Special sidewalk construction techniques using geotextiles and/or pavers to reduce excavation requirements (thickness and compaction) will be investigated during detail design to avoid impacting as many trees as possible.

On-street bicycle lanes are proposed as shown on Exhibit 5.1.

Utilities

ENWIN Powerlines has an aerial hydro pole line on the east side of Howard Avenue, which will require relocation.

Illumination

The existing east side illumination of Howard Avenue between Cabana Road and Division Road will be improved by the installation of west side illumination. Illumination will be as per City of Windsor standards.

5.2.4 Howard Avenue – Division Road to Grand Marais Road

The section of Howard Avenue between Division Road and Grand Marais Road is currently six lanes wide (plus turning lanes) and is characterized by commercial/retail (mall) use on either side of the roadway. Traffic analysis has indicated that this section will operate adequately in the future and therefore no mainline roadway improvements are proposed.

Two areas of concern were noted regarding the E.C. Row Expressway/Howard Avenue Interchange:

1. The westbound E.C. Row Expressway to Howard Avenue exit ramp terminal intersection was noted in the 1993 *E.C. Row Expressway Traffic and Planning Study* to have poor operating conditions in the future. However, recent observations (2002) note that the ramp terminal intersection was reconstructed in 2001 and it is operating adequately.

2. The Devonshire Mall access intersection opposite the south E.C. Row Expressway ramp terminal:
   Vehicles exiting from the Mall must turn right (north) on to Howard Avenue at this location. Currently the right turn lane has an approximately 30 second green arrow when Howard Avenue southbound has an advanced green. Conflict could occur due to the close proximity of the right-turn lane to the northbound Howard Avenue to eastbound E.C. Row ramp bullnose. To improve safe operations, "No Right Turn on Red" signs should be considered for vehicles exiting the Mall.

To improve pedestrian/cyclist access from the southern sections of Howard Avenue to the north end of the Study, the current sidewalk between Division Road and Grand Marais Road will be widened to 3.0 m to meet multi-use path standards. The path could be constructed of two different materials, if desired, to delineate separate cyclist/pedestrian movements.

As the sidewalk is located only on one side of Howard Avenue in this section (west side from Division Road to the south E.C. Row Expressway ramp terminal and east side under the E.C. Row Expressway Bridges), the feasibility of installing multi-use paths on both

sides of Howard Avenue was investigated. However, the proximity of drainage channels, light standards and tight clearances under the E.C. Row Expressway Bridges preclude this option.

5.2.5 Dougall Parkway Interchange

The Dougall Parkway/Howard Avenue Interchange will be improved in two stages:

- Short-term: signage improvements
- Longer-term: geometric improvements

Signage Improvements

Exhibit 5.2 details the proposed signing improvements at the Dougall Parkway/Howard Avenue Interchange.

- Northbound to Eastbound Move

Sign 10 is added on northbound Howard Avenue just north of North Talbot Road as the advance sign for eastbound Dougall Parkway and Highway 401. Sign 5, the arrow tab sign indicating access to Highway 401 at Tuson Way, is replaced with a full size signboard (Sign 11). Sign 11 is placed in advance of the right turn lane onto Tuson Way as the turnoff sign for eastbound Dougall Parkway and Highway 401.

- Northbound to Westbound Move

Sign 6 advising drivers to exit on the right to access westbound Dougall Avenue is relocated immediately south of the bridge structure. This will be far enough away from Tuson Way making the sign more effective and less confusing.

- Southbound to Westbound Move

Signs 14 and 15 will serve as the turnoff and advance signs on southbound Howard Avenue for access to the loop ramp to westbound/northbound Dougall Avenue.

- Southbound to Eastbound Move

The text “First Left” and “Via Tuson Way” is added to Sign 8 in order to clarify that access to Highway 401 from southbound Howard is via Tuson Way.

- Eastbound to Southbound Move

Sign 1 is relocated on Dougall Avenue well in advance of the eastbound to southbound ramp. Sign 2 is relocated just upstream of the physical bullnose of the eastbound to southbound ramp. The proposed locations will sign this move more effectively since the driver will have time to read the signs, and to choose to use the ramp to access southbound Howard Avenue.

- Eastbound to Northbound Move

A directional sign (Sign 12) is proposed on (Old) Howard Avenue to indicate access to Howard Avenue is via Tuson Way.

- Sign 13 is proposed to address the lack of signage for Howard Avenue northbound and southbound in two locations: at the T-intersection of Howard Avenue and Tuson Way and at the north ramp terminal.

- Chevron warning tabs are proposed to the approach bullnoses within the interchange.

Geometric Improvements

The proposed long-term improvements for the Dougall Parkway/Howard Avenue Interchange are summarized as follows and are shown on the recommended plan following page 5-26:

- Reconfiguration of the south side of the interchange

The eastbound to southbound Dougall Avenue off-ramp is realigned and becomes the only exit to access Howard Avenue. This would simplify a driver's workload on eastbound Dougall Avenue. The ramp terminal at Howard Avenue is signalized and is located to the north of the existing one. This would eliminate the existing short merge lane and short weaving distances to North Talbot Road. The ramp would widen to two lanes at the terminal (one for northbound and one for southbound Howard Avenue). As this ramp will be located closer to the residences on Dougall Avenue, a landscaping plan will be developed during detail design to help screen the ramp from the residences.

In the SE quadrant, a direct ramp to eastbound Dougall Parkway/Highway 401 from northbound Howard Avenue is proposed. By way of a left turn lane and a ramp merge lane, southbound Howard Avenue traffic will also use this ramp to access Dougall Parkway.

The southbound Howard Avenue to eastbound Dougall Parkway left turn lane will begin at the north side ramp terminal intersection and will use the current southbound Howard Avenue lane across the Howard Avenue Bridge. The current wide southbound Howard Avenue shoulder will be used for the southbound through lane. To accommodate four lanes over the Howard Avenue Bridge, lane widths will be reduced to 3.35 m over the structure.

A continuous raised median will be installed in between the south ramp terminal and North Talbot Road intersections.

Additional properties are required in the SW and SE quadrants. The additional properties are owned by the Province and have been declared surplus lands.

EXHIBIT 5.2 DOUGALL PARKWAY INTERCHANGE – SIGNAGE IMPROVEMENTS

The design criteria of the proposed south side exit and entrance ramps are as follows:

Exit Ramp (Assumed Dougall Avenue Design Speed: 70 km/h)
- Design Speed: 60 km/h
- Controlling curve radius: 130 m
- Length of Taper, L_t: n/a (direct taper)
- Length of Deceleration Lane, L_d: 70 m (measured from where the ramp is 3.5 m wide)

Entrance Ramp (Assumed Dougall Parkway Design Speed: 120 km/h)
- Design Speed: 50 km/h
- Controlling curve radius: 95 m
- Length of Taper, L_t: 95 m
- Length of Acceleration Lane, L_a: 400 m

- North side interchange improvements

The existing single lane exit ramp from Dougall Parkway will be expanded to two lanes near the ramp terminal to provide dedicated lanes for Howard Avenue northbound and southbound.

- Signalization

The south ramp terminal intersection will be signalized due to the southbound Howard Avenue left-turn lane. The current volumes at the north ramp terminal do not warrant a signal, however, one could be installed if volumes increase in the future.

- Closure of Darcey Street at Dougall Avenue

This closure is required because the Dougall Avenue to Howard Avenue exit ramp improvements move the bullnose further northwest on Dougall Avenue, and therefore the Darcey Street intersection would be located within the exit ramp gore area. This would create an unfamiliar conflict point on the ramp and would be a safety hazard.

- Closure of (Old) Howard Avenue at Dougall Parkway

This closure is proposed due to the construction of the dedicated Howard Avenue entrance ramp to Dougall Parkway.

- Closure of Wallace Avenue at Howard Avenue

As discussed in Section 5.2.2, in order to improve the safety and the operations of the north ramp terminal at Howard Avenue, it is proposed to close Wallace Avenue. Wallace Avenue and Hanley Avenue traffic would be required to access Howard Avenue via an extended Holis Avenue and either Scofield Avenue or Ducharme Street. Sarah Court will also be extended to Hanley Avenue.

- Tuson Way improvements

The existing curve on Tuson Way will be eliminated and the road straightened.

- Provision for Pedestrians/Cyclists

Due to the limited cross-section of the existing Howard Avenue Bridge over Dougall Parkway and the two weaving areas in the northbound direction, the proposed Howard Avenue on-street bike lanes will shift to the sidewalks in the vicinity of the bridge. The new combined multi-use paths will be 3.0 m wide, except on the bridge where the existing 1.8 m sidewalks can only be widened to 2.0 m.

The specific limits of the multi-use paths in this area are:

- Northbound – from Tuson Way to the north side ramp terminal intersection
- Southbound – between the north and south side ramp terminal intersections

The path could be constructed of two different materials, if desired, to delineate the cyclist/pedestrian movements.

Adequate signage should be installed at the beginning and end of the multi-use paths to inform cyclists and pedestrians of their respective paths. Due to the reduced sidewalk widths over the bridge, signage should be installed that requests cyclists to dismount and walk their bicycles across the bridge. A suggested format is: "Narrow sidewalks ahead – Cyclists please dismount to cross bridge."

5.2.6 South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex

To improve the operational concerns at this location, Howard Avenue will be shifted to intersect with Division Road at a 90° angle. This is accomplished by extending Howard Avenue 110 m along the South Cameron Boulevard right-of-way, and curving it back to Division Road using a 55 m radius curve. This radius corresponds to a design speed of less than 40 km/h, therefore advisory speed signs will be required approaching the curve. The recommended improvements are shown on the recommended plan following page 5-26. Other associated improvements are:

- Both the South Cameron Boulevard and Division Road intersections will be signalized and signal coordination will be required to ensure that vehicles do not stop on the railway tracks when a train is approaching. Transport Canada-approved signals and barriers will be required across the Howard Avenue roadway and the pedestrian/cyclist facilities. The design and the coordination of the signals will be performed during detail design.
- A northbound left turn lane to South Cameron Boulevard is proposed.
- Separate left and right turn lanes on South Cameron Boulevard are proposed at Howard Avenue.
- Dual northbound left turn lanes are proposed from Howard Avenue south to Howard Avenue north.
- The Devonshire Mall access road will be widened and dual left turn lanes will be provided to Division Road southbound. This widening is required to match the width of the opposing Howard Avenue leg of the intersection. Some Devonshire Mall parking reconfiguration is likely required as well.
- The Howard Avenue north to Howard Avenue south direct ramp will be removed. Access is proposed to be via a right turn lane.
- The Roundhouse Centre loop ramp from Howard Avenue southbound will be realigned and modified to accommodate the widened Howard Avenue/Division Road

intersection. The ramp width will be modified to a constant width of 5.0 m (equal to the current width at entry). These modifications will not impact the recently completed Krispy Kreme Donuts.

- The on-street bicycle lanes proposed for the southern sections of Howard Avenue will move off-street south of South Cameron Boulevard. At this point they will join with the proposed boulevard sidewalks as 3.0 m wide multi-use paths. This will allow pedestrian and cyclist movements to be separated from the vehicular traffic at the rail line and the Howard Avenue/Division Road intersection.
- Overhead (lane designation) and ground-mounted signage will be required to inform drivers of their intended paths through the intersection complex. Signage details will require investigation during detail design.
- Property will be required to accommodate the improvements:
    - From Lots #79 and 80 along Hamner Circle to accommodate the widened and realigned Howard Avenue.
    - From the DRTP to accommodate the relocated Howard Avenue rail crossing.

CN Rail and Transport Canada (via CN Rail) have given their approval in principle of the proposed rail crossings in this intersection design based on email correspondence dated December 13, 2002 (see Appendix A). However, further discussions with CN Rail and Transport Canada will be required prior to detail design.

5.2.7 Property Requirements

Based on the preliminary plans, some additional property is required to accommodate the undertaking. The majority of this property is in thin strips adjacent to the current right-of-way to accommodate the proposed sidewalk improvements. Additional property will be required as follows:

- Along the east side of Howard Avenue at Havens Drive including sight triangles at Havens Drive
- Along the west side of Howard Avenue at Country Club Drive including sight triangles at Country Club Drive
- Sight triangles at Lake Trail Drive
- Along the west side of Howard Avenue at Neal Boulevard including sight triangles at Country Club Drive
- Along the southeast side of the Howard Avenue/North Talbot Road intersection including sight triangles
- Along the southeast side of Howard Avenue at Tuson Way including a sight triangle
- Along the southeast side of Howard Avenue to accommodate the proposed Howard Avenue ramp to eastbound Dougall Parkway
- Along the west side of Howard Avenue between the Dougall Parkway north ramp terminal and Scofield Avenue
- From all four quadrants of the Howard Avenue/Cabana Road intersection
    - The Pizza King building on the southwest corner will be impacted by the construction and the property will be required
- At the South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex
    - From Lots #79 and 80 along Hamner Circle to accommodate the widened and realigned Howard Avenue
    - From the DRTP to accommodate the relocated Howard Avenue rail crossing

Property requirements will be confirmed during detail design.

5.2.8 Preliminary Construction Cost Estimate

Subsequent to the selection of the recommended alternative, the preliminary cost estimate was refined. Taking into account additional intersection costs and the requirement for concrete pavement, the preliminary construction cost for the recommended undertaking has been estimated as follows:

Preliminary Construction Cost Estimate (in Order of Staging)	(millions of dollars)
Intersection improvements at Howard Avenue/Cabana Road	$2.2 M
Intersection improvements at South Cameron Boulevard/DRTP Rail/Division Road Intersection Complex	$2.8 M
Signage improvements at Dougall Parkway Interchange	$0.04 M
Howard Avenue Widening, Highway 3 to Dougall Parkway	$3.2 M
Howard Avenue Widening, Dougall Parkway to Cabana Road	$1.3 M
Howard Avenue Widening, Cabana Road to Division Road	$2.9 M
Sidewalk improvements, Division Road to Grand Marais Road	$0.03 M
Geometric improvements at Dougall Parkway Interchange	$1.2 M
Total	**$13.7 M**

5.2.9 Design and Construction Considerations

The mitigation of construction impacts will follow the Environmental Construction Guidelines for Municipal Road, Sewage and Water Projects, issued by the Municipal Engineers Association.

Potential Impacts During Construction

The following sections describe the potential environmental impacts during construction and mitigating measures. The following potential adverse effects are identified:

- protect existing vegetation
- construction noise and air quality
- disruption to vehicle traffic
- mud and dust during reconstruction

The mitigation and monitoring conditions included in the following sections indicate a commitment on the part of the proponent to mitigate potential environmental impacts and undertake a monitoring programme during and after construction.

During the detail design stage and prior to construction, the City of Windsor will be responsible for obtaining approval from the Ministry of the Environment for stormwater management and sewage works.

It is intended that the works proposed are executed in such a manner, which to the fullest possible extent, minimizes any adverse effects on the natural environment of the project

area. The Contractor will be responsible to ensure all his personnel are sufficiently instructed so that the work is carried out in a manner consistent with minimizing environmental insult. The City will assign a qualified environmental inspector whose responsibility will be to ensure compliance with the environmental objectives.

Disposal of Excess Material

Surplus excavated material shall be removed to locations arranged by the Contractor at his own expense.

Prior to the disposal of any surplus excavated material, the Contractor will provide the Engineer with a sketch of the dumping site(s) showing access thereto. A written statement from the property owner(s) agreeing to allow the disposal of fill on the property must be approved by the Engineer. Furthermore, the placement of fill within any swamp, ravine or floodplain requires the written permission of the local Conservation Authority.

The Contractor is responsible for obtaining all approvals.

Upon completion of the disposing, levelling and grading of surplus excavated material on any property, the Contractor shall obtain a written statement from the property owner(s) releasing the Contractor and City from any claims and accepting the condition of the property as satisfactory.

Measures for Proper Tree Removal and Preservation of Residual Plant Communities

Measures for proper tree removal and preservation of residual plant communities are as follows:

- A Tree Protection Plan will be developed during detail design. This plan will provide guidelines for protecting trees during construction, as well as minimizing soil compaction and making wise use of the removed timber resource. The plan should also include recommendations for during and post-construction maintenance including hazard tree monitoring, pruning, insect and disease control, aerating, watering and mulching.
- The Contractor shall not damage or remove any trees or shrubs on the road allowance or adjoining lands unless the Engineer or representative shall otherwise direct. Trees and shrubs which require trimming or tying back should be trimmed or tied back in advance of construction under the direction of the Engineer.
- Adjacent to vegetated areas, the cut and fill slope limits will be identified and a temporary fence would be erected. This will restrict the construction work area, protect the root zone of trees from damage and avoid soil compaction during construction.
- Temporary fence will be erected around the drip line of trees to be retained;
- Trees to be removed on City of Windsor property require prior approval in accordance with applicable City by-laws and procedures. Trees will be felled away from the residual stand to avoid damage. Tree removal should be conducted by a qualified firm experienced in the tree cutting operations.

Construction Noise and Air Quality

The applicable by-laws developed by the City of Windsor would be adhered to.

Mud and Dust Control

The Contractor shall take such steps as may be required to prevent dust nuisance resulting from his operations. The Contractor shall be responsible for all dirt and mud that is tracked onto the roadways from vehicles entering or leaving the job site. He shall, upon request from the Engineer, immediately proceed with clean up operations, or in the opinion of the Engineer, the Contractor has not or cannot sufficiently remove the mud from the road, the Engineer will proceed with the necessary clean up.

Traffic Control

Construction Staging – It is anticipated that Howard Avenue would be kept open for 2 lanes of traffic during construction, however temporary, short-term road closures may be required.

Local Traffic - The Contractor shall provide access for local residents and businesses who presently have access along the line of construction.

Construction Signs - The Contractor shall apply, place and maintain all barricades, warning signs, delineators and flashing lights necessary for the protection of the public and the work, including warning signs of construction operations in accordance with the Ministry of Transportation's Temporary Condition Manual (February 2000), Book 7 for all temporary traffic control issues for both short and long term durations.

Flagging - The Contractor shall, when directed by the Engineer, supply an adequate number of traffic control persons to direct traffic during construction, also in accordance with Ministry of Transportation's Temporary Condition Manual (February 2000), Book 7 and as directed by the Engineer.

5.2.10 Monitoring and Maintenance

During construction, the City will ensure that the environmental protection recommendations in the ESR and other subsequent agency approval conditions are complied with. A full inspection of every part of the undertaking will be carried out one year after the completion of each part.

5.3 POTENTIAL ENVIRONMENTAL EFFECTS, MITIGATING MEASURES AND COMMITMENTS TO FUTURE WORK

5.3.1 Transportation

The proposals for Howard Avenue, as outlined in the ESR, support the transportation goals and objectives of the City. The associated benefits are:

- increased capacity in the Howard Avenue corridor to accommodate existing and future travel demands
- increased safety for residential access between Dougall Parkway and Cabana Road through the introduction of a continuous two-way left turn lane

- improvements to the intersections of Howard Avenue with Havens Drive, Lake Trail/Country Club Drives, Neal Boulevard/North Talbot Road, Tuson Way, Cabana Road, South Cameron Boulevard, DRTP Rail crossing, and Division Road
- safety and operational improvements to the Dougall Parkway/Howard Avenue Interchange
- improvements to both Howard Avenue will improve area roadway network flexibility to serve existing and future land uses
- potential for increased transit service

5.3.2 Land Use

The proposed undertaking provides improved access to existing and future land uses adjacent to Howard Avenue.

5.3.3 Social Environment

In terms of the existing residential community, the proposed undertaking:

- improves overall community access
- is generally located within the existing right-of-way thereby reducing impacts
- widens the existing sidewalks and installs new sidewalks along Howard Avenue
- provides on-street bicycle lanes for cyclists

Future Noise Levels

As part of the Class EA study, a noise analysis was carried out. Where an existing roadway is proposed to be modified/widened adjacent to a noise sensitive area, the Ministry of the Environment (MOE) requires that the future noise level with the proposed improvements be compared to the future noise level without the proposed improvements. This assessment is done at the outdoor living area. The provision of noise mitigation is to be investigated should the future noise level with the proposed improvements result in a greater than 5 dBA increase over the future noise level without the proposed improvements. For reference, a doubling in traffic volumes results in an approximate 3 dBA increase in sound levels while an increase or decrease of 2 to 3 dBA is typically regarded as just perceivable to the average individual.

The noise analysis is included in Appendix H.

Noise levels were calculated at representative receiver locations (backyard locations in each of the three Howard Avenue sections where widening is proposed; near the proposed modified Dougall Parkway exit ramp; and where backyards face Howard Avenue south of South Cameron Boulevard) as summarized in Appendix H. In summary, projected noise level increases are less than 5 dBA, therefore the consideration of noise mitigation is not required based on MOE criteria.

Air Quality

Studies of arterial roads in other municipalities with equal or higher projected traffic volumes than Howard Avenue, showed predicted air emission levels to be below MOE

criteria and in fact, air emissions were predicted to decrease as the number of fuel efficient cars increases. While vehicle emissions will increase through the Howard Avenue corridor as traffic volumes increase, it is concluded that emission levels will be below MOE criteria.

Pedestrians/Cyclists

Existing sidewalks will be widened. Additional sidewalks will be constructed where none exist today. On-street bicycle lanes are proposed for Howard Avenue. Some multi-use paths are proposed to remove cyclists from areas of on-street conflict and/or narrow roadway widths.

5.3.4 Natural Environment

As part of this Study, the potential natural environmental effects were determined and proposed mitigation measures were identified associated with the recommended undertaking. The findings are provided herein as they pertain to:

- vegetation and flora
- groundwater
- summary and commitments to future work

Vegetation and Flora

Howard Avenue is an established residential street with many large, mature trees. These trees contribute to the present character of the road. As the road is currently only two lanes wide, any reconstruction of the road that increases the width will have significant impacts on these trees and hence the aesthetic character of the road. Maintaining a residential character for the roadway is important to the community. In order to do this a balance must be achieved between public needs (required vehicular/cyclist/pedestrian traffic) and environmental impacts (trees and aesthetics).

Study Approach

A tree inventory field review was initially conducted and all tree locations within approximately 10 m of the existing Howard Avenue pavement edge were numbered and compared to the tree locations as shown on the latest City of Windsor base-mapping. Missing trees were added to the base maps and inaccurate locations were adjusted. Trees were not tagged in the field.

The tree species, diameter at breast height (dbh), health and general structure/condition were recorded in a table, which is included in Appendix I.

The Howard Avenue alternatives were superimposed over the tree locations to determine the potential tree impacts of each alternative. The trees impacts were evaluated using the following letter designations:

A – Directly Impacted Tree. Removal Required (includes all trees greater than 10 cm dbh within proposed roadway, boulevard or proposed sidewalk; or within 1 m of the proposed sidewalk and over 20 cm dbh).

B – Potentially Significant Root Impacts. By looking at tree age, species and health the degree of impact was evaluated as significant (i.e. tree will likely decline) or not (tree

will likely survive). It also considers significant pruning required (as in spruce). This category is a first approximation and is somewhat subjective. It does not take into account factors such as curb-face sidewalk, floating sidewalk, utility locations or grading requirements.

C – Poor Condition Tree (will likely decline in the future regardless of construction).

D – No likely impacts. Tree age, species and health make it a good candidate for retention. Transplanting of small trees (less than 10 cm dbh) was also included in this category and should be separated out at the detailed design stage.

E – Not a tree. Many of the plants indicated on the plans were in fact shrubs, flower beds, small hedges or trees under 10 cm dbh.

The number of trees impacted was used as a criterion in selecting the recommended alternative.

Upon selection of the recommended alternative, the refined Howard Avenue alignment was again superimposed on to the tree locations to determine the tree impacts of the recommended plan.

Preliminary Impacts Analysis

The following tables summarize the number of trees impacted in the three Howard Avenue sections where a widened cross-section is proposed.

South Section – 4 Lanes

West Side		East Side	
Outside ROW	Within ROW	Within ROW	Outside ROW
3	9	9	8
12		17	
29			

Central Section – 3 Lanes

West Side		East Side	
Outside ROW	Within ROW	Within ROW	Outside ROW
11	0	22	1
11		23	
34			

North Section – 4 Lanes

West Side		East Side	
Outside ROW	Within ROW	Within ROW	Outside ROW
3	12	19	6
15		25	
40			

'ROW' is defined as the right-of-way required for the recommended alternative. For the most part, this is the same as the existing ROW, however some additional property is required at intersections.

Mitigating Measures

There are many ways to help maintain as many trees as possible while widening the road. Although a tree may not be directly impacted (its location coincident with the new road, sidewalk or utility location), it may have its roots significantly impacted. There are two considerations in evaluating root disturbance: removal of absorbing roots and removal of support/anchoring roots. Removing the absorbing roots causes immediate water stress; survival is linked to the tree's ability to tolerate the stress and grow new roots (this is somewhat dependant on the current health of the tree and the tree species). Several precautions can be taken during detail design to help maintain existing trees and preserve the aesthetic quality of the roadway including:

- Preparing a Tree Protection Plan. This plan will provide guidelines for protecting trees during construction, as well as minimizing soil compaction and making wise use of the removed timber resource. The plan should also include recommendations for during and post-construction maintenance including hazard tree monitoring, pruning, insect and disease control, aerating, watering (most important) and mulching.
- Implement design modifications to help reduce tree impacts including:
  a) Adjusting the sidewalk location to accommodate large trees where feasible (reduce the amount of required root and branch pruning as much as possible).
  b) Adjusting utility locations where feasible or investigating the use of a trenchless technology system.
  c) Investigate a revised sidewalk construction design to reduce excavation requirements (thickness and compaction) by using geotextiles and/or pavers.
- Preparing a Replanting Plan to be implemented after construction.

Consultation with the City of Windsor Forester will be required prior to and during Detail Design to confirm that tree preservation measures meet Windsor requirements.

In addition, any Ash material that is removed must be disposed of as per the Canadian Food Inspection Agency Quarantine order.

Groundwater

No major cuts or excavations are proposed.

During detail design, groundwater investigations will be conducted to confirm the groundwater elevation and flow regime that may be impacted by road excavation or fill placed on embankment (at the Dougall Parkway/Howard Avenue Bridge).

Surface Water Drainage

It is proposed to convey roadway runoff using storm sewers. As the remaining surface flows will outlet to the Grand Marais Drain (at the E.C. Row Expressway) or to the Wolfe Drain (near Highway 3), a permit under Section 28 of the Conservation Authorities Act will need to be obtained prior to the proposed work proceeding.

5.3.5 Cultural Environment

The built heritage and archaeological assessments are discussed in detail in Appendix J.

Built Heritage Features

Road widening and/or intersection improvements may have a variety of impacts upon built heritage features and cultural landscapes. These include the loss or displacement of resources through removal or demolition and the disruption of resources by introducing physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting.

The preliminary preferred alternative will result in minimal disruption to cultural heritage resources.

1. Any proposed alignments through the study area should be suitably planned in a manner that avoids any identified, above ground, cultural heritage resource.

2. Where any identified, above ground, cultural heritage resource is to be affected by loss or displacement, further research should be undertaken to identify the specific heritage significance of the affected resource and appropriate mitigating measures adopted, such as detailed recording or historic research and photo-documentation where appropriate.

3. Where features are to be disrupted by introducing physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting suitable measures such as landscaping, buffering or other forms of mitigation should be adopted. In this regard provincial guidelines should be consulted for advice.

4. Mature trees should be conserved where possible.

Archaeology

The Stage 1 archaeological assessment completed as part of this Study determined that no archaeological sites have been registered within the study area limits.

Based on the archaeological potential of the study area, however, there is potential for the identification of precontact and historic archaeological resources throughout much of the study area. As a result,

1. Where land disturbance (due to road widenings, alignment changes, temporary detours, etc.) is proposed beyond the limits of the existing disturbed right-of-ways within any area identified as having archaeological potential, a Stage 2 archaeological assessment will be undertaken during the detail design stage.

2. In the event that deeply buried archaeological remains are encountered during construction activities, the office of the Regulatory and Operations Group, Ministry Culture (MOC), will be notified immediately.

3. Furthermore, in the event that human remains are encountered during construction, both MOC and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Business Services will be notified immediately.

5.4 PUBLIC REVIEW

The opportunities for public involvement was described in Section 1.7 while public input was described in Sections 4.2 and 4.4.

Overall public comments received and the response / future course of action are summarized in Exhibit 5.3.

EXHIBIT 5.3 SUMMARY OF PUBLIC COMMENTS

SUBJECT	WHAT THE PUBLIC TOLD US:	OPPORTUNITIES
General	Maintain the existing neighbourhood atmosphere.	Changes to existing neighbourhood atmosphere will be minimized by: -Limiting the majority of the road widening to within the existing right-of-way (except at intersections) -Minimizing impacts to the displacement of trees, protection of mature trees where possible by reducing cross-section elements, and/or meandering sidewalk. Replanting of trees to compensate displaced trees will also be proposed. (details will be confirmed during the next stage of the project) -Introducing streetscaping (during the next stage of the project)
	Trucks should be prohibited on Howard due to noise and pollution.	Existing peak hour truck percentage on Howard south of Division is less than 7%, notwithstanding this, this study recommends the truck route designation be reviewed by the City. However, the removal of the truck route designation will need to be considered in a City-wide basis and is therefore outside the scope of this study.
	Traffic concerns • increase in the volume of traffic • opposition to increase in number of lanes	If Howard Avenue is not widened, road conditions and level of service will deteriorate resulting in increased congestion and delays, reduced level of safety performance and increase in noise and pollution. Widening alternatives were considered to address the current traffic volumes as well as future growth.
	Introduction of traffic calming measures	-The current speed limit is consistent with a Class II arterial designation. -Wider lane widths would encourage higher speeds. Lane widths from the lower range of the design domain have been proposed.
	Suppression of dust from gravel shoulders	Replacement of gravel shoulders with an urbanized cross section of curb and gutter is being proposed.
	Provision of cycling and pedestrian facilities	Dedicated bike lanes are included in the proposed roadway improvements. A continuous sidewalk is proposed for both sides of Howard Avenue within the study limits.
	Driveway access and safety	A two-way centre turning is being proposed in the central section to facilitate safe access from driveways. The four-lane cross-sections in the South and North sections will facilitate safe driveway access by allowing through traffic to bypass turning traffic.

SUBJECT	WHAT THE PUBLIC TOLD US:	OPPORTUNITIES
	Improvements to the Cabana Road intersection are needed immediately.	Improvements to Cabana Road are being proposed by the current study and also by the separate Cabana Road EA Study. The priority for improvements at this location is recognized by the City and the on-going separate Division-Cabana Road EA Study.
South Section Alternatives (Highway 3 to Dougall Parkway)	A 4-lane cross-section is preferred (however a 4- or 5-lane road may increase truck traffic). Highway 3, Havens Drive and North Talbot Road intersections need improvements.	A 4-lane cross-section is proposed to improve safety and accommodate anticipated traffic volumes. Dedicated turning lanes will be added to these intersections to improve safety and traffic operations.
Central Section Alternatives (Dougall Parkway to Cabana Road)	The road acts like a residential collector, not an arterial.	There are lower traffic volumes on this section of Howard Avenue. Therefore, a 3-lane cross-section is proposed to increase safety, while also minimizing the impacts to the residences.
North Section Alternatives (Cabana Road to Division Road)	A 3-lane cross-section is preferred	A 3-lane cross-section cannot accommodate the anticipated future traffic volumes in this section. To improve safety and to accommodate anticipated traffic, a 4-lane cross-section is proposed. Property impacts will be minimized by maintaining the existing Right-of-Way (except where additional width is required to improve safety at intersections)
Dougall Parkway Interchange Improvements	There is need to improve the interchange. Option 2 was generally preferred.	Short-term signage improvements are proposed. Option 2 is the recommended interchange alternative for longer-term geometric improvements.
South Cameron Boulevard/ Division Road/ DRTP Intersection Improvement Alternatives	There is a strong need to improve this intersection. Option 2 was preferred.	This intersection has been identified as having top priority for improvements by this Study. Option 2B is the technically-preferred intersection alternative as it improves safety, maintains road network connectivity, and minimizes property impacts.
Proposed Road Closures	South Cameron Boulevard must remain open. Support for closing (Old) Howard Ave. at Dougall Parkway. No consensus on other road closures	South Cameron Boulevard will remain open. (Old) Howard Ave. will be closed at Dougall Parkway to improve safety at the interchange. A closure of Darcey Street at Dougall Avenue and Wallace Street at Howard Avenue are proposed to improve safety at the Dougall Parkway Interchange. Additional road improvements near Wallace Street will be performed to maintain the neighbourhood road network.