

Report

# Banwell Road Environmental Study Report

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Tecumseh Road East to CP Railway Tracks



Prepared for City of Windsor  
by IBI Group

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# Document Control Page

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# Executive Summary

## INTRODUCTION AND BACKGROUND

This Environmental Study Report (ESR) was prepared as part of the Municipal Class Environmental Assessment (Class EA) process for improvements to the City of Windsor's Banwell Road from Tecumseh Road East to the Windsor City Limits at the CPR tracks. It describes the existing and predicted future traffic volumes, operating conditions, existing environmental conditions, and area sensitivities and constraints associated with the planned improvements to this section of Banwell Road. It outlines the work that was carried out to assess and develop the preferred long term roadway improvement solution.

Growth at the eastern edge of the City of Windsor and adjacent Town of Tecumseh will result in significantly increased traffic in the Banwell Road corridor. This corridor will also require safe and reasonable accessibility for all modes of travel. This ESR was prepared to ensure that the City of Windsor can accommodate future travel demands on Banwell Road so that this facility operates in an efficient manner. Improvements of this nature fall under the Ontario Environmental Assessment Act (EA Act) and as such this involves the preparation of a Municipal Class Environmental Assessment (EA) Schedule C for this project. The study limits along the Banwell Road corridor are bounded on the north by Tecumseh Road East, and the city boundary immediately south of the CPR tracks south of Intersection Road.

The EA takes into consideration a number of City and regional transportation and related planning studies conducted over the past ten plus years, including but not limited to the City of Windsor and County of Essex Official Plans, the CR 22 EA from Manning Road to CR 43, the Tecumseh Transportation Master Plan, CR 19 EA and the most recent CR 43/Banwell Road Class EA from the City boundary to south of CR 42.

## PLANNING PROCESS AND CONSULTATION

This EA followed the requirements of a Schedule C EA under Ontario's Municipal Class EA Process. It was directed by a Project Team that included staff members from the City of Windsor and the consulting team of Giffels Associates Ltd. /IBI Group (IBI Group). External agencies and stakeholder groups with interests in the study area were notified of the project and the four Public Information Centres held on May 16, 2007, September 18, 2007, June 2, 2009 and June 25, 2015.

After PIC #2 in September 2007, the project team was asked to further consider and evaluate new land use development plans and proposals in the vicinity of the Banwell Road corridor. In addition, the County of Essex was also conducting the County Road 19 (Manning Road) and County Road 22 Improvement Class EAs and proposed changes were being considered at Lesperance Road. The result was a prolonged delay in completing the ESR while further research and analysis was conducted of future growth scenarios and associated impacts in the corridor area. The results were reported to the public, stakeholders and external agencies at the June 2, 2009 PIC including expected impact on traffic generated and related transportation needs. The results of this were contained in draft ESR submitted in 2011. With further growth in the corridor, the City decided to update the study with latest information in 2013. The primary driver of the growth is from an updated study of Tecumseh Hamlet. From the Tecumseh Hamlet Secondary Plan Transportation Study Final Report page 36, dated January 2015 from Dillon Consulting, this residential development on the east side of Banwell Road south of

EC Row Expressway includes 3,100 residential units and 413,000 square feet of commercial space.

The newer traffic assessment suggested that the growth rate used in previous assessment were higher than the latest trend, which resulted in changes to recommendations made in draft 2011 ESR. As a result, a fourth PIC session was held to inform public, stakeholders and external agencies on June 25, 2015. The correspondences and materials for this PIC are included in this ESR.

## **PROBLEM STATEMENT**

At a minimum, a four lane cross-section will be required for Banwell Road from the City boundary to Tecumseh Road East to serve forecasted travel demands in east Windsor/west Tecumseh to 2034. However, this may be incapable of accommodating the increased traffic arising from the maximum planned land use projections in this area. This includes up to 3 million square feet of planned new commercial and retailing space, partial interchange and the closure of the at-grade intersection of Lesperance Road with EC Row Expressway in the Town of Tecumseh. As a result, traffic volume projections show that additional Banwell Road capacity and operational improvements are required.

## **ALTERNATIVE PLANNING SOLUTIONS**

Three basic types of transportation planning solutions were evaluated to address the Problem Statement established for Banwell Road ; 1) Do Nothing (as required by the EA process), 2) Improve road capacity through localized operational improvements (i.e., traffic controls), road widening and installation of a full Parclo A4 interchange at Banwell Road and the EC Row Expressway, and 3) Transportation Demand Management measures to reduce or slow the growth in single occupant automobile use along the corridor.

Evaluation of these alternative planning solutions concluded that the City should further consider capacity improvements focusing on road widening and a full Parclo A4 interchange, in association with initiatives to enhance the use of public transit, cycling and walking along the corridor so as to reduce to some degree the growth in auto use.

## **ALTERNATIVE DESIGN**

Three design alternatives for Banwell Road were evaluated in detail:

1. Do Nothing (Base Case);
2. Widen Banwell Road on the Centreline; and
3. Widen Banwell Road on the Centreline (EC ROW to Tecumseh) and to the West (south of EC ROW to CPR Tracks) of Existing Road Right-of-Way.

Using a series of technical, social, natural and economic environment evaluation criteria, the EA concluded that Design Alternative #3 would create the best benefits and least impacts and was selected as the Technically Preferred Design.

Although the Technically Preferred Design for the interchange is recommended to be implemented in the short term, given the high cost of the interchange and lack of funding availability, interim mitigation improvements may be pursued. This may help relieve some of the severely congested movements at EC Row Expressway and Banwell Road through to 2024 although much of the capital expenditure would be not recovered when the Technically Preferred Design is implemented.

## SUMMARY DESCRIPTION OF THE TECHNICALLY PREFERRED DESIGN

- Widen Banwell Road to a four through lane cross section from the City boundary (CPR tracks) to Tecumseh Road East;
- Protect for required utility infrastructure and an ultimate six lane widening of Banwell Road from north of CP Railway Tracks to the south leg of a new EC Row Expressway interchange, with the additional two lanes having the potential to operate as rapid transit or High Occupancy Vehicle lanes;
- Construct a Parclo A4 interchange at EC Row and Banwell Road intersection, with W-N/S/E Off Ramp providing access to new development (Future Gouin Street);
- Include civic gateway urban design treatment at the Banwell Road /E.C. Row interchange;
- Restrict direct access to Banwell Road as a controlled access highway by using a 0.3 m restricted access reserve strip along the road;
- Reserve property for a future grade separation at the CP Rail crossing at the southern study area limit;
- Construct a multi-use trail along the full project corridor;
- Sidewalk along the project corridor (excluding EC ROW interchange);
- Signalize existing intersections of Palmetto Street, Intersection Road, and future connection at Maisonneuve Street;
- Construct a roundabout at Mulberry Drive/Wildwood Drive intersection; and,

The modern two-lane roundabout is recommended at the intersection of Banwell Road with Wildwood Drive/Mulberry Drive. It was selected over a standard signalized intersection for the following reasons:

- The proven ability of a modern roundabout to move large volumes of traffic through the intersection continuously, and the Study recommendation to use roundabouts at major Banwell Road intersections to accommodate the large increase in traffic volume forecast from area land development;
- Modern roundabouts are proven to avoid major collisions and fatalities caused by high speeds, red light running and head-on collisions. Those collisions that do occur at modern roundabouts tend to be at low speed and involve side impacts;
- The traffic volumes and associated left turn movement forecasts on Mulberry Drive/Wildwood Drive at Banwell Road would be better served with roundabout operating under yield conditions. The roundabout will include the capability to avoid long queuing of northbound left turn movement inbound for Wildwood Drive; and,
- Existing commercial development driveways are situated on the west side of Banwell Road along Wildwood Drive.

This EA also recommends to:

- Provide sidewalk based on the standards & guidelines compliant with the most current Accessibility for Ontarians with Disabilities Act (AODA).
- Re-evaluate the need for a six lane cross-section in advance of approval of any developments along Banwell Road, south of EC ROW; and
- Monitor traffic volumes on Banwell Road such that when current or forecasted PM peak hour directional volumes on Banwell Road within the City of Windsor exceed

**1,300 per direction**, the timing of the need for additional expansion from a four to six-lane cross-section be reviewed and confirmed. This would require the City of Windsor to acquire property as identified in the ESR document along the existing Banwell Road right-of-way to implement the planned widening and improvements.

The preliminary estimate of required property acquisition for the preferred ultimate Banwell Road widening and improvements is approximately **3.22 ha**.

A preliminary construction cost estimate prepared for the reconstruction of Banwell Road is based on 2015 costs and excludes property acquisition, and retaining wall costs. Widening the entire length of Banwell Road from an existing 2 lane to 4 lanes starting from the City boundary (CP Railway Tracks) to Tecumseh Road East including a two lane roundabout at Wildwood Drive/Mulberry Drive, and providing signalized intersections is estimated to cost approximately \$18.8 Million. A Parclo A4 interchange at the EC Row Expressway is estimated to cost approximately \$28.1 Million.

To further widen the section of Banwell Road from north of the CP Railway Tracks to the south of EC Row Expressway to six through lanes is estimated to cost additional \$2.7 Million (approximately). The total project cost is estimated of \$49.7 Million.

A monitoring program will be established to ensure that the mitigation measures specified in this ESR are undertaken. The key impacts to the environment are the short-term impacts that require monitoring during construction. The long-term impacts are expected to be taken into consideration during the detailed design of the project.

## Glossary of Terms

**Arterial Road** – a major or main traffic route.

**CEAA** – Canadian Environmental Assessment Act

**Capital Cost** – cost to construct the recommended undertaking/project.

**DFO** – Department of Fisheries and Oceans Canada that can trigger the Canadian Environmental Assessment Act if project impacts fish habitat.

**EA** – Environmental Assessment process used in Ontario to determine the impacts of proposed public infrastructure projects on the social, natural and economic environments.

**LOS** – Level-of-Service of a roadway or intersection measured as a rating from A (best) to F (worst) based on the planning capacity of the road or intersection compared to traffic volumes experienced now or forecasted into the future.

**NSA** – Noise Sensitive Area used in noise impact assessment.

**Ontario Environmental Assessment Act (EAA)** – sets up a process for reviewing the environmental impacts of proposed public infrastructure projects.

**EBL** – Eastbound Left  
**EBT** – Eastbound Through  
**EBR** – Eastbound Right

**WBL** – Westbound Left  
**WBT** – Westbound Through  
**WBR** – Westbound Right

**SAR – Species at Risk** - is any naturally occurring plant or animal in danger of extinction or of disappearing from the province. Once classified as "at risk", they are added to the Species at Risk in Ontario (SARO) List. Sometimes called the "endangered species list".

**Traffic Calming** – physical measures applied to a public street designed to reduce the negative effects of motorized vehicular traffic, alter driver behavior and improve conditions for non-motorized street use.

**VPH** – vehicles per hour as a measurement of motorized or all vehicle traffic volume on a street, depending on traffic data.

**V/C** – Volume to Capacity ratio of the volume of traffic measured on a street compared to the planning capacity of the street to carry traffic.

**VPLH** – Vehicles per Lane per Hour used as a measurement to establish the planning capacity of a street.

**Preferred Undertaking or Design** – the infrastructure alternative evaluated to be the best approach to address the Problem/Opportunity Statement established for the EA.

**NBL** – Northbound Left  
**NBT** – Northbound Through  
**NBR** – Northbound Right

**SBL** – Southbound Left  
**SBT** – Southbound Through  
**SBR** – Southbound Right

# 1 Introduction and Background

This report was prepared as part of the Municipal Class Environmental Assessment (Class EA) process for improvements to the City of Windsor's Banwell Road from Tecumseh Road East to the Windsor City Limits south of the CPR tracks. It describes the existing and predicted future traffic volumes, operating conditions, existing environmental conditions, area sensitivities and constraints associated with the planned improvements to this section of Banwell Road. It outlines the work that was carried out to assess and develop the preferred long term roadway improvement solution.

## 1.1 Purpose of the Study

The purpose of this study is to address the Banwell Road capacity and operating deficiencies that were identified in the 1999 Windsor Area Long Range Transportation Study (WALTS) and the 2005 Essex Windsor Regional Transportation Master Plan (EWRTMP).

Growth within the adjacent Town of Tecumseh and at the eastern edge of the City of Windsor will result in significantly increased traffic in the Banwell Road corridor. This corridor will also require safe and reasonable accessibility for all modes of travel.

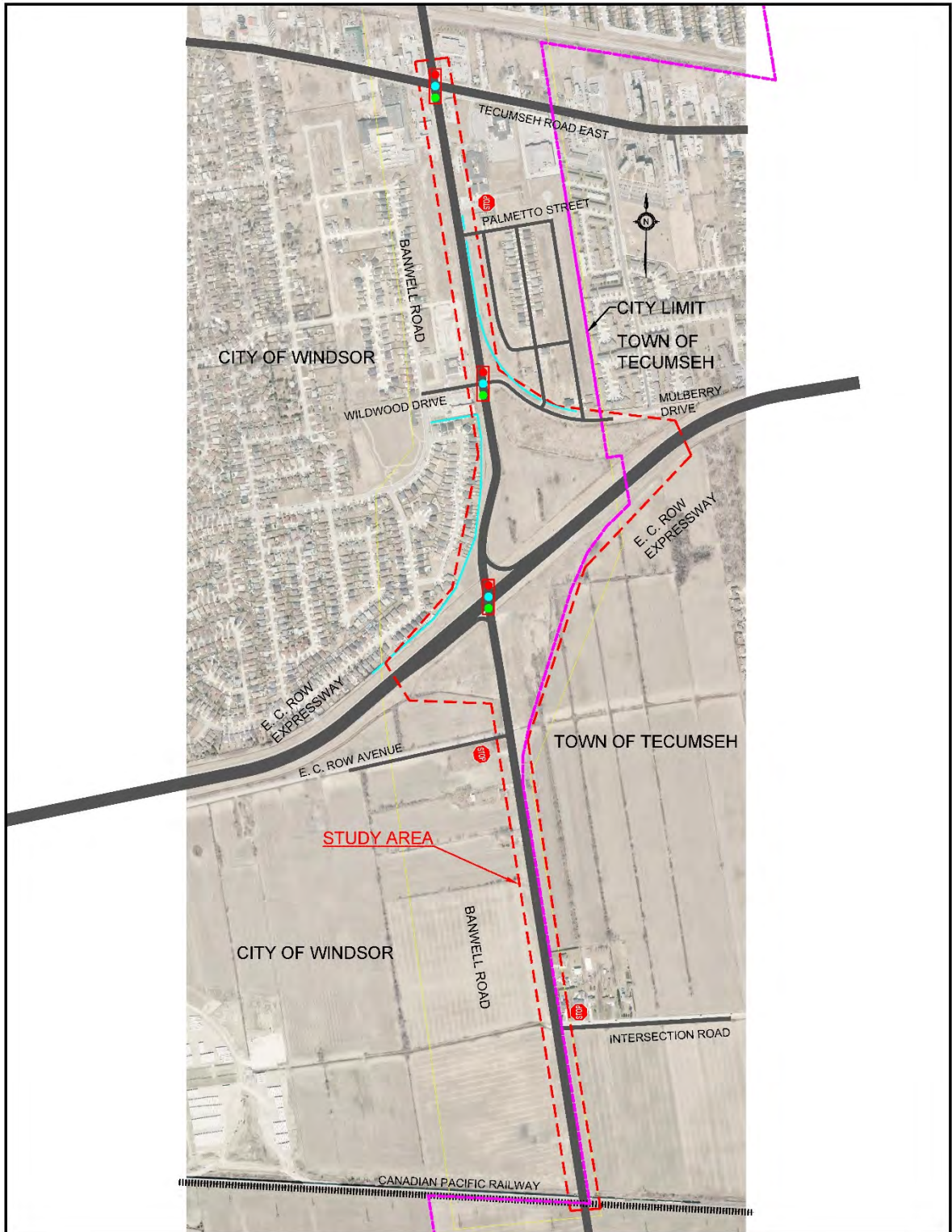
This study will ensure that the City of Windsor can accommodate future travel demands on Banwell Road so that this facility operates in an efficient manner. Improvements of this nature fall under the Ontario Environmental Assessment Act (EA Act) and as such this involves the preparation of a Municipal Class Environmental Assessment (EA) Schedule C for this project.

## 1.2 Description of the Study Area

The study limits is bounded on the north by Tecumseh Road East, and the city boundary immediately south of the CPR tracks. Refer to **Exhibit 1-1** for the study area limits.



**Exhibit 1-1 Study Area**



## 1.3 Related Studies

The following is a list of related background studies within the immediate Banwell Road corridor which provided a context for the need for improvements:

### **City of Windsor Official Plan**

Data from Canada's 2006 Census suggests that Windsor's population grew by 3.5 percent between 2001 and 2006 from 209,218 to 216,473. Currently, the City's Official Plan (2007) projects a 2021 population of approximately 244,811. The Windsor-Essex and City of Windsor Population and Housing Projection report prepared by Lapointe Consulting Inc. dated January 16, 2008, prepared for the Looking Back-Moving Forward review of the City's Official Plan, forecasts population growth at 256,000 by 2026 and 267,700 by 2031.

It is expected that over the next twenty years, Windsor's share of the population will stabilize and the surrounding area municipalities, particularly the Towns of Tecumseh, LaSalle and Lakeshore will accommodate significant peripheral growth.

In terms of infrastructure, the Official Plan goals are to achieve:

- Sustainable, effective and efficient infrastructure;
- Optimal use of existing infrastructure;
- The coordinated and orderly provision of new infrastructure;
- An accessible, affordable and available transportation system;
- An environment where all modes of transportation can play a balanced role; and,
- Proper physical services in all developed areas of Windsor.

Within this context, Banwell Road has been designated as a Class II Arterial Road with the objective of adopting strategies and programs that increase public transportation use, cycling and walking. According to Section 7.2.6.5 (b) of the Official Plan, direct property access to Class II Arterials is discouraged.

### **Windsor Area Long Range Transportation Study (WALTS)**

WALTS was conducted in 1997 and 1998 to provide a master plan to guide future development of transportation services in the Windsor area. WALTS relied on existing Official Plans at that time, and available growth studies to establish expected transportation needs by the year 2016.

The following area roads that may impact on the Banwell Road/County Road 43/11<sup>th</sup> Concession corridor formed part of the recommended roadway system improvements within WALTS:

- Widening Lauzon Road from Wyandotte Street East to Tranby Avenue;
- Widening Tecumseh Road East from Jefferson Boulevard to Banwell Road;
- Operational/Capacity Improvements to Tecumseh Road East from Banwell Road to Lesperance Road;
- Operational/Capacity Improvements to Lauzon Parkway (County Road 17) from EC Row Expressway to Division Road; and



- Operational/Capacity Improvements to County Road 22 from EC Row Expressway to Manning Road.

As well, the WALTERS study addressed the need to protect additional roadway corridors for future transportation flexibility in the Windsor area. One such corridor was the Highway 401 East Connector. This connector was seen as the future phase of a Lauzon Parkway extension by upgrading County Road 17 (10<sup>th</sup> Concession Road) to connect Highway 401 with the EC Row Expressway. Other candidate connection alternatives included Banwell Road/11<sup>th</sup> Concession and Manning Road (County Road 19).

### **Essex – Windsor Regional Transportation Master Plan (EWRTMP)**

The goal of the 2005 EWRTMP was to develop a comprehensive regional transportation master plan for the Essex–Windsor region with recommended policies and an implementation strategy that will serve the needs of the region to the year 2021. The following principles were established to develop a transportation plan:

- Optimize arterial road network capacity;
- Select appropriate levels of service and standards;
- Ensure transportation improvement affordability;
- Ensure transportation system sustainability; and
- Ensure roadway network enhancement achievability.

Of note is the fact the EWRTMP study identified that Banwell Road from County Road 22 to County Road 42 will experience a significant capacity deficiency by the year 2021 if no improvements were undertaken, and further that four through lanes are required to satisfy Banwell Road's future transportation demands.

The EWRTMP was not adopted by the City of Windsor Council as an official planning document, but was adopted by the County of Essex.

### **Tecumseh Road East Improvements from Jefferson Boulevard to Banwell Road Class Environmental Assessment Study (October 1996)**

This report documents the need for improvements to the Tecumseh Road East corridor between Jefferson Boulevard and Banwell Road and provides a plan for construction of future improvements through the horizon year of 2010. In addition to recommending a six lane median divided roadway for Tecumseh Road East as the preferred solution, Banwell Road was highlighted for intersection widening to a basic four lane cross section with added turn lanes. Intersection improvements were completed in 2004/05 at the Banwell Road and Tecumseh Road East intersection.

### **Twin Oaks Business Park Class Environmental Assessment Study (March 1997)**

The City of Windsor has identified the requirement for additional serviced industrial property to meet the existing and future growth demands. As a result, this study investigated the development potential of the Twin Oaks Business Park located at the south east corner of the EC Row Expressway and Lauzon Parkway.

The report recommended a number of infrastructure improvements to accommodate a staged approach to developing up to 24 hectares. Of note was the need to construct an interchange at the intersection of EC Row Expressway and Banwell Road and a new

ramp into Twin Oaks east of Lauzon Parkway from the eastbound EC Row Expressway lanes (button-hook ramp) when the development becomes greater than 75 hectares.

### **Bicycle Use Master Plan, City of Windsor (April 2001)**

This plan outlines a 20 year guide for cycling in Windsor and provides an overall cycling network, including the design guidelines, vision, principles and goals for cycling. Included in this report is a recommendation for a multi-use trail to be developed on Banwell Road within the 5 to 20 year time frame.

### **Traffic Evaluation and Planning Study EC Row Expressway (Final Report 1993)**

The 1993 report prepared by Dillon Consultants documents the assessment of the existing and future traffic conditions on the EC Row Expressway and provides an overall plan for construction of future improvements which would serve traffic demands through to the horizon years 2001 and 2011. Of note is that this report recommended a grade separation of EC Row Expressway at Banwell Road by 2001.

### **County of Essex Official Plan**

The Official Plan offers fundamental broad based guidance and direction to the County and its municipalities on land use and planning, and is intended to provide the necessary framework to implement Provincial Policy at the County level.

Within the context of the Official Plan, the Town of Tecumseh's population is expected to grow to between 30,106 to 35,259 persons by 2016 compared to its 1996 population of 23,151. Much of this growth is expected to occur within the immediate Banwell Road corridor.

Additional studies have been commenced or completed that relate to the future of Banwell Road as follows:

#### **1. CR 22 EA East of Manning Road to CR 42, Town of Tecumseh/Town of Lakeshore, (2006)**

Capacity and operational improvements to CR 22 from east of Manning Road to County Road 42 are contained in an ESR completed on March 31, 2006. The preliminary design for the section from east of Manning Road to Belle River was completed in January 2008. Recommended road improvements from east of Manning Road to east of Patillo Road were constructed in 2010. All of these CR 22 improvements are intended to accommodate growing traffic volumes on the road which intersects with Banwell Road, thereby affecting the intersection needs and capacity at this location.

#### **2. County Road 19 (Manning Road) and County Road 22 Improvements Environmental Assessment (2008)**

In November 2008, the Ministry of Transportation and County of Essex completed an EA and preliminary design of improvements to 13 km of CR 19 (Manning Road) from Highway 3 north to the CN Chatham Subdivision (VIA) rail line, and along 3 km of CR 22 from the City of Windsor boundary located east of Banwell Road to Lakeshore Blvd. The preferred design of improvements to these roads includes:

- Widen CR 19 from 2 to 4 lanes;

- Widen CR 22 from 4 to 6 lanes;
- Install double lane roundabout at CR 19 and CR 34;
- Highway 401 interchange improvements at CR 19;
- Grade separation of the CPR crossing of CR 19;
- Single point urban interchange at CR 19 and 22; and
- Partial interchange (half diamond/button hook) at CR 22 and Lesperance Road.

### **3. *Community Based Strategic Rail Study, Transport Canada/City of Windsor (2008)***

The City of Windsor and Transport Canada prepared a strategic planning study to assess the opportunities for rail rationalization and modal integration in the City of Windsor. The intent of the study is to produce a strategic plan that is technically feasible and addresses the City's transportation needs, while being responsive to the local community through consultation with key stakeholders. The forecasting of rationalized rail traffic in the Windsor area, including on the CP mainline forming the south boundary of this EA study area, provides data to determine future grade-separation requirements across the line in the Banwell Road corridor.

### **4. *Town of Tecumseh Transportation Master Plan (2008/09)***

The Town of Tecumseh has experienced significant growth over the past twenty years and is planning for future development in the Maidstone, Oldcastle and Tecumseh Hamlets with a population of 40,000 by 2028. In order to accommodate the projected growth and to meet the transportation needs of the community, in early 2008 the Town initiated a Transportation Master Plan (TMP) that will establish sustainable integrated transportation strategies that consider all modes of travel (automobiles, transit, cycling, walking).

The TMP provides the Town with the strategies and policy directions to manage transportation needs safely, effectively, and cost efficiently while providing Tecumseh residents with a range of transportation choices to meet their needs. Ultimately, the TMP is intended to result in a more livable community that supports the mobility needs of its residents, businesses and visitors in both the rural and urban areas.

The TMP integrates transportation and land use planning and is founded on the notion of sustainable development, which "meets the needs of the present without compromising the ability of future generations to meet their own needs." The transportation network should be based on a proper balance between providing transportation alternatives, protecting the natural environment, enhancing economic competitiveness, and fostering a healthy, equitable society.

### **5. *County Road 43/Banwell Road Class Environmental Assessment from CPR Tracks (Municipal Boundary) to south of CR 42 (2009)***

The CR 43/Banwell Road Schedule C Class EA was prepared for the County of Essex with recommended improvements to this County Road located immediately south of the City of Windsor's Banwell Road Class EA. The two projects were conducted mostly

concurrently, with the County's Class EA filed with the MOE in August 2009. The purpose of that County study was to address the CR 43/Banwell Road capacity and operating deficiencies resulting from anticipated growth within the Town of Tecumseh and the eastern section of the City of Windsor. The planned widening of CR 43 to four travel lanes within a 30.0 m right-of-way links with the four lane cross-section of Banwell Road at the municipal boundary between the City and County.

The recommended design of CR 43/Banwell Road improvements includes a realignment of the road to the west of the 11<sup>th</sup> Concession Road. Unlike the City's Banwell Road EA that plans for a future potential grade separation at the CPR tracks, the County's CR 43 EA does not include this feature.

#### **6. *Twin Oaks Drive EA (MMM Group, 2012)***

A rail spur is proposed to the west of Banwell Road and the Twin Oaks EA was completed by MMM group in 2012. The report identified and compared several alternatives for the extension of Twin Oaks Drive for feasibility in terms of technical, financial, natural environment, social environment, cultural environment and community planning. This report does not provide significant traffic impact analysis though it should be noted that a future connection between Twin Oaks Drive and Banwell Road is expected along with a future rail spur. This connection was incorporated into the future road network.

#### **7. *Traffic Assessment and Review of Tecumseh Hamlet Secondary Plan Memos (Dillon Consulting, 2013)***

The traffic assessment memo was completed by Dillon consulting in 2013 and focused on Tecumseh Hamlet which is on the east side of Banwell Road. The memo provides a review of the 2009 Paradigm TIS and proposed new accesses onto Banwell Road. It was found that three access locations south of EC Row Expressway would likely be needed in order to disperse left turn traffic along Banwell Road to different intersections.

The memo showed that a 6 lane Banwell Road ultimately would be needed to accommodate traffic demand south of EC Row Expressway. Interim improvements such as the additional intersections and expansion of other intersections along Banwell Road would be able to delay the need for widening. It was also found that although minor improvements could be made to the intersection of Banwell Road and EC Row Expressway, the planned interchange would be necessary to fully alleviate the traffic congestion. Finally Lesperance Road was found not be effective at providing relieve for Banwell Road due to high demand on Banwell Road as well as existing operational issues along Lesperance Road.

#### **8. *Lauzon Parkway EA (MRC, 2013)***

An EA for Lauzon Parkway to the east of Banwell Road was completed by MRC in 2013. This report provided an update to the Windsor travel demand model with specific emphasis in the areas around Lauzon Parkway. The 2011 and 2031 model outputs are carried forward for analysis to examine existing and future traffic demands.

The Tecumseh Hamlet traffic assessments and Lauzon Parkway EA will serve as the basis of traffic demand projections for this EA update. The Lauzon Parkway EA captures growth west of Banwell Road within the City of Windsor boundaries while the Tecumseh Hamlet traffic assessments looks at developments to the east of Banwell Road within Tecumseh Hamlet and provided up to date analysis for this study area.

**9. Tecumseh Hamlet Secondary Plan Transportation Study (Dillon Consulting, 2015)**

The titled report is a transportation study completed by Dillon Consulting for the Town of Tecumseh, outlining the potential impact of traffic generated by the continued development of the town. A 20 year horizon (2034) was considered to determine future transportation network needs.

Several proposed network changes to the EC Row Expressway were carried over from previous reports included a full interchange at Banwell Road, a partial interchange at Lesperance Road and a full interchange at Manning Road.

An interim phasing analysis was completed to determine the maximum traffic volumes coming from the Town that would be supportable by an at grade intersection at Banwell Road and EC Row Expressway.

A full build-out of Tecumseh Hamlet is anticipated to accommodate approximately 3,100 residential units, and 413,000 square feet of commercial space. The report indicated that in the 20 year horizon, 2,880 new trips will be added to the network during the a.m. peak hour and 4,450 during the p.m. peak hour.

## 2 Planning Process and Consultation

### 2.1 Municipal Class Environmental Assessment Process

The Municipal Class Environmental Assessment (Class EA) is a planning document approved by the Province of Ontario that describes the process and the proponent, in this case the City of Windsor, must follow to meet the requirements of the *Environmental Assessment Act*. Municipal projects, that are similar in nature and frequently undertaken by a municipality, may follow the planning process set out in the Municipal Class Environmental Assessment (MEA, 2000, as amended in 2007 & 2011) document, providing the projects are limited in scale, have generally predictable range of effects, have relatively minor environmental significance, and are responsive to mitigation measures.

Road projects conducted under the Class EA planning process vary in their environmental impact and are classified as Schedules A, B or C. This project is identified as a Schedule C project under the Municipal Class EA. Schedule 'C' projects have the potential for significant environmental effects and must proceed through the full planning process of the Class EA which requires an Environmental Study Report (ESR) to be prepared and submitted for public review.

The planning process covered by the Class EA for this project incorporated the following phases that are considered essential for compliance with the EA Act:

*Phase 1: Define Problem/Opportunity (including Initial Public Notification)*

*Phase 2: Identify and Evaluate Alternative Solutions to the Problem*

*Phase 3: Identify and Evaluate Alternative Designs*

*Phase 4: Environmental Study Report*

*Phase 5: Implementation*

#### **Phase 1 – Define Problem and Initial Public Notification**

A full Transportation Study was completed by Paradigm Transportation Solutions Ltd. (PTSL), and a problem statement was identified for this project. In later years, a new full transportation study was completed in 2015 by IBI Group, the Transportation Study is included as Appendix B of this ESR. To scope the study, the City of Windsor, Town of Tecumseh, and County of Essex staff representatives were contacted to engage their participation, identify issues and build upon existing information.

Government agencies and ministries, interest groups, and property owners in the immediate area were also contacted. Contact lists were created and updated as required throughout the study. The main agency and public consultation material used in this project is included in **Appendix A: Public Consultation and Related Correspondence provided in the separate Appendix A-F document.**

#### **Phase 2 – Identify and Evaluate Alternative Solutions to the Problem**

This phase involved conducting an inventory of the environment within the study area, generating, analyzing and evaluating alternative solutions to the problem. The evaluation of alternative solutions and the details of the recommended alternative solutions were presented to the Project Team prior to being presented to the public at the first open house Public Information Centre (PIC).

### **Phase 3 – Identify and Evaluate Alternative Designs**

Alternatives were generated and assessed based on technical considerations and impacts to the natural, social, economic, and cultural environments. The evaluation of alternative designs and the details of the recommended alternative design were presented to the Project Team prior to being presented at the Public Information Centre (PIC). Subsequent to the PIC and after addressing stakeholder's concerns, the details of the recommended design were finalized.

### **Phase 4 – Environmental Study Report**

This Environmental Study Report (ESR) is required in accordance with the Municipal Class EA for municipal road projects. The ESR documents the need and justification for the project, the alternatives considered, potential impacts, preferred alternative, proposed mitigation, and the consultation undertaken.

Upon study completion, a public Notice of Study Completion of the ESR will be issued and the ESR will be placed on the public record with the City of Windsor Clerks Office and other appropriate venues for a public review period for 30 calendar days. Following the public review period for filing any objections, the requirements of the Environmental Assessment (EA) Act are deemed to be satisfied subject to the appropriate resolution of any objections received from the public and/or review agencies.

If concerns cannot be resolved through discussions with the City's representatives, then a person or party may request that the Minister of Environment place an order for the project to comply with Part II of the EA Act (referred as Part II Order), which addresses Individual Environmental Assessments. A written submission may be made to the Minister of the Environment within the 30 calendar day review period requesting an Individual Environmental Assessment in accordance with the EA Act. The Minister will consider such requests and notice of the Minister's decision respecting requests for an Individual Environmental Assessment will be given within 45 days of the request. If the request is granted, the project will be subject to formal government review and approval under the EA Act and may result in a formal public hearing. In all Part II Order requests, the Minister's decision is final.

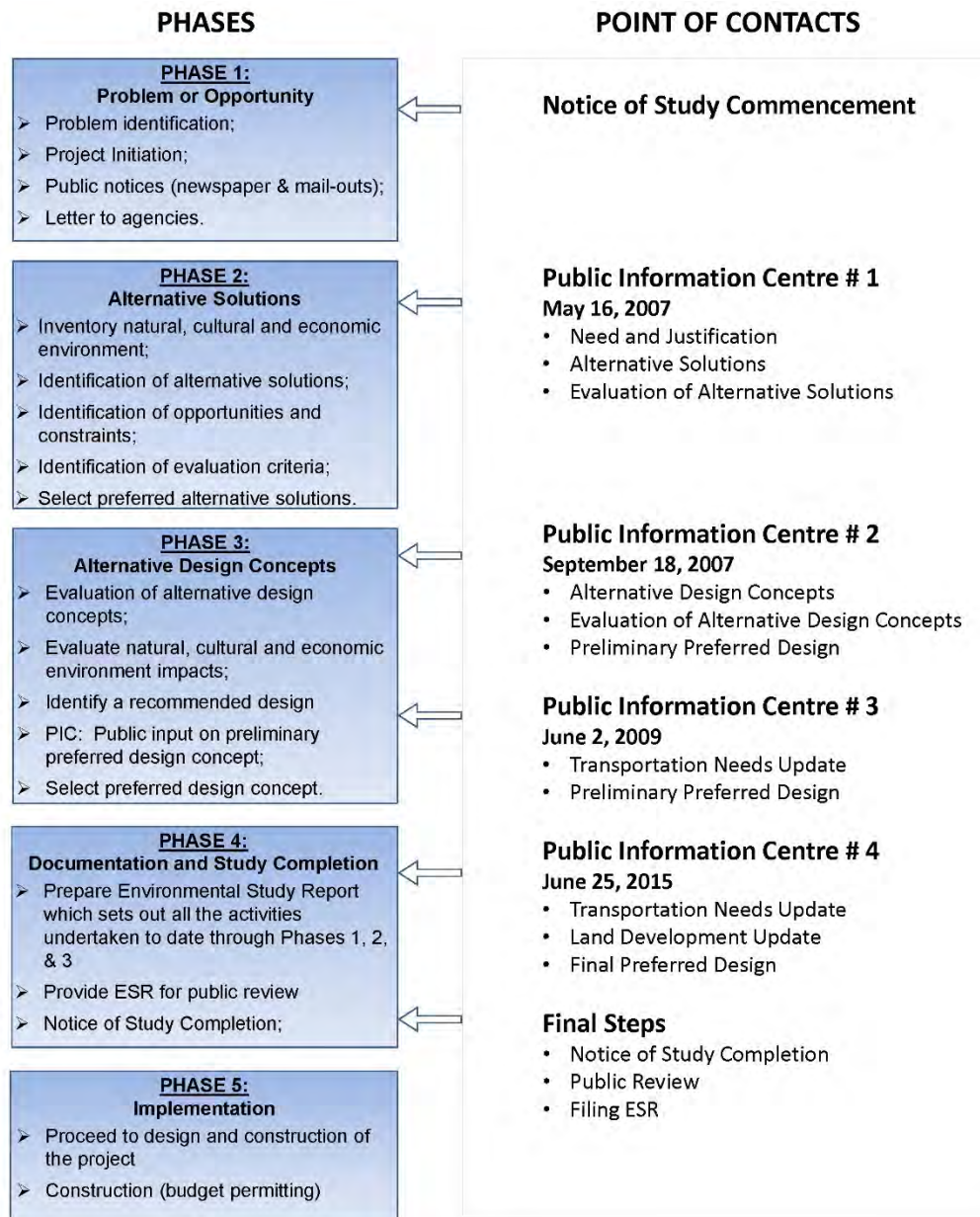
### **Phase 5 – Implementation**

If the Minister receives no request for an Order within the review period, then the project can proceed to the implementation phase of the project. To implement the project, contract drawings are prepared, and the project then proceeds to construction, operation and monitoring, all subject to project funding. All environmental provisions and commitments made in the ESR must be fulfilled.

The Class EA planning and design process is shown schematically in **Exhibit 2-1**.



**Exhibit 2-1 Municipal Class Environmental Assessment Process**



It should be noted that the County Road 43/Banwell Road Class EA Study undertaken by the County of Essex preceded the commencement of this City of Windsor's Class EA Study for Banwell Road. The County made a decision in late 2006 to place the County Road 43/Banwell Road Class EA Study on hold until the City's Banwell Road Class EA Study reached Phase 3 where the "Technically Recommended Design" for the entire Banwell Road corridor was determined. The overall integrated, technically recommended design for the entire Banwell Road corridor from Tecumseh Road East to south of County Road 42 was presented to the public at a combined second and third Public Information Centre with representation from the City and the County. In this



manner, the interested stakeholders had the opportunity of understanding the recommended improvements for Banwell Road extending from the City into the County.

The notice of completion and public review process for the County's CR 43/Banwell Road Class EA was completed in August 2009, at which time the ESR was filed.

## 2.2 Project Team Organization

A key feature of successful planning and approval under the EA Act involves early consultation with involved agencies and stakeholders (i.e. property owners, residents, businesses), as well as interested members of the public. Consequently, the study was conducted with these affected parties who were:

- Involved throughout the study at appropriate times (Notice of Commencement, Public Information Centres, Notice of Completion and Public Review Period);
- Provided with access to information;
- Provided with sufficient time to respond to questions and data requests; and
- Encouraged to participate in an issue identification/resolution process.

To achieve the above-mentioned objectives, consultation activities with government ministries/agencies, utility companies, interest groups, and the public were carried out.

At the outset of the study, a Project Team was established and included representatives from the City of Windsor, and Giffels Associates Ltd. /IBI Group (IBI Group) who provided consulting services for this project.

Meetings were held at key decision points during the course of the study to review and resolve project specific concerns. Prior to presenting the study findings to the public, the information was reviewed by the Project Team members.

The Project Team members are as follows:

<b>City of Windsor:</b>	Fahd Mikhael, Project Manager/Manager of Traffic Operations Wesley Hicks, Senior Manager Infrastructure & Geomatics / Deputy City Engineer Josette Eugeni, Manager of Transportation Planning Jeff Hagan, Policy Analyst Steve Kapusta, Policy Analyst Jim Abbs, Planner III Anna Godo, Engineer III Jennifer Leitzinger, Transportation Planning Engineer Mark Winterton, City Engineer Mike Clement, Manager of Parks Development Heidi Baillargeon, Landscape Architect Frank Scarfone, Property Supervisor Denise Wright, Property Coordinator Tom Cadman, Planner III Phong Nguy, Manager of Contracts, Field Services and Maintenance Stefan Feduik, Landscape Architect Neil Robertson, Manager of Urban Design John Wolf, Senior Manager of Traffic Operations, Parking and Transportation Planning Dwayne Dawson, Executive Director, Operations Department
<b>Giffels Associates Limited/IBI Group:</b>	<b>2014 to date:</b> Muhammad Khan, Project Manager (IBI Group 2014 to date) Don Drackley, Project Advisor Allan Ortlieb, Design Manager Scott Johnston, Traffic Engineer Jeff Qiao, Transportation Planner  <b>2007-2011</b> Don Drackley, Project Manager (2008-2011) Len Rach, Consultant Project Manager (2006-2008) Susan Smyth, Environmental Planner Chandi Ganguly, Transportation Engineer Musha Foradi, Engineer

## 2.3 External Agency Consultation

Various federal and provincial government agencies, ministries/authorities, plus other public agencies were contacted by mail and asked to respond to the following questions:

- What do you perceive to be the positive and/or negative effects of this project?
- Do you perceive any “critical” issues that must be addressed as part of this project?
- Other than the anticipated Public Information Centres (PICs), how else would you like to be consulted during the project?
- Does your Ministry/Agency wish to be notified for continued involvement in the study?

The external agencies contacted were as follows:

### **Federal and Provincial Ministries, Agencies, Groups**

- Environment Canada
- Fisheries and Oceans Canada
- Transport Canada
- Ministry of Tourism, Culture and Sport
- Ministry of Municipal Affairs and Housing
- Ministry of Health and Long Term Care
- Ministry of Natural Resources and Forestry
- Ministry of Environment and Climate Change
- Ontario Realty Corporation
- Ontario Provincial Police
- Ministry of Aboriginal Affairs
- Canadian National Railway (CN)
- Canadian Pacific Railway (CPR)
- Essex Region Conservation Authority
- Can-Am Indian Friendship Centre
- Union of Ontario Indians
- Ontario Native Affairs Secretariat
- Ministry of Economic Development, Employment and Infrastructure
- Windsor/Essex Métes Council
- Southern First Nations Secretariat
- Six Nations of the Grand River
- Association of Iroquois and Allied Indians
- Local First Nations Groups
- Walpole Island First Nation
- Caldwell First Nation
- Moravian of the Thames First Nations
- Metis Nation of Ontario
- Huron-Wendat First Nations
- Association of Iroquois and Allied Indians
- Iroquois Confederacy
- Hiawatha First Nation
- Moose Deer Point First Nation
- Aamijiwnaang First Nations
- Bkejwanaong Territory (Walpole Island)
- Oneida Nations of Thames (Southwold)
- Ministry of Agriculture and Food Resources Management Branch

### **Municipal Agencies, Utilities, Interested Stakeholders**

- City of Windsor
- County of Essex
- Town of Tecumseh
- Transit Windsor
- Windsor Fire and Rescue Services
- Essex-Windsor EMS
- Windsor Essex County Health Unit
- Windsor Police Services
- Windsor – Essex Catholic District School Board
- Greater Essex County District School Board
- Windsor Bicycle Committee
- Conseil Scolaire de District Des Ecoles Catholiques du Sud-Ouest
- Windsor Heritage Planning
- Town of Tecumseh Fire Department
- Sun Parlour Emergencies Incorporated
- Student Transportation Services
- Hydro One Networks Inc.
- Cogeco Cable Systems
- Union Gas Limited
- WUC – Water
- Bell Canada
- Enwin Utilities
- Citizens Environmental Alliance
- Airport Advisory Committee
- Conseil Scolaire de District Des Ecoles Sud-Ouest
- Windsor Accessibility Advisory Committee

The majority of the external agencies responding to the request for input into the study indicated limited concern with the proposed undertaking. However, most respondents requested to be kept informed of the study progress.

All external representatives that expressed an interest regarding the study were invited to attend the Public Information Centres and/or were contacted during the course of the study to ensure that any issues were adequately addressed. Refer **Appendix A** for details.

## 2.4 Public Consultation

The consultation program for the study included contact with the public at the following key points in the study:

- Notice of Study Commencement and Notice of Public Information Centre No. 1 on May 16, 2007;
- Notice of Combined Public Information Centre No. 2 on September 18, 2007;
- Notice of Combined Public Consultation Centre No. 3 on June 2, 2009;
- Notice of Public Consultation Centre No. 4 on June 25, 2015; and
- Notice of Study Completion and 30-Day Public Review Period, followed by filing of the Environmental Study Report with MOE.

To inform the general public of the study, a Notice of Study Commencement and Notice of the First Public Information Centre was published in the Windsor Star on Thursday May 10 and Saturday May 12, 2007. This notice provided a brief introduction to the study and encouraged interested individuals to contact the Project Team directly for more information.

In addition to the advertisement, a contact list was prepared containing the property owners adjacent to Banwell Road from Tecumseh Road East to the CPR Tracks. A letter was distributed to those on the contact list introducing the study and nature of the EA process. By way of this letter, each recipient was asked if they wished to continue to be involved in the study, and provide any comments and/or concerns they had at that time regarding this study. The contact list was updated on a regular basis to include all persons that provide written comments and/or requested to be added to the project mailing list.

Throughout the course of the study, the Project Team dealt with numerous requests of information regarding the study process and progress and these requests were followed up by a letter, telephone conversation, meeting, or mailing of project related material.

### **Public Information Centre No. 1**

The first PIC was held between 3:00 PM and 8:00 PM on Wednesday May 16, 2007 at Place Concorde – Richelieu Room, 7515 Forest Glade Drive in the City of Windsor.

Visual display boards providing a brief background of the study, depicting existing conditions and improvement considerations were set up for review in an informal walk-through format for public review and discussion. The PIC was staffed by members from the City and Giffels Associates Limited to assist attendees in their review of material.

The purpose of the first PIC was to present the following information to the public:

- Study Area Under Consideration;
- Purpose of the Study;
- Study Objectives;
- Background Environmental Information Collected to Date;
- Need and Justification;
- Alternative Solutions Under Consideration;
- Preliminary Alternative Solutions for Banwell Road (Typical Cross Sections)

- Preliminary Evaluation Methodology and Criteria for Alternative Design Concepts; and
- Next Steps in the Process.

A “sign-in” sheet was maintained at the PIC to record visitor’s names and addresses (see **Appendix A.1**). In total, 26 people attended the PIC, from which one individual attended on behalf of the Town of Tecumseh, one on behalf of Transit Windsor and one individual representing WECHU (Windsor Essex County Health Unit), with the remainder being local residents.

Comment sheets were available for participants to provide them with an opportunity to communicate their comments and concerns. The comment sheet included five specific questions:

- Do you have any comments, concerns, questions, or suggestions regarding the existing conditions on Banwell Road?
- Do you have any comments, concerns, or suggestions regarding the proposed future widening and improvements to Banwell Road?
- Based on the presentation of the study issues we have identified, are there other issues that we should be aware of?
- How frequently do you use Banwell Road between Tecumseh Road and County Road 42? [ ] Daily, [ ] Weekly, [ ] Monthly, [ ] Rarely?
- Other comments/concerns.

In total, 5 comment sheets were submitted at the PIC. Following this, a letter from the Union of Ontario Indians and a letter from the Association of Iroquois and Allied Indians were received, plus 5 comment sheets/response forms were faxed in and 6 emails were submitted since the study commencement and PIC. An exhibit summarizing the comment sheets received and the response by the City can be found in **Appendix A.1** (Study Commencement and Public Information Centre No. 1).

From the comments received from the PIC, emailed, and provided by letter, the following highlights the major verbal and written comments received at the PIC:

- Traffic volumes are continually increasing so agree with the need to widen Banwell Road and construct an interchange at Banwell Road/EC Row Expressway.
- Signage is needed at Wildwood Drive, not Palmetto Street.
- Improve visibility at the Banwell Road/South Service Road intersection.
- Four Lane cross-section would be preferred.
- Connecting Twin Oaks Drive to Banwell Road is desirable.
- A 5th lane for turning is needed on Banwell Road.
- Main concern is about increased truck traffic on Banwell Road between EC Row Expressway and Tecumseh Road East which is adjacent to a residential area.

## **Combined Public Information Centre No. 2**

It was decided by the County of Essex and the City of Windsor to hold a combined second PIC and to present the technically recommended design for the entire Banwell Road corridor.

The second PIC was held between 3:00 PM and 8:00 PM on Tuesday September 18, 2007 at the Banwell Community Church located at 2400 Banwell Road in the City of Windsor. The public was notified of the Combined Public Information Centre No. 2 by newspaper advertisements in Windsor Star and Tecumseh Tribune on Thursday September 13 and Saturday September 15, 2007. A hand delivered invitation was provided to adjacent property owners along the corridor. In addition, review agencies and all other members on the project mailing list, including utility companies and interest groups, were invited to attend the second PIC via Canada Post direct mail.

Various text displays and a plan illustrating the technically recommended design were presented. The purpose of the second PIC was to present the following information to the public:

- Alternative designs concepts;
- Evaluation of alternative designs;
- Screening analysis of the EC Row Expressway and Banwell Road Interchange Alternatives;
- Consultation activities undertaken to date; and
- Preliminary preferred design for both the County and the City sections of Banwell Road.

In total, 52 people registered their names at the PIC, from which 3 individuals were representatives from the Ministry of Transportation, and 2 individuals attended on behalf of the City of Windsor, the remaining were local residents and business associates.

In total, two comment sheets were submitted at the PIC, 2 faxes, 2 emails, and one letter was submitted since the PIC.

The following highlights the major verbal and written comments received at the PIC that are included in **Appendix A.2**:

- Should consider a dedicated bicycle lane rather than a multiuse trail system.
- Ensure that the sidewalks are large enough to accommodate pedestrians and cyclists.
- Improvement to street lighting is required.
- Property impacts and access into existing and proposed businesses.
- Distance from the centreline of the proposed Twin Oaks Drive to Intersection Road and whether Twin Oaks Drive is a fixed location for the proposed road.

From the comments received from the PIC and emails, the perceived notion is that improvements to Banwell Road are warranted and to be sure that the enhancements to the roadway accommodate pedestrians and cyclists. Refer to **Appendix A.2** (Public Information Centre No. 2) for the details of the PIC material, completed comment sheets and summary of responses. Following PIC #2, there was a delay in the Banwell Road EA due to the County Road 19 (Manning Road) and County Road 22 Improvement EA and proposed changes at Lesperance Road.

### **Combined Public Information Centre No. 3**

After the First Draft ESR document was prepared, reflecting public input up to and including PIC #2 in September 2007, the project team was asked to further consider and evaluate new land use development plans and proposals in the vicinity of the Banwell

Road corridor, as will be further explained in Section 3 of this ESR. The result was a prolonged delay in completion of the ESR while further research and analysis was conducted of future growth scenarios in the corridor area, and their expected impact on traffic generated and related transportation needs. The results of this are contained in this ESR.

On June 2, 2009 a third PIC (and second joint PIC with the County's CR 43 EA) was held in the Banwell Community Church from 3:00 pm to 8:00 pm. to present the new transportation needs information and associated preferred design modifications to the public, stakeholders and agencies. A PIC #3 Notice was mailed to those individuals and groups who had signed in to the previous two PIC sessions, identified in **Appendix A.3**.

A total of 36 members of the public signed in to PIC #3 held on June 2, 2009. Two comment sheets were completed relating to the Banwell Road project, and are included in the following summary list of comments offered to the project team at and after PIC #3 with the contact person noted on the public record. Comments and correspondence resulting from PIC #3 are included in **Appendix A.3**:

- Comment sheet supporting the project and needs for additional capacity on Banwell Road;
- Comment sheet asking to shift the proposed roundabout to reduce impacts on an approved site plan;
- Request to resolve access impacts on their property in the SE quadrant of the Banwell/Tecumseh intersection;
- Comments on multi-use trail crossing of proposed E.C. Row interchange;
- Opposed to proposed roundabout;
- Use of cut-off luminaries for road lighting;
- Comments on multi-use trail at bus stops and pedestrian accessibility;
- Comments on proposed roundabout, interchange design and multi-use trail routing;
- Request to confirm the proposed EC Row Expressway/Banwell Road interchange design; and
- Correspondence received June 1, 2009 in Appendix A.3 provides basic information on conditions that could require a federal EA, and basic information needed to prepare a project description should a federal EA be required. No conditions were noted in this EA that would trigger a federal EA.

#### **Public Information Centre No. 4**

In 2013, the City of Windsor decided to update and finalize the ESR with latest traffic information. IBI Group was asked to conduct a new traffic study with recent traffic count and growth rate along the corridor. Based on traffic assessment, there were design changes required to reflect future demand. It was felt necessary to hold a final information session not only to hear from the public and stakeholders but also to inform them of design changes due to latest traffic trend along the corridor.

The Notice of PIC # 4 was published in the Windsor Star on June 17<sup>th</sup> and 20<sup>th</sup> 2015. The newspaper advertisement provided residents and stakeholders with information on how to participate actively in the study through the planned PIC. The Notice of PIC was also posted on the City of Windsor website (link shown below) which was accessible to all members of the public and external stakeholders.

[www.WindsorEAs.ca](http://www.WindsorEAs.ca)

The Notice of PIC was also mailed to owners of the properties abutting Banwell Road within the Study Area. An initial mailing list of property owners was provided by the City which was further appended by IBI with additional contacts obtained during/from previous PICs.

Additionally, IBI prepared/updated mailing list for Member of Parliaments, External Agencies, Stakeholders and First Nation/Aboriginal Communities. Upon City's review, letters along with PIC notice were mailed to Member of Parliaments, External Agencies, Stakeholders and First Nation/Aboriginal Communities.

A letter and the Notice of PIC # 4 were mailed to the First Nations and Metis Communities that may have interest within the project limits. A complete list of contacted communities is provided in **Appendix A.4**.

The PIC was arranged as a drop-in format where members of the project team were available to answer questions and address concerns. The session was held on Thursday June 25, 2015 from 3:00 p.m. to 8.00 p.m. at Banwell Community Church in the City of Windsor.

The session was attended by 26 individuals (signed in). The material related to PIC # 4, such as PIC Summary Report, Display Boards, Sign-in Sheet, Comment Sheets, etc. are included in **Appendix A.4** for reference.

A highlight comments received during PIC session is provided below, whereas a detailed summary of comments received are included in PIC Summary Report.

- Concerned with Bike lane on east side of Banwell Road south of EC ROW Expressway;
- Like the roundabout idea, satisfied with detail presented during PIC
- Install OFF Ramps as interim solution
- Concerned with six lane that could potentially add more noise, pollution and traffic



## 3 Problem Statement

### 3.1 Existing Traffic Conditions

Banwell Road between Tecumseh Road East and the City limits south of the CPR track is classified by the City of Windsor as a Class II Arterial Road. The existing right-of-way along Banwell Road is approximately 12 m between the CPR tracks and EC Row Avenue and is situated approximately 5.5 m to the west of the east City limit. North of the EC Row Expressway, Banwell Road has a right-of-way of approximately 30 metres. In addition, a significant parcel of land has been set aside in the area around the Banwell/EC Row Expressway intersection for a future interchange. Banwell Road from Wyandotte Street East to the EC Row is currently designated as a truck route.

Banwell Road operates as a basic 2-lane roadway with gravel shoulders and open ditch drainage between south of the Tecumseh Road East intersection and the City limits. Added turn lanes are provided at the signalized intersections of EC Row Expressway, Wildwood Drive/Mulberry Drive and Tecumseh Road East. Several other minor roads intersect with Banwell Road to provide access to residents and developments in the area. A total of 6 intersections are analyzed within the study area and a summary of their control types is shown in **Exhibit 3-1**.

**Exhibit 3-1 Intersection Control Type**

Location	Control Type
Tecumseh Road and Banwell Road	Signalized
Palmetto Road and Banwell Road	Unsignalized
Mulberry Drive/Wildwood Drive and Banwell Road	Signalized
EC Row Expressway and Banwell Road	Signalized
EC Row Avenue and Banwell Road	Unsignalized
Intersection Road and Banwell Road	Unsignalized

Controlled site access to Banwell is currently provided immediately south of Tecumseh Road (commercial/institutional developments) and five residential properties between EC Row Avenue and Intersection Road enjoy direct fronting access. North of Tecumseh Road, Banwell Road widens to a basic 4-lane cross section with a centre median. Currently, no facilities are provided for either pedestrians or an exclusive bike/trails corridor within the study area.

The posted speed limit in the study area ranges from 60 km/h from the City limits to the EC Row Expressway and drops to 50 km/h north of the expressway. Within the study limits, Banwell Road is classified as a truck route from EC Row Avenue East to Tecumseh Road East. A single rail track carrying CPR rail traffic exists immediately north of the City limits. This crossing is currently controlled with flashers and a gate system.

### 3.2 Existing Intersection Capacity

For analysis, Highway Capacity Manual (HCM) methodology (2000) was used in Synchro 7 to assess intersection and movement operational performance. Refer to **Exhibit 3-2** below for the level-of-service (LOS) based on control delay, for signalized and unsignalized intersections and movements.

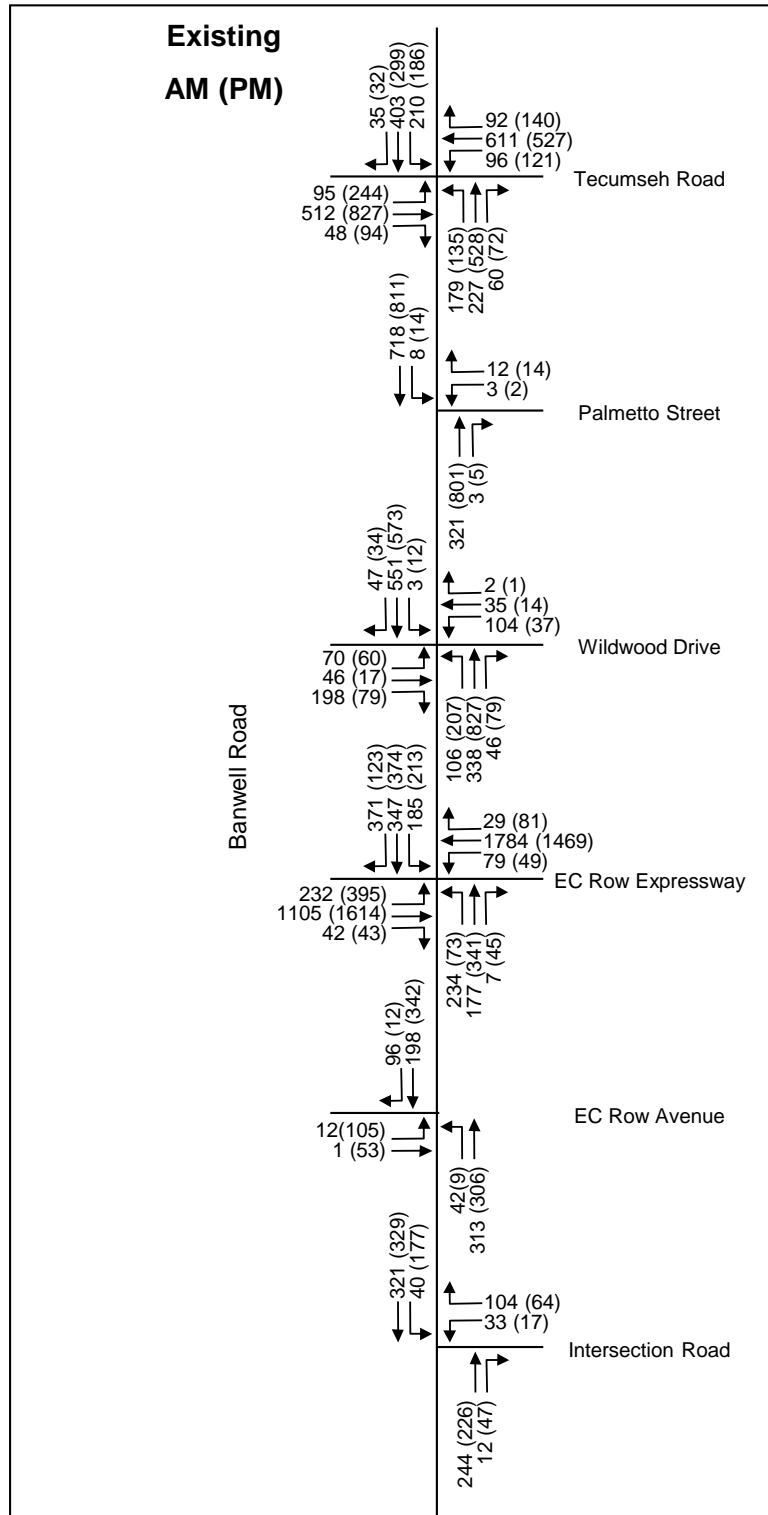
**Exhibit 3-2 Level of Service and Delay Lookup**

HCM	Control Delay per Vehicle (s)	
	Signalized	Unsignalized
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Intersection Level-of-Service (LOS) is a recognized method of quantifying the efficiency of traffic flow at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows. Critical movements are identified by using Ministry of Transportation, Ontario traffic guidelines and generally reflect poor operations in need of improvement.

The capacity analysis was based on traffic counts completed in 2012-2014. Traffic counts were scaled using a 1% per annum growth rate to bring older counts up to date as required. Existing traffic volumes are provided in **Exhibit 3-3**. A summary of the analysis is provided in **Exhibit 3-4**.

**Exhibit 3-3 Existing 2014 Traffic Volumes**



**Exhibit 3-4 Existing Conditions**

Location	Peak	Overall LOS	Critical				
			Mvmt	LOS	Delay (s)	V/C	95th Queue (m)
Tecumseh Road and Banwell Road	AM PM	C C					
Palmetto Road and Banwell Road	AM PM	n/a n/a					
Mulberry Drive/Wildwood Drive and Banwell Road	AM PM	C B	WBL	F	99	0.93	#43
EC Row Expressway and Banwell Road	AM	E	EBL	F	152	1.16	#104
			WBT	E	70	1.06	#299
			NBL	F	155	1.17	#104
			SBT	E	79	0.94	#141
			SBR	F	83	0.94	#130
	PM	E	EBL	F	142	1.17	#162
			WBT	C	30	0.88	216
			WBL	F	84	1.08	#256
			NBT	E	79	0.95	#156
			SBL	F	148	1.15	#96
SBT	D	50	0.76	#130			
EC Row Avenue and Banwell Road	AM PM	n/a n/a					
Intersection Road and Banwell Road	AM PM	n/a n/a					

# sign indicates queue movement exceeds capacity, queue may be longer

### 3.3 Banwell Road/CPR Rail At-Grade Crossing

Municipalities use an “Exposure Index” as a guide to determine an appropriate treatment for the at-grade crossing of a roadway with a rail line. The “Exposure Index” is calculated by multiplying the number of vehicles per day times the number of trains per day. Grade separations are considered when the Exposure Index exceeds a threshold of 200,000.

At the present time, the average number of trains crossing Banwell Road on a daily basis is 15 with an average of 66 cars and engines. While the average delay to Banwell Road traffic is in the area of 3 to 4 minutes per occurrence, no significant queuing exists and there have been no recorded traffic collisions associated with this crossing over the last 8 years. Based upon the current average daily traffic, the Exposure Index was approximately 45,000.

### 3.4 Public Transit

The only Transit Windsor service on Banwell Road south of Tecumseh Road involves a portion of the Lauzon 10 route into the southeast Forest Glade community, with northbound service on Banwell from Mulberry Drive/Wildwood Drive to north of Tecumseh Road. The route has low floor bus service for mobility impaired patrons. Appropriate pedestrian amenities are required on the east side of Banwell Road between Wildwood and Tecumseh Road to access the service, and on the west side owing to the amount of employment generated in this area. Transit Windsor is also investigating bus travel along

Banwell from EC Row Ave. East to Mulberry/ Wildwood. Depending on the developments with the current employer's requests for bus service in the Twin Oaks/Anchor Dr. area, this is a corridor that is being explored.

The Transit Windsor Master Plan identifies that Banwell Road will have a bi-directional service between Tecumseh Road and Mulberry Drive/Wildwood Drive, but at the time of this EA this had not been initiated.

### 3.5 Traffic Safety at Banwell Road and EC Row Expressway

Based on the 2013 Road Safety Report by the City of Windsor, the Banwell Road corridor only experiences high collisions rates at the intersection with EC Row Expressway.

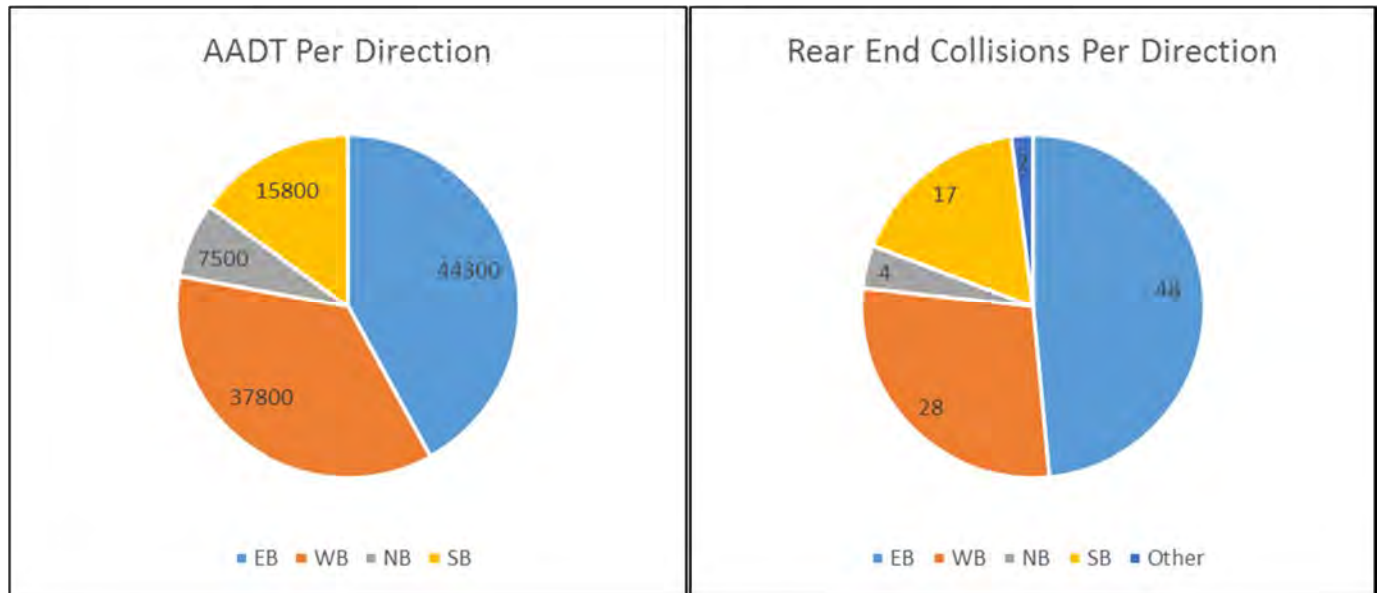
The intersection of Banwell Road and EC Row Expressway experienced the 4th highest collision rate from 2009 to 2013. The average collision frequency at signalized intersections in the city is only 0.48 collisions per million entering vehicles. With 1.34 collisions per million entering vehicles, this intersection has the highest number of collisions in the City of Windsor.

From 2009 to 2013 there are a total of 125 accidents, of which 99 are rear end collisions. This represents 79% of the collisions. When compared to regional averages, (33% for 2013) this is a significant overrepresentation. There are very low amounts of other collisions, without rear ends there would only be 26 collisions from 2009-2013 which having extremely high volumes of over 96 million vehicles entering the intersection during that time. Of the 125 accidents only 34 (27%) resulted in injuries, this is consistent with the City of Windsor ratio of 929 injuries with 3,798 collisions (24%). As a result, although amount of collisions are high, the number of fatalities is zero and the number of injuries is similar to that of the City-wide average.

The number of rear end collisions does not appear to exhibit a significant bias towards a specific approach direction. All directions shows a reasonably proportional amount of rear end collisions when compared with the number of vehicles travelling in that direction. The eastbound direction seems to be the worst, it represents 42% of the traffic approaching the intersections but is 48% of the rear end collisions as shown in **Exhibit 3-5**. Most of the rear end collisions are likely as a result of congestion causing unexpected slowdowns, long queues and increased driver frustration. The eastbound direction has the poorest level of service which is likely the reason for it having the highest number of rear end collisions.

As a result, in order to reduce the number of rear end collisions, the most effective measure would be to reduce queues and improve LOS. However due to the size of the existing intersection and high volumes, this is very difficult to accommodate, only minor improvements can be made that are discussed in Section 3.8.

**Exhibit 3-5 Collision Rate Splits**



**3.6 Assessment of Future Traffic Conditions**

Within the context of the City of Windsor’s Official Plan, it projected that the total population will reach between 209,674 and 220,972 by the year 2016. The 2011 population for the City of Windsor was 210,891. This projected growth is affected by a number of attributing factors such as international migration into the City, economic conditions, and a diversified employment base. The annexation of approximately 2,530 hectares of land from the Town of Tecumseh into the jurisdiction of the City provides additional employment lands that will enable growth to continue on the east edge of the city. Recent City population projections for the year 2021 anticipate the total projected population to reach 244,811, and 256,000 by 2026 and 267,000 by 2031.

**3.6.1 Base Future Network**

The base network scenario for traffic capacity analysis consists of the preferred road network from the previous Draft Banwell Road Environmental Assessment carried forward along with the proposed modifications by the 2015 Dillon Consulting Transportation Study for the Town of Tecumseh. The Dillon Study was reviewed in Section 2 of this report and in provides a solid basis for updating the traffic analysis. The base layout lane configurations are shown in **Exhibit 3-6** and include the following:

- Banwell Road four lanes north of EC Row Expressway to Tecumseh Road East and six lanes south of EC Row Expressway to north of CPR Track.
- In the southbound direction the transition from four to six lanes occurs at the eastbound off-ramp. The eastbound right-turn is channelized and becomes the third southbound lane.
- Northbound the transition occurs at the south to west loop ramp – three lanes are carried through the eastbound off-ramp and the third lane exits onto the loop ramp.

- Eastbound off-ramp from EC Row Expressway to have a 4<sup>th</sup> leg to provide access to Gouin Street and into Tecumseh Hamlet.
- Two intersections are provided south of EC Row Expressway and north of the CP tracks. The two intersections have single left turn lanes on Banwell Road and dedicated right turn lanes. Turns from the side streets may in future require double-left turns if retail supercenter is implemented as expected.
- North of EC Row Expressway the westbound off-ramp connects directly to a roundabout at Wildwood Drive/Mulberry Drive. Mulberry Drive is disconnected east of Banwell Road so that the westbound off-ramp can connect instead.
- North of Wildwood Drive/Mulberry Drive signalized intersections are provided at Palmetto Street and Tecumseh Road East.

### 3.6.2 Traffic Forecasts

In terms of employment growth, the area east of Banwell Road between Tecumseh Road East and the EC Row Expressway will see the majority of the employment increases in the area. South of the EC Row Expressway, significant employment increases are projected to occur on the lands west of Banwell Road.

Based on land use forecasts, traffic data and City of Windsor's Transportation Demand Model (updated for the Lauzon EA in 2013), an annual growth rate of 0.5% north of EC Row Expressway and 2.5% south of EC Row Expressway was used. A description of future traffic conditions can be found in Appendix B.

As a result of both background traffic growth in the region and developments along the corridor, Banwell Road traffic volumes is predicted to more than double that of today's volumes. Much of this traffic growth will be associated with the development of lands adjacent to the roadway and to the north and south of the Study Area. The pace of this development will largely determine the timing of road widening. With this growth in population and employment, there will be the need to provide for road and transit improvements and complementary facilities for pedestrians and cyclists.

Within the City of Windsor, a plan for the Pointe East Windsor Limited lands (formerly referred to as the Fanelli lands), bounded by Banwell Road, Twin Oaks Business Park, EC Row Avenue East and the CP rail line was brought forth that includes an additional 1.5 million square feet of new commercial development to be located west of Banwell Road, south of EC Row and north of Twin Oaks Drive along with a plan for lands west of Banwell Road north of Wildwood Drive (Royal Timbers Centre).

Development within the Tecumseh Hamlet was also reviewed based on the Tecumseh Hamlet Secondary Plan Transportation Study (Dillon, 2015). The Town of Tecumseh is expected to add approximately 3,100 residential units and 413,000 square feet of commercial gross floor area. Based on these updated growth assumptions, **Exhibit 3-7, Exhibit 3-8, & Exhibit 3-9** below summarizes projected Banwell Road corridor traffic volumes and performance to 2034 with the base network.

### 3.6.3 Future Traffic Operations

The capacity analysis shows several intersections that are at or near capacity by 2034 in both the a.m. and p.m. peak periods. However none of the movements are over capacity with all v/c ratios below 1.0. Due to the conservative nature of the growth projections and full addition of development traffic, there should be sufficient future capacity in 2034 using the base network with multiple movements nearing capacity.



**IBI GROUP REPORT**

**BANWELL ROAD**

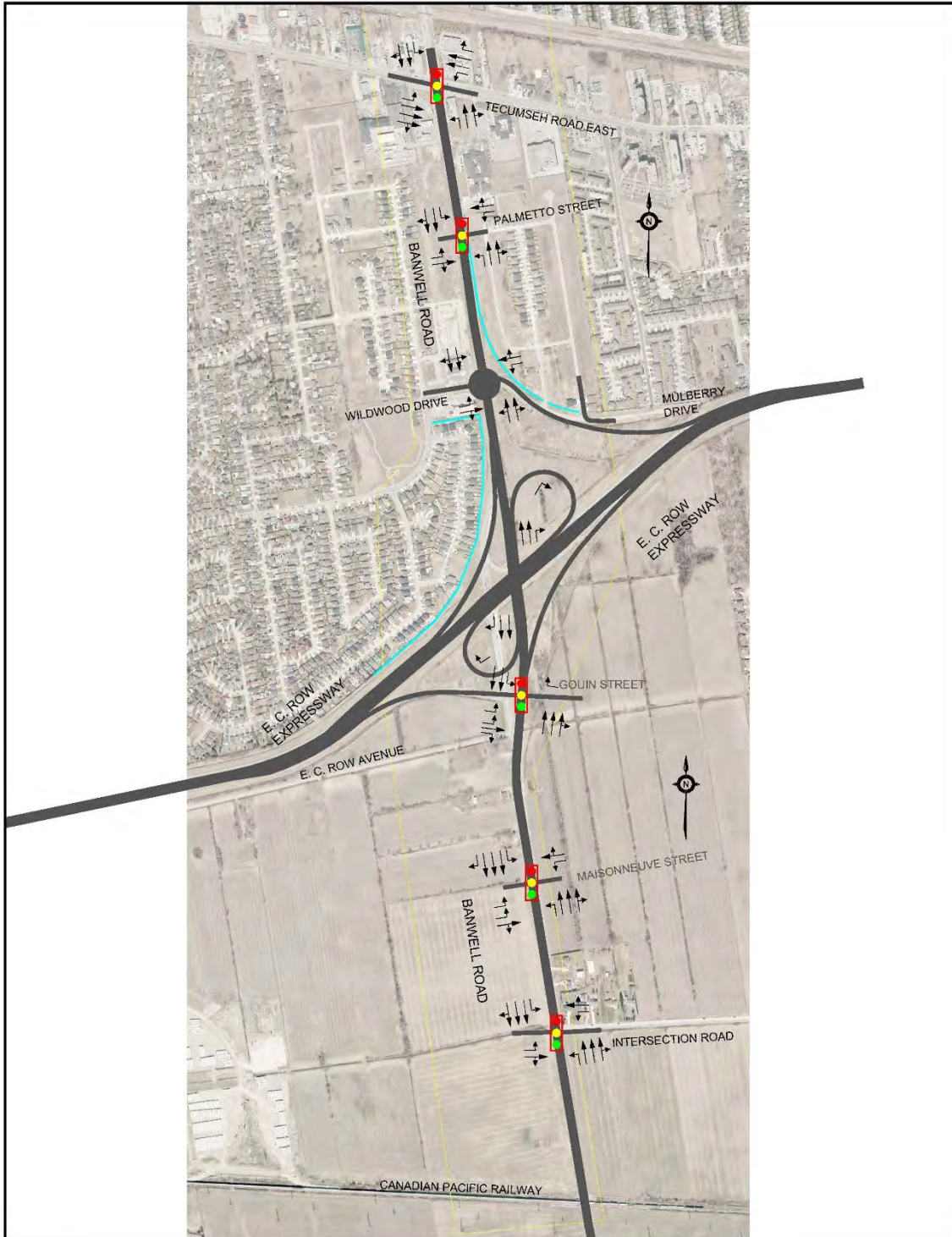
**ENVIRONMENTAL STUDY REPORT Tecumseh Road East to CP Railway Tracks**

Prepared for City of Windsor

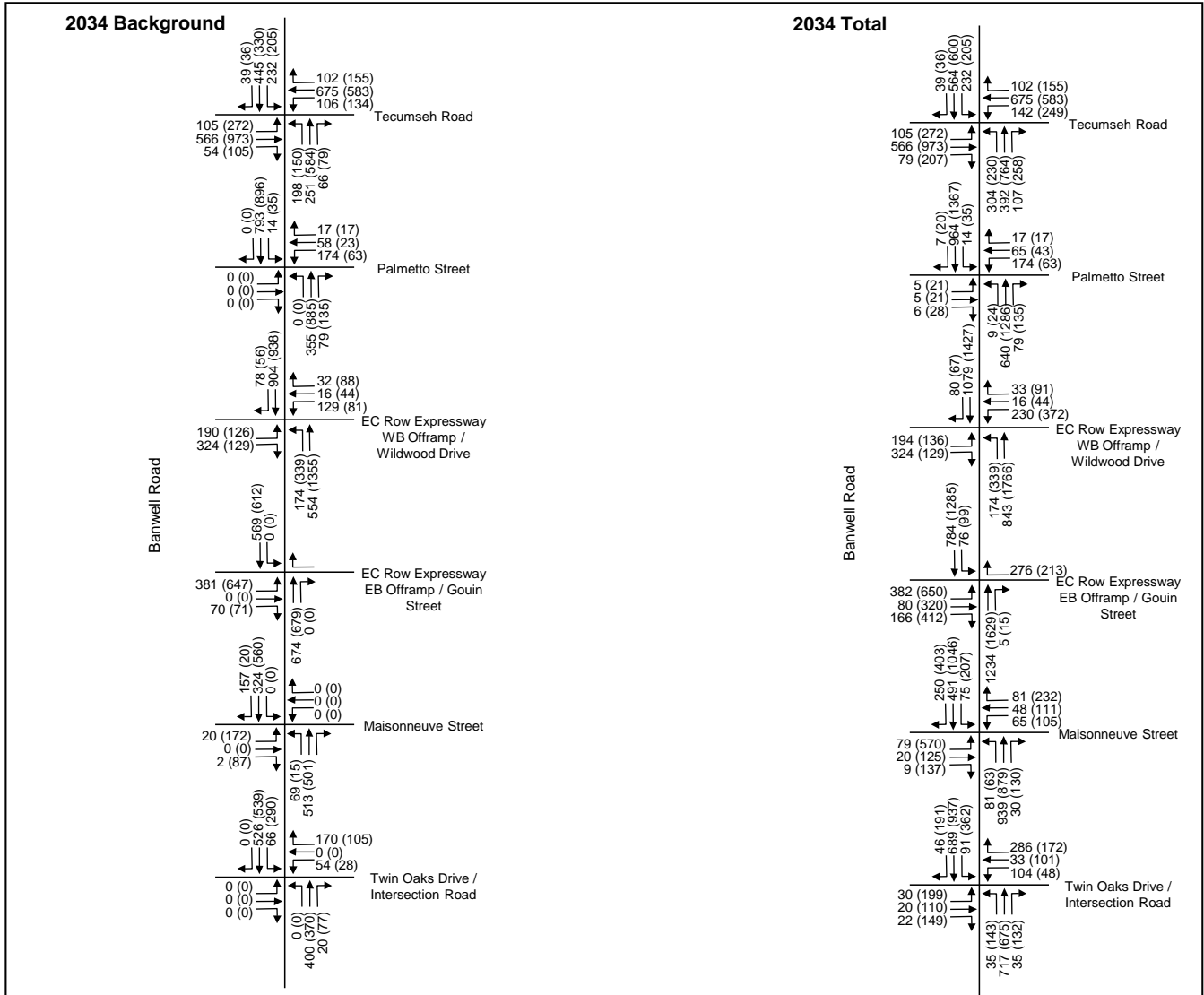
A separate analysis was conducted for Mulberry Drive/Wildwood Drive and Banwell Road to determine if the previously recommended roundabout was still valid under newly updated traffic projections. Based on the analysis, it was seen that a roundabout provides significantly better traffic operations at this intersection compared with a signalized intersection. However a signalized intersection is able to function with a LOS E in the a.m. peak and E in the p.m. peak.

A detailed report of Banwell Road Corridor Assessment is provided in **Appendix B** for reference.

**Exhibit 3-6 2034 Base Road Configuration**



**Exhibit 3-7 2034 Projected Volumes**



**Exhibit 3-8 AM Peak Period Capacity Analysis Results**

Intersection	Intersection LOS	Critical			
		Movement	LOS	V/C	95% Queue (m)
Banwell Road at Tecumseh Road	C	EBL	D	0.51	27
		EBT	D	0.57	59
		WBT	D	0.78	95
		WBR	D	0.06	7
Banwell Road at Palmetto Road	B	EBL	D	0.02	4
		EBT	D	0.02	6
		WBL	E	0.73	39
		WBT	D	0.23	14
Banwell Road at EC Row EB Off-ramp/Gouin Street	C	EBL	D	0.70	59
		EBT	D	0.27	31
		WBR	E	0.80	85
Banwell Road at Maisonneuve St	B	EBL	E	0.40	17
		EBT	D	0.17	13
		WBL	D	0.26	23
		WBT	D	0.44	33
Banwell Road at Twin Oaks Drive/Intersection Road	C	EBL	D	0.26	13
		EBT	D	0.07	12
		WBL	E	0.62	39
		WBT	D	0.35	35

**Exhibit 3-9 PM Peak Period Capacity Analysis Results**

Intersection	Intersection LOS	Critical			
		Movement	LOS	V/C	95% Queue (m)
Banwell Road at Tecumseh Road	D	EBT	D	0.84	111
		WBL	D	0.84	81
		WBT	D	0.62	84
		NBL	D	0.69	69
		NBT	D	0.72	96
		NBR	D	0.16	27
		SBL	D	0.73	55
		SBT	D	0.62	90
Banwell Road at Palmetto Road	A	EBL	D	0.19	12
		EBT	D	0.17	16
		WBL	E	0.57	28
		WBT	D	0.33	23
Banwell Road at EC Row EB Off-ramp/Gouin Street	C	EBL	D	0.52	58
		EBT	D	0.74	100
		WBR	E	0.78	72
Banwell Road at Maisonneuve St	D	EBL	E	0.86	91
		WBL	D	0.34	24
		WBT	E	0.86	104
		NBL	D	0.41	25
		NBT	D	0.64	95
		SBL	D	0.73	58
		SBR	D	0.25	24
Banwell Road at Twin Oaks Drive/Intersection Road	C	EBL	D	0.70	50
		WBL	D	0.26	20
		WBT	E	0.78	75
		SBL	D	0.73	100

### 3.7 2034 Preferred Configurations

The previously identified configuration for Banwell Road results in two opportunities for improvement as a result of the proposed off-ramp locations.

The first opportunity is that under the base configuration, Mulberry Drive East will be disconnected from Banwell Road and as a result residents will be required to use a different route to access Banwell Road. The alternative analysis shows that it would be possible to allow for an off-ramp from EC Row Expressway to Banwell Road between EC Row Expressway and Wildwood Drive/Mulberry Drive. This would be advantageous because it keeps the existing Mulberry Drive access to Banwell Road as well as allowing for the development of lands between Mulberry Drive and EC Row Expressway.

The second opportunity is based on the recommendations of the Tecumseh Hamlet Secondary Plan Transportation Study (Dillon, 2015). This report suggested a fourth leg to the EC Row Expressway EB off-ramp. This would allow increased connectivity into the Tecumseh Hamlet and reduce left turning traffic into the development further south of the intersection.

The analysis shows that the most ideal scenario from a traffic operations perspective, would be if only inbound traffic from the off-ramp into the residential development was allowed. This would minimize impacts to traffic along Banwell Road as no additional signal phase would be required.

Alternatively if a WBR was to be provided at this intersection, a shared phase with the SBL traffic could be used. This adds some delay to the through traffic on Banwell Road however the analysis found that although there are some disadvantages, the operations are still acceptable.

#### 3.7.1 Banwell/Wildwood/Mulberry Roundabout

By creating a new signalized intersection between the EC Row Expressway Westbound Off-ramp and Banwell Road, the existing Mulberry Road would not need to be disconnected. This alternative would bring significant benefits to the city by allowing potential developments on the land available between Wildwood Drive/Mulberry Drive and EC Row Expressway in the northwest quadrant of the EC Row Expressway intersection with Banwell Road. Also it would continue to allow current the access to Banwell Road at Mulberry Drive from residential developments to the east of Banwell Road. Therefore it would not have a significant impact on residents' travel patterns in the area.

This EA also conducted a sensitivity analysis to compare the option of a roundabout versus a signalized intersection at the intersection of Banwell Road and Wildwood Drive/Mulberry Drive. The results of the analysis is summarized in **Exhibit 3-11** and **Exhibit 3-12**. Overall the analysis indicates that the roundabout would have better operations than the signalized intersection and is preferred.

A complete Intersection Control Study (ICS) should be conducted at this location at the detailed design stage to confirm selection of a roundabout over traffic signals. Based on the numerous roundabouts installed on Region of Waterloo Roads over the past 10 years, and the ICSs that supported these installations, it is expected that while the initial capital cost to construct a two lane roundabout (\$2.0 M) is relatively high compared to traffic signal installation (\$100,000 - \$150,000), the total life cycle costs of a roundabout are typically much lower than a traditional signalized intersection as summarized on **Exhibit 3-10**.

**Exhibit 3-10 Relative Cost-Benefit Differences Roundabout vs. Signals**

Cost-Benefit Item	Signals	Roundabout
Construction Cost	Low	High
Maintenance Cost	Low	Low
Injury Crash Cost	High	Low
Additional Street Lighting & Maintenance	High	Low
Total Present Value	High	Medium/High
Expected Average Annual Collisions	High	Low
20 Year Operational Performance	Medium	High
Overall Assessment		Preferred



**Exhibit 3-11 Banwell/Wildwood/Mulberry & OFF Ramp Signalized LOS Sensitivity Analysis**

Intersection	Peak Hour	Overall LOS	Mvmt	Delay (s)	LOS	v/c	95% Queue (m)
Banwell Road and EC Row WB Off-ramp (Signalized)	AM	A	WBL	57	E	0.70	62
			WBR	44	D	0.03	10
			NBT	4	A	0.36	50
			SBT	2	A	0.50	34
	PM	B	WBL	58	E	0.74	70
			WBR	47	D	0.42	39
			NBT	9	A	0.67	145
			SBT	2	A	0.59	12
Banwell Road and Wildwood Drive/Mulberry Drive (Signalized)	AM	C	EBL	56	E	0.64	43
			EBT	47	D	0.30	29
			EBR	48	D	0.37	36
			WBL	40	D	0.55	49
			WBTR	36	D	0.13	20
			NBL	25	C	0.53	36
			NBTR	8	A	0.38	48
			SBL	12	B	0.02	2
			SBTR	15	B	0.57	112
	PM	B	EBL	64	E	0.70	43
			EBT	48	D	0.13	15
			EBR	48	D	0.08	17
			WBL	51	D	0.39	27
			WBTR	48	D	0.11	13
			NBL	51	D	0.83	93
			NBTR	6	A	0.68	88
			SBL	16	B	0.17	6
			SBTR	21	C	0.75	160

**Exhibit 3-12 Banwell/Wildwood/Mulberry Roundabout LOS Sensitivity Analysis**

Intersection	Peak Hour	Overall LOS	Mvmt	Delay (s)	LOS	v/c	95% Queue (m)
Banwell Road and Wildwood Drive /Mulberry Drive (Roundabout)	AM	A	EBL	14	B	0.18	8
			EBT	7	A	0.09	4
			EBR	9	A	0.09	
			WBL	16	B	0.21	9
			WBT	8	A	0.48	27
			WBR	10	A	0.48	
			NBL	14	B	0.50	29
			NBT	6	A	0.51	
			NBR	7	A	0.51	
			SBL	12	B	0.42	25
			SBT	5	A	0.42	
			SBR	6	A	0.42	
	PM	A	EBL	18	B	0.13	42
			EBT	12	B	0.07	45
			EBR	13	B	0.07	
			WBL	16	B	0.23	43
			WBT	7	A	0.23	47
			WBR	9	A	0.23	
			NBL	16	B	0.69	48
			NBT	8	A	0.69	
			NBR	9	A	0.69	
			SBL	13	B	0.81	48
SBT	6	A	0.81				
SBR	7	A	0.81				

The proposed Alternative configuration is shown below in **Exhibit 3-13****Error! Reference source not found.**

**Exhibit 3-13 2034 Preferred Configuration**



### 3.8 Interim Improvement Options

The only intersection currently (2014) overcapacity is the intersection of EC Row Expressway and Banwell Road.

Due to the high capital cost of constructing an interchange at EC Row Expressway and Banwell Road, analysis was completed to determine whether at-grade interim mitigation operations were feasible.

The analysis shows that minor interim improvements, shown in **Exhibit 3-14**, based on the Dillon, 2015 Transportation Study recommendations, can provide a short-term benefit to traffic operations on the corridor by improving the overall LOS from F to D, with some movements at or above capacity. However the improvements are not sufficient by 2024, where the analysis shows that the intersection of Banwell Road and EC Row Expressway will become severely congested. The volumes at this point are approximately 2800

eastbound, 2100 westbound, 900 northbound and 1150 southbound. The need for improvements would be dependent on timing of nearby developments as they introduce different travel patterns. Congested left turn movements may trigger a need for improvements at an earlier time.

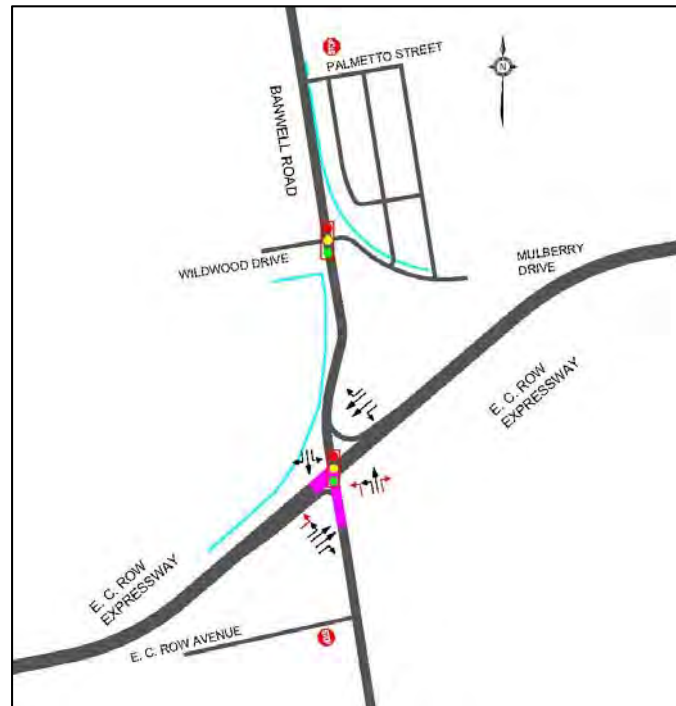
More extensive at-grade improvements, shown in **Exhibit 3-15** (six lanes on EC Row and four lanes on Banwell Road through the intersection) would be costly, but would bring 2024 conditions from Overall F to D-E with some movements at or above capacity. This second alternative was developed in an effort to reduce the amount of 'throw-away' cost and infrastructure through construction of road widening (e.g. six lanes) that is compatible with the future interchange (six lanes under Banwell Road including on-ramps).

No formal cost estimates were developed, however order-of-magnitude costs estimates for the two options are provided below:

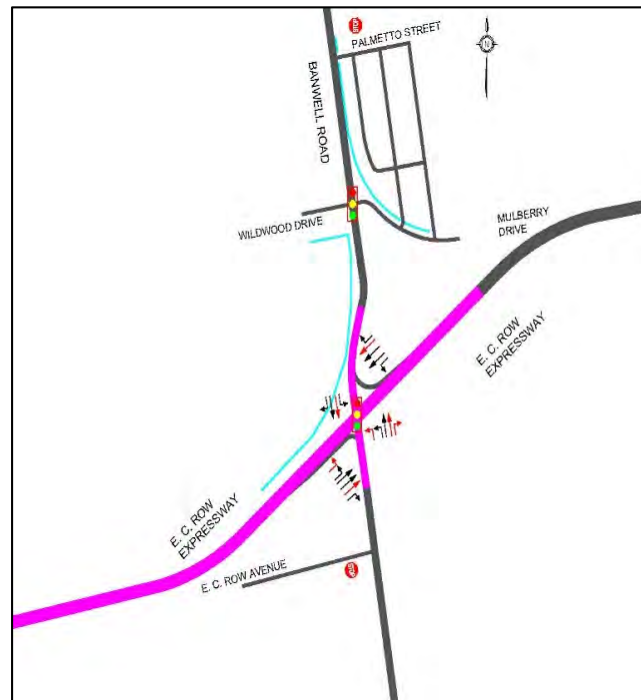
- Interim Dillon (2015) proposed layouts – \$1.5M, all throwaway with 5 years of potential usage. (Overall F to D in short-term, projected LOS F by 2024)
- Six lanes EC Row and 4 lanes Banwell Road at-grade – \$6M, \$3M is throwaway with 10 years of potential usage. (Overall F to D-E in 2024)

The above figures are based on MTO unit rates for road widening excluding property acquisition and utility relocations, if necessary.

**Exhibit 3-14 Dillon Proposed Interim Layout**



**Exhibit 3-15 Interim 6 Lane EC Row and 4 Lane Banwell Configuration**



— Proposed improvements

### 3.9 Summary of Transportation Analysis

Analysis of existing (2014) conditions found that several intersections in the corridor operate with poor level-of-service, in particular the intersection of EC Row Expressway and Banwell Road. With several movements operating at level-of-service 'F' indicating long delay normally considered unacceptable, there is a need for road capacity improvements in the short term.

Updated traffic forecasts account for background regional growth and local developments including the build-out of the Town of Tecumseh, large-format retail on the Pointe East Windsor Limited lands west of Banwell Road, and the Royal Timbers completion north of EC Row Expressway. Updated traffic forecasts are lower than the prior EA due to new background growth projections more in line with development trends in the region, however substantial traffic growth is still forecasted clearly indicating a need for Banwell Road widening and an interchange at EC Row Expressway.

Future road network alternatives were developed based on the prior EA and the Tecumseh Hamlet Secondary Plan Transportation Study (Dillon Consulting, 2015). Analysis of alternatives resulted in the following recommended road layout for 2034:

- North of EC Row Expressway, Banwell Road should be widened to four lanes with signalized intersections at Tecumseh Road East and Palmetto Street. At Banwell Road and Mulberry Drive/ Wildwood Drive, a roundabout provides superior traffic operations compared to a signal.
- Analysis of the EC Row westbound off-ramp indicates acceptable operations if it connects directly to Banwell Road adjacent to the N-W on-ramp. This would create a new signalized intersection.

- Banwell Road will require a Parclo A4 interchange. The recommended configuration is to provide a fourth leg to the eastbound off-ramp (south ramp intersection) with SBL and WBR movement, from and to the Town of Tecumseh development lands.
- South of EC Row expressway Banwell Road requires widening to four lanes with two signalized intersections between EC Row Expressway and the Canadian Pacific railway and protection for six lanes in the future when the proposed developments along the corridor are constructed.

Analysis of alternatives for the EC Row westbound off-ramp indicated acceptable operations if it connects directly to Banwell Road adjacent to the south to west loop ramp. This is a deviation from design concepts previously presented to the public which recommended the off-ramp connect to Wildwood Drive and disconnection of Mulberry Drive. The disconnection would create a large parcel of undevelopable land and would inconvenience local residents. The change in recommendation is mainly driven by updated traffic forecasts and analysis which indicate acceptable operations despite the close intersection spacing.

Due to the update, Mulberry Drive can remain connected to Banwell Road and the City can develop the parcel of land previously landlocked. However, further review of ramp location and geometries is suggested to be undertaken during detailed design.

At the proposed W-N/S off-ramp, the Tecumseh Transportation Study recommended a fourth leg to provide two-direction travel to and from the adjacent development lands. Analysis of the intersection indicated that providing the exiting movement (westbound right) results in additional delay to background traffic.

The delay is caused by a requirement for a signal phase for the movement by extending the southbound left phase, which involves taking green time away from northbound through (3 lanes) and eastbound approach (3 lanes) to provide capacity for a single right-turn lane. Although not ideal, it would be acceptable from an operations perspective to allow for the westbound right turn as no excessive delays or failing movements are caused.

The above establishes a need for an interchange and the recommended lane configuration. Due to the high cost of the interchange, an interim analysis was undertaken to identify potential phasing opportunities. Objectives of the analysis were to identify opportunities to limit road widening and defer the interchange.

The analysis shows that minor improvements (e.g. additional turning lanes per Tecumseh Hamlet Secondary Plan Transportation Study prepared by Dillon Consulting, 2015) can provide a short-term benefit to traffic operations on the corridor. However the minor improvements are not sufficient by 2024, where the analysis shows that the intersection of Banwell Road and EC Row Expressway will again become congested.

More extensive at-grade improvements including six-laning of EC Row and four-laning of Banwell Road could improve level of service in 2024 from F to E. LOS E can be considered a threshold for acceptable traffic operations. Therefore, even the more extensive at-grade option indicates that it will reach traffic thresholds at or near 2024.

A 2024 lifespan would not normally be considered acceptable for capital projects and therefore the recommendation would be to proceed with an interchange as soon as possible. However, given the high cost of the interchange, and as of writing (2016) lack of funding availability even through the 2024 time-frame, the City and Town may wish to pursue these at-grade improvements separately from the current study, as they could relieve the most severely congested movements through 2024.

## 4 Existing Conditions

### 4.1 Road Network

Banwell Road between Tecumseh Road East and the City limits south of the CPR track is a Class II Arterial Road. Banwell Road operates as a basic 2-lane roadway with narrow gravel shoulders and open ditch drainage between south of the Tecumseh Road East intersection and the City limits. Added turn lanes are available at the signalized intersections of EC Row Expressway, Wildwood Drive/Mulberry Drive and Tecumseh Road East. Within the study area, three local streets currently intersect Banwell Road, namely Palmetto Street, EC Row Avenue (South Service Road) and Intersection Road which are controlled by stop signs.

The existing intersections and lane configurations are described in **Exhibit 4-1**. Controlled site access to Banwell is currently provided immediately south of Tecumseh Road (commercial/institutional developments) and five residential properties between EC Row Avenue and Intersection Road enjoy direct fronting access. North of Tecumseh Road, Banwell Road widens to a basic 4-lane cross section with a centre median. Currently, no facilities are provided for either pedestrians or an exclusive bike/trails corridor beyond the intersection at Tecumseh Road E.

**Exhibit 4-1 Existing intersections and lane configurations**

Intersections	Control	Eastbound	Westbound	Northbound	Southbound
Tecumseh Road East	Signal	1 EBL 2 EBT 1 EBR	1 WBL 2 WBT 1 WBR	1 NBL 1 NBT 1 NBTR	1 SBL 2 SBT 1 SBR
Palmetto Street	Stop	-	1 WBLR	1 NBTR	1 SBTL
Mulberry Drive/Wildwood Drive	Signal	1 EBL 1 EBTR	1 WBL 1 WBTR	1 NBL 1 NBT 1 NBR	1 SBL 1 SBTR
EC ROW Expressway	Signal	1 EBL 2 EBT 1 EBR	1 WBL 2 WBT 1 WBR	1 NBL 1 NBTR	1 SBL 1 SBT 1 SBR
E. C. ROW Avenue (South Service Road)	Stop	1 EBLR	-	1 NBTL	1 SBTR
Intersection Road	Stop	-	1 WBLR	1 NBTR	1 SBTL



The posted speed limit in the study area ranges from 60 km/h from the City limits to the EC Row Expressway and drops to 50 km/h north of the expressway. Within the study limits, Banwell Road is classified as a truck route from EC Row Avenue East to Tecumseh Road East. A single rail track carrying CPR rail traffic exists immediately north of the City limits. This crossing is currently controlled with flashers and a gate system.

## 4.2 Road Geometry

### 4.2.1 Right-of-Way

The existing right-of-way along Banwell Road is approximately 12 m between the CPR tracks and EC Row Avenue and is situated approximately 5.5 m to the west of the east City limit. North of the EC Row Expressway, Banwell Road has a right-of-way of approximately 30 metres. In addition, a significant parcel of land has been set aside in the area around the Banwell/EC Row Expressway intersection for a future interchange.

### 4.2.2 Horizontal and Vertical Alignment

Banwell Road is relatively straight facility from the City limits immediately south of the CPR tracks northerly to EC Row Expressway. There are two horizontal curves located immediately north of EC Row Expressway along Banwell Road, curve of  $R=240m$  followed by a curve of  $R=200m$ . Further north, Banwell Road is a straight facility between Mulberry Drive/Wildwood Drive and Tecumseh Road East and beyond with minor alignment deflections along the tangent sections which seem to be well within the accepted geometric design standards for current operating conditions.

The existing profile along Banwell Road is extremely flat within the project limits, with grades range of 0.1% to 0.6%. The one exception is at the south end, where the road rises to meet the railway bed at the CPR crossing, resulting in a localized “hump”.

### 4.2.3 Cross Section and Pavement Structure

The pavement width along Banwell Road varies between 6m and 7m. The gravel shoulders on either side of the road are quite narrow and almost non-existent at some locations. Road section flares from 2 to 4 lanes just south of the Tecumseh Road East and Banwell Road intersection and an additional northbound left turn lane is provided. On the west side of Banwell Road the southbound lane taper of approximately 8:1 is inadequate for operating speed of 60 km/hr. This can be addressed by increasing taper length to 55m (min.) reflecting 15:1 ratio based on the design speed of 80km/hr.

Currently, Banwell Road has a flexible pavement structure, but at the intersection of Banwell Road and Tecumseh Road East the pavement changes to concrete. It is anticipated that a full geotechnical investigation will be undertaken during the detailed design phase to provide recommendations on pavement structure and recycling of material.

### 4.2.4 Traffic Signals and Illumination

Traffic signals, along Banwell Road, are currently installed at the intersections of EC Row Expressway, Wildwood Drive/Mulberry Drive and Tecumseh Road East.

Stop controls, along Banwell Road are currently in operation at Palmetto Drive, EC Row Avenue and Intersection Road.

Illumination is currently provided at the intersection of Banwell Road/Mulberry Drive/Wildwood Drive, Banwell Road/EC Row Expressway, Banwell Road/Intersection Road and Banwell Road/Tecumseh Road East.

#### **4.2.5 Drainage**

Within the study limits, runoff from Banwell Road is conveyed primarily by roadside ditches. The ditches are characterized by shallow V-shaped cross-section with vegetated cover.

The ditches along Banwell Road drain into Lachance Drain, Gouin Drain, and Robinet Drain. All these drains flow perpendicular to Banwell Road and are pipe culverts with head walls to prevent erosion. Head walls on these culverts are in poor condition and need to be reviewed at the detailed design stage.

There are approximately 17 culverts, mostly driveway culverts within the study limits along the existing Banwell Road.

#### **4.2.6 Utilities and Infrastructure**

The following utility companies were contacted for information on the existing and proposed utility plant within the study area. The following information has been extracted from base maps:

##### **Bell Canada**

There are underground Bell cables running along the west side of Banwell Road south of EC Row Expressway approximately 7 m from the existing center line of Banwell Road. From EC Row Expressway to Tecumseh Road East underground Bell cables runs predominantly along the west side with one line running on the east side just south of Tecumseh Road East. The actual plant locations and depths will need to be confirmed during detailed design.

Bell also has underground fibre optic cables on the south side of the CPR Tracks and running parallel to the tracks at the south limit of the study area.

##### **Cogeco Cable Solutions**

No Cogeco cable plant exists within the study area.

##### **Hydro One Networks Inc.**

There is an existing pole line running on the west side of Banwell Road between CPR Tracks and EC Row Expressway.

##### **Enwin Utilities Ltd.**

From EC Row Expressway to Tecumseh Road East the existing pole line runs along the east side of the Banwell Road.

There is an existing underground hydro cable running along the south side of Wildwood Drive approximately 10 m from the center line of the road.

##### **Union Gas**

A gas line exists on the west side of Banwell Road, south of EC Row Avenue approximately 7.5 m from the center line of the road for a length of approximately 100 m.

Also, there is a gas line running along the south side of Wildwood Drive at a distance of approximately 12 m terminating at approximately 15 m from the center of Banwell Road. On Palmetto Drive gas line runs along the road on the north side at a distance of approximately 9 m terminating at approximately 15 m from the center line of Banwell Road.

### **Storm Sewer**

There are catch basins on Banwell Road primarily around the intersections of EC Row Expressway and Palmetto Drive with leads running to the existing ditch lines. Also there is a 1050 mm diameter sewer line running 8 m west of Banwell Road center line from north of Palmetto Drive up to Tecumseh Road East which also connects to 900 mm diameter line on Palmetto Drive.

Information on existing roadside drainage ditches along Banwell Road and EC Row Expressway, plus associated drainage channels is provided in Section 4.3.2.

### **Sanitary Sewer**

A 2100 mm sanitary sewer exists on the west side of Banwell Road north of EC Row Expressway and runs 6 m deep, approximately 7.5 m from the center line of Banwell Road based on the available information. This is to be confirmed at the detailed design stage.

### **Watermain**

A 900 mm watermain exists on the east side of Banwell Road north of EC Row Expressway and runs approximately 6.5m from the center line of Banwell Road based upon the available information. This is to be confirmed at the detailed design stage.

Information concerning hydrants is not available at this stage but needs to be collected at the detailed design stage.

## **4.3 Natural Environment**

### **4.3.1 Terrestrial Habitat**

**Appendix C** of this ESR document contains the Environmental Conditions Report conducted for this project. The northern portion of the study area is former agricultural land that is being converted to residential/commercial development. Some new single deciduous trees have been planted in the completed development areas. The southern portion of the study area is dominated by active agricultural land, with a few sparse deciduous hedgerows separating individual cultivation fields. The vegetation characteristics located in the study area are not expected to support any ecological functions beyond support of common, disturbance-tolerant species.

### **4.3.2 Fisheries and Aquatic Habitat**

A desktop analysis was completed for the study area using aerial photography and topographic maps. Existing fisheries and aquatic information was obtained from the Ontario Ministry of Natural Resources (MNR) Chatham District Office, Essex Region Conservation Authority (ERCA) and Fisheries and Oceans Canada (DFO). ERCA has recently completed mapping of the drainage features within the study area. The study area encompasses seven drains: Lachance Drain, Gouin Drain, Banwell Drain, Robinet

Drain, Parent Outlet Drain and two unnamed drains. According to the ERCA mapping all drains are classified as Class F – Channelized and eventually discharge into Little River, which is a warmwater tributary of Lake St. Clair.

ERCA and MNR provided historical fisheries information for Little River and McGill Drain, both of which are outside the study area but no information for the drains within the study area was available. Background fisheries data for the Little River and McGill Drain are provided in **Appendix C: Environmental Conditions Report** (Exhibit 1).

The fish community is diverse although most of the species are common warmwater species that are tolerant to environmental disturbance. No Species-At-Risk (SAR) fish have been documented at any of the sites for which information was provided.

Of particular interest is the round goby (*Neogobius melanostomus*), which is an aggressive, invasive species. It was first introduced to Ontario in ballast water and reported in the St. Clair River in 1990. The round goby is rapidly expanding its range. It is tolerant of low dissolved oxygen and a wide range of water temperatures.

Field investigations were conducted on June 19, 2007. On that day, 5.6 mm of rain fell before noon. All assessments were completed after the rainfall. Electrofishing (under MNR License No. 1039353) was conducted in isolated pools, where possible. No fish were captured at any site. These drains would seasonally contribute to fish habitat during times of high flow (i.e., spring freshet) but are otherwise for drainage purposes only. Photos of these drains can be found in **Appendix C: Environmental Conditions Report** (Appendix A).

### **4.3.3 Wildlife Habitat**

Most of the wildlife habitat in the study area is located within roadside ditches, agricultural lands with wildlife species that are habituated to human activity. Consequently, habitat in or adjacent to the right-of-way has limited wildlife capability.

## **4.4 Socio-Economic Environment**

### **4.4.1 Land Use Planning Context**

#### **Official Plans**

Land use within the City of Windsor is governed by the City's Official Plan (OP) that guides the physical development of the municipality over a 20-year period. In accordance with this OP, the City of Windsor is divided into a total of 19 planning districts which provide the basis for developing more detailed planning policies (City of Windsor Official Plan, Updated per Amendment #85 Aug 28, 2013). Specifically, the Banwell Road study area lies within the Forest Glade Planning District according to Schedule A – Planning Districts and Policy Areas of the City of Windsor Official Plan and does not conflict with the planning policies of this District.

The transferred lands from the Town of Tecumseh (2,532 hectares) were included in the former Official Plan for Sandwich South. A comprehensive Official Plan amendment was prepared in 2004 to bring the new land under the guidance of the City Official Plan (City of Windsor Official Plan, Updated per Amendment #85 Aug 28, 2013). The lands on either side of Banwell Road are designated as follows:

- Adjacent to the CPR tracks at the City boundary is designated Ontario Hydro Right-of-Way (ROW);

- From the CPR tracks northerly to County Rd 22 and to the west of Banwell Road is designated by the City as Mixed Use and Business Park;
- Between the CPR tracks northerly to County Rd 22 and to the east of Banwell Road in the Town of Tecumseh is designated Hamlet Development with a smaller land parcel designated as Low Density Residential;
- From County Road 22 northerly to Tecumseh Road East and to the west of Banwell Rd is designated as Residential and Commercial Corridor; and
- From County Road 22 northerly to Tecumseh Road East and east of Banwell Road in the Town of Tecumseh is designated as Hamlet Development, with Residential designated in the City of Windsor.

### **Zoning By-Laws**

Based on City of Windsor Zoning Bylaw 8600 and Zoning District Map 15 as provided on the City of Windsor's Web Site, the lands adjacent to Banwell Road between the CPR tracks and Tecumseh Road East in the City are zoned as follows:

- CD2.1 Commercial District – General Commercial;
- HCD2.1 Commercial District – General Commercial under holding provision;
- HCD1.1 Commercial District – Local Convenience under holding provision;
- HCD4.1 Commercial District – Mixed use Commercial, Industrial under holding provision;
- RD2.4 Medium Density Residential District – Single Unit, Semi-Detached Dwelling;
- HRD2.1 Residential District – Single Unit, Duplex, Semi-Detached Dwelling under holding provision; and
- MD2.4 Manufacturing District.

Adjacent lands are also zoned BP(H)-Business Park with a Holding provision and A-Agriculture in the Township of Sandwich South Zoning Bylaw 85-18. The wide range of uses and the amount of land that permits commercial uses in the BP(H) area is the main reason why a six lane cross section is projected to be required in parts of the Banwell Road corridor.

Lands on the west side of Banwell Road between EC Row Expressway and the CPR tracks are zoned BP(H)-Business Park with a Holding provision associated with the Pointe East Windsor Limited lands (formerly referred to as Fanelli lands). On the east side of Banwell Road, this Zoning Bylaw zones the lands as A-Agriculture.

### **Existing Land Uses**

As part of this study, a “windshield survey” was undertaken on June 19, 2007 to identify existing land uses within the study area. In general, land uses within the study area were found to be a mixture of urban and rural residential, commercial institutional, industrial and agriculture as summarized below.

#### *Banwell Road between Tecumseh Road East to EC Row Expressway*

In the northern portion of the study area, particularly between Tecumseh Road East and EC Row Expressway, land use along Banwell Road is comprised of institutional, industrial and commercial operations. Specific land use features observed included a lumber yard, day care, hair salon, coffee shop, convenience store, nursing home, funeral home and a

shopping plaza. Both existing residential development as well as residential areas currently under construction were also observed.

*Banwell Road between EC Row Expressway to CPR tracks*

In the southern portion of the study area, particularly between EC Row Expressway and the CPR tracks, land use adjacent to Banwell Road is primarily vacant and agricultural, along with scattered residential properties. Three newer residential dwellings are located on the east side of Banwell Road immediately north of Intersection Road (11602 Intersection Road, 2040 Banwell Road and 2020 Banwell Road. On the west side of Banwell Road between Gouin Street and the Expressway, two houses have been demolished at 3463 and 3447 Banwell Road, leave one residence at 3455 Banwell Road. The homes were demolished at the time the City installed a new trunk sewer along the west side of Banwell Road from 3455 Banwell Road to the CPR tracks.

#### **4.4.2 Urban Design Context**

The City of Windsor Official Plan contains policies which promote the development of a series of Civic Ways and Gateways. The EC Row Expressway is identified on Schedule G of the Official Plan as a Civic Way.

As described in 8.11.2.12 of the Official Plan, Civic Ways will be designed to:

- a) Promote and present an attractive and unifying image of Windsor;
- b) Maintain a sense of welcome and arrival for travelers;
- c) Create a memorable impression of Windsor; and
- d) Complement and enhance the Municipality's capital investment in major infrastructure.

A Civic Gateway is identified on Schedule G of the Official Plan in the vicinity of EC Row Expressway near the municipal boundary between the City of Windsor and Town of Tecumseh.

As described in 8.2.2.5 of the Official Plan, Gateways at major entry points into Windsor will be designed to:

- a) Provide a sense of welcome and arrival;
- b) Assist in orientation;
- c) Create a memorable image; and
- d) Contribute to the social, historic or thematic character of the area being defined.

#### **4.4.3 Noise**

Noise is a form of energy. Noise is measured in terms of sound pressure, using "Decibels" (dB) to best represent the way in which the human ear perceives noise. The following lists examples of sound levels from various sources:

**Decibel Level Sounds Like:**

130dBA      Jet Take Off

100dBA	Jack Hammer
90dBA	Busy Street
65dBA	Business Office
40dBA	Living Room
25dBA	Bedroom
0dBA	Threshold of Hearing

The following identifies general thresholds for how people perceive changes in noise levels. These guidelines can be used for either increases or decreases in the decibel levels to which people are exposed.

Change in Decibel Level:

- Less than 3dBA: Change considered insignificant due to imperceptibility;
- Between 3dBA and 5dBA: Change considered a just-noticeable difference;
- Between 5dBA and 10dBA: Change considered marginally significant; and
- Over 10dBA: Change considered significant (perceived as doubling of sound exposure).

Roadway noise, like most noise, varies throughout the day. Therefore, the noise descriptor used in Ontario to assess noise is the equivalent sound level (Leq). Leq is identified as the continuous sound level which has the same energy as a time varying noise level over a specified time period. Roadway noise levels generally depend on vehicle type (truck, car), road profile, distance from receiver, type of ground between the road and the receiver. A doubling of traffic volume typically produces an increase in sound level of about 3dBA.

### **MOE/MTO Protocol**

The Ministry of the Environment (MOE) uses the 16-hour period between 7 AM and 11 PM for the assessment of municipal roadway noise. The noise at any one instant may be higher or lower than the 16 hour average. MOE requires that the predicted future noise level without the proposed road improvement be compared to the future noise level with the proposed road improvement adjacent to a Noise Sensitive Area (NSA). If a future increase in noise of greater than 5dB is predicted, the MOE/Ministry of Transportation (MTO) Noise Protocol requires that noise mitigation be investigated within the right-of-way.

For purposes of assessing noise as part of road expansion project, MTO defines a NSA as a noise sensitive land use with an outdoor living area, which includes private homes/single family units and townhouses; multiple unit buildings such as apartments with outdoor living areas for use by all occupants; hospitals and nursing homes where an outdoor living area is provided for the patients.

Some land uses are generally not considered by either the MTO or MOE to qualify as NSAs, including apartment balconies; cemeteries; parks and picnic areas; all commercial and industrial uses.

Lands that have been zoned for future noise sensitive uses but where NSAs do not currently exist, such as the planned homes on Viola Crescent adjacent to Banwell Road, must also be considered under MOE/MTO policies (lands with a plan of subdivision in



place). A review of the land use zoning within the project area has been conducted, showing zoned NSA residential lands on the east side of Banwell Road plus an existing Banwell Gardens Nursing Home located at 3000 Banwell Road and a new Windsor Chapel Funeral Home located at 11677 Tecumseh Road East on the south side of Tecumseh Road east of the Banwell Road intersection. Any additional noise sensitive land use should be developed with regard to the planned road configuration presented in this ESR.

One noise wall currently exists along the west side of Banwell Road for residential lots fronting onto Timberbay Crescent, north of EC Row Expressway to south of Mulberry Drive/Wildwood Drive.

Refer to Section 8.0 for the potential noise impacts and recommended mitigation. Refer to **Appendix D: Noise Impact Assessment** for more details.

## 4.5 Cultural Environment

As part of this study, any notable and existing archaeological resources, built heritage features and cultural landscape features were assessed and reported in **Appendix E and F** of this ESR. The following sections highlight the key findings in the study area.

### 4.5.1 Archaeological Resources

In order that an inventory of archaeological resources could be compiled for the study corridor, three sources of information were consulted; 1) registered archaeological site records kept by the Ontario Ministry of Culture, 2) published and unpublished documentary sources, and 3) the files of Archaeological Services Inc. (ASI).

Under the Ontario Archaeological Sites Database (OASD) maintained by the Ontario Ministry of Culture, the study corridor is located in *Borden Block AbHr* and while no sites have been registered within the study corridor, one site has been registered within **one kilometre**. Site *AbHr-4* is located just south of the study corridor, approximately 250 metres east of Banwell Road under the centre hydro line paralleling the CPR line.

The site consists of two components: a scatter of historic Euro-Canadian artifacts and an isolated sidenotched chert projectile point of an undetermined affiliation. The site was registered in 1991 by Mr. Frank A. Dieterman. In general, the study area lies within an area designated by the Windsor Archaeological Master Plan as having high archaeological site potential.

A field review of the study corridor was carried out on September 18, 2006 in order to confirm the assessment of archaeological potential and to determine the degree to which development and landscape alteration may have affected that potential. The weather on that day was rainy and cool.

The study corridor focuses on lands along Banwell Road from Tecumseh Road East to the CPR Tracks. Banwell Road is a narrow two lane road, elevated on fill with narrow gravel shoulders, and deep roadside ditches. The typically disturbed rural right-of-way is quite narrow and almost entirely disturbed. The Intersection Road and EC Row Avenue (former South Service Road) right-of-ways are similar to that of Banwell Road.

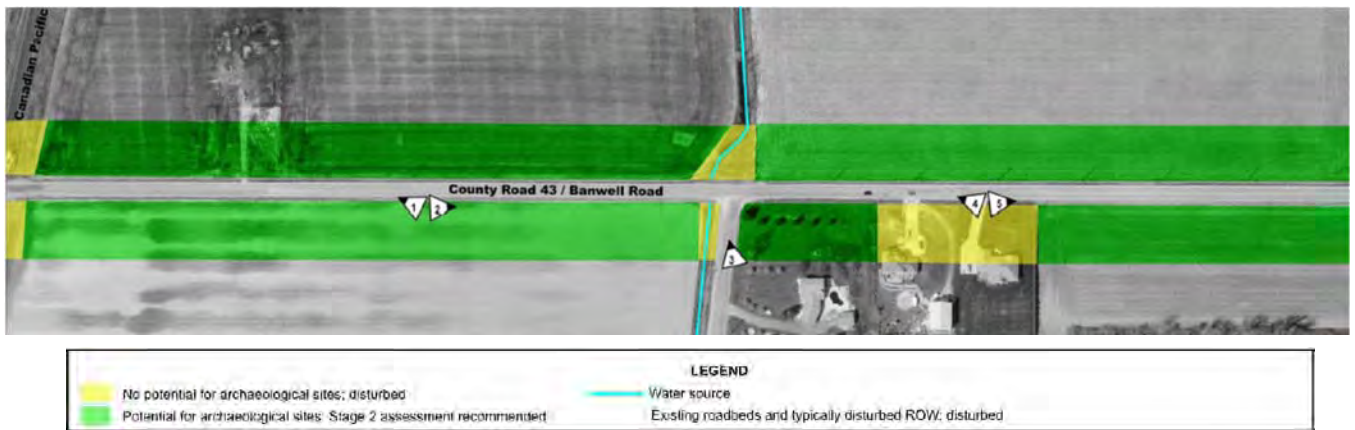
North of the EC Row Expressway, Banwell Road has been rerouted to the east of its former location. In the north portion of the study corridor Banwell Road has a wide disturbed right-of way with wide shoulders and large roadside ditches. The EC Row Expressway and Tecumseh Road right-of-way are similar.

In general, the study corridor is comprised of a mix of agricultural lands, residential properties and commercial properties. South of the EC Row Expressway, the lands adjacent to the road right-of-way are largely agricultural with scattered residential development. The residential properties include a possible historic structure as well as possible former farm sites. The agricultural lands are largely undisturbed with the exception of the various ditches dug to facilitate drainage through the level land. Some of these ditches are small channelized streams so all are regarded as approximations of the former stream courses. North of the EC Row Expressway, lands adjacent to the relocated Banwell Road are almost entirely disturbed. In general, there is a potential for archaeological sites along Banwell Road south of EC Row Expressway as illustrated in **Exhibit 4-2**.

Refer to Section 8.0 for the results and recommendations of the Stage 1 Archaeological Assessment and further details can be found in **Appendix E: Stage 1 Archaeological Assessment Report**. It recommends that a Stage 2 Archaeological Assessment should be conducted on any lands with archaeological potential that would be impacted by Banwell Road improvements as identified in green on the following excerpts.

**Exhibit 4-2 Lands with Archaeological Potential**

South Portion:



South - Central Portion:



North - Central Portion:



#### 4.5.2 Built Heritage and Cultural Landscape

For the purposes of the cultural heritage assessment of the proposed road improvements, all potentially affected cultural heritage resources within the study area were subject to inventory. A short form name was applied to each resource type, (i.e. barn, residence) and the locations were plotted on area maps. Building interiors were not subject to survey. Historical research was also conducted for the purposes of identifying broad agents or themes of historical change in the area while historic mapping was consulted to reveal cultural landscape development in the area.

Built heritage features and cultural landscapes were inventoried according to a consistent typology of units based upon Ministry of Culture guidelines and past experience. The following definitions of typical cultural landscape units were used:

Farm complexes: comprise two or more buildings, one of which must be a farmhouse or barn, and may include a tree-lined drive, tree windbreaks, fences, domestic gardens and small orchards.

- Roadscapes: generally two-lanes in width with absence of shoulders or narrow shoulders only, ditches, tree lines, bridges, culverts and other associated features.
- Waterscapes: waterway features that contribute to the overall character of the cultural heritage landscape, usually in relation to their influence on historic development and settlement patterns.
- RAILSAPES: active or inactive railway lines or railway rights of way and associated features.
- Historical Settlements: groupings of two or more structures with a commonly applied name.
- Historical Agricultural Landscapes: generally comprises a historically rooted settlement and farming pattern that reflects a recognizable arrangement of fields within a lot and may have associated agricultural outbuildings and structures.
- Historic research revealed that the study area has origins in eighteenth and nineteenth-century survey and settlement and it has remained largely rural in character until recently. There are no designated structures under Part IV of the Ontario Heritage Act within the study area.

A field survey was conducted in August 2006 and a discussion on the findings can be found in Section 8.0 and further details of the built heritage and cultural landscape assessment can be found in **Appendix F: Built Heritage and Cultural Landscape Assessment**.

## 5 Evaluation of Alternative Planning Solutions

### 5.1 Overview of Alternative Planning Solutions

A number of alternative solutions were investigated to address the identified transportation problems and needs along Banwell Road. The alternative solutions that were considered included:

1. *Do nothing;*
2. *Capacity and operational improvements to Banwell Road by widening to a 4/6-lane cross section with a Parclo A4 interchange at Banwell Road and EC Row Expressway; and,*
3. *Manage transportation demand by developing and promoting transportation demand management (TDM) strategies to reduce travel demand through initiatives such as carpooling, local transit initiatives, diverting traffic to parallel routes, spreading the peak travel times and eliminating urban growth.*

#### 5.1.1 Do Nothing Alternative

This alternative is defined as continued maintenance of the existing 2 lane roadway corridor within the project limits. It does not solve the identified capacity and safety deficiencies, and as such, was not considered as a reasonable solution.

*This alternative was not carried forward for further investigation.*

#### 5.1.2 Improvements to Banwell Road

##### 5.1.2.1 Localized Operational Improvements – Intersection Expansion, Traffic Signal Controls and Roundabouts

This alternative does not address the projected traffic deficiencies for 2034. By installing traffic control signals at the various intersections (i.e., Intersection Road) in conjunction with localized improvements will not adequately satisfy the existing capacity and safety deficiencies but may present a reasonable interim solution. However, opportunities are available to introduce new localized intersection improvements on Banwell Road. This includes reconstructing the Banwell Road intersection with Wildwood Drive / Mulberry Drive as a modern roundabout.

*This alternative was carried forward for further investigation as an interim solution.*

##### 5.1.2.2 Widen to a 4/6-Lane Cross Section

To address the forecasted traffic volume on Banwell Road to 2034 as previously described in Section 3.7, this alternative provided for the widening of Banwell Road from a rural 2 lane cross section to a basic 4 through lane urban roadway between the CPR tracks northerly to Intersection Road. It would then widen to 6 through lanes from north of CPR tracks to the south of EC Row Expressway, and then 4 through lanes north of EC ROW Expressway to Tecumseh Road East. These cross-sections respond in part to the forecasted traffic volumes on the road (see Section 3.7 and **Appendix B**), and the existing land use pattern and property boundaries along both sides of Banwell Road. This alternative would address immediate capacity and safety deficiencies, and provide

long-term flexibility along the Banwell Road corridor with overall improved safety, traffic operations and options for rapid transit or High Occupancy Vehicle (HOV) lanes.

*This alternative was carried forward for further investigation.*

#### **5.1.2.3 Construct a Parclo A4 Interchange at Banwell Road and EC Row Expressway**

This alternative would be a major localized improvement in the Banwell Road corridor and addresses the projected regional traffic growth, traffic capacity deficiencies, and traffic safety issues at Banwell Road and the EC Row Expressway. It would also consider off-ramp locations and feasibility.

*This alternative was carried forward for further investigation as an interim solution.*

### **5.1.3 Manage Transportation Demand**

#### **5.1.3.1 Spread the Peak Period**

Encourage road users to spread their travel demands outside the traditional peak hour periods to avoid designing the road facilities to meet the “peak” need. This alternative is realistic to consider as a future transportation demand management strategy and is consistent with both the Windsor Area Long Range Transportation Study and the Essex Windsor Regional Transportation Master Plan. However, this alternative when considered in combination with other alternatives does not provide a significant contribution towards satisfying the problem statement specifically along Banwell Road.

*This alternative was not carried forward for further consideration.*

#### **5.1.3.2 Shift Travel Elsewhere**

This alternative examines the effect of shifting travel from the Banwell Road corridor to other corridors where capacity is available or operational problems do not exist.

Within the Study Area, Banwell Road is a designated north/south arterial road under the jurisdiction of the City of Windsor. Unless improvements are implemented along this corridor in response to adjacent and surrounding planned growth, other north/south facilities will need to be further widened beyond the ultimate number of lanes planned for these facilities in to accommodate vehicular volumes diverted from the Banwell Road corridor. One alternative capacity enhancement would be on Lesperance Road parallel to and east of Banwell Road, but the Town of Tecumseh plans this road as a 2 lane “main street” type of function in the Tecumseh Hamlet Secondary Plan, so adding travel lanes is counter to that plan. Also, upgrading parallel facilities would not eliminate the need to widen Banwell Road to four through lanes since the majority of growth related traffic is associated with adjacent development.

*This alternative was not carried forward for further consideration.*

#### **5.1.3.3 Eliminate Growth**

The Banwell Road corridor abuts a major growth area in the City of Windsor and Town of Tecumseh. This alternative would limit growth in this area, which in turn would restrict traffic growth both within and external to the Banwell corridor. According to the Tecumseh Hamlet Secondary Plan (August 2007), the total population of the Town will reach 47,420 persons at full buildout in 2024. Most of the projected growth is expected within the existing settlement areas of the former Township of Sandwich South (i.e. Tecumseh Hamlet, Maidstone Hamlet). To anticipate this growth, the Town completed a



master water servicing plan for the area, and this alternative to eliminate growth is inconsistent with the City and Town's plans to encourage growth and development within its existing settlement areas.

*This alternative was not carried forward for further consideration.*

#### **5.1.3.4 Reduce Demand**

This alternative would develop and promote Transportation Demand Management (TDM) strategies to encourage reduced automobile use through carpooling, local transit initiatives, cycling, walking and other alternatives to private automobile use. Projected traffic volumes used in this study incorporated the Windsor Area Long Range Transportation Study and the Essex Windsor Regional Transportation Master Plan target modal split and vehicle occupancy values that include benefits from TDM strategies. It should also be recognized that the road improvements and the widened right of way will play a key role in enhancing the provision of future conventional or rapid transit service along Banwell Road, or the conversion of general travel lanes to High Occupancy Vehicle (HOV) lanes if desired by the City of Windsor. The widening also allows for the provision of a new multi-use trail within the Banwell corridor.

Overall, these TDM factors cannot reduce travel demands enough to eliminate the need to widen Banwell Road, with the magnitude of the proposed developments along the Banwell Road corridor along with existing high traffic. Therefore, this alternative was not carried forward, but the City and Town can incorporate TDM actions into the technically preferred solution.

An assessment summary of considered alternative solutions is provided in **Exhibit 5-1**.

**Exhibit 5-1 Assessment of Alternate Solutions**

PLANNING ALTERNATIVES	SELECTION CRITERIA	POTENTIAL TO ADDRESS PROBLEM AND/OR OPPORTUNITY STATEMENT ALONE OR IN COMBINATION WITH OTHER ALTERNATIVES	RECOMMENDATION
DO NOTHING	MAINTAIN THE STATUS QUO. NO IMPROVEMENTS ARE PLANNED OR MADE TO BANWELL ROAD.	Not Realistic Does not address the projected traffic growth and traffic capacity deficiencies along Banwell Road.	Not carried forward for further consideration.
IMPROVEMENTS TO BANWELL ROAD	OPERATIONAL IMPROVEMENTS	Realistic Alone can provide minor contributions to improving Banwell Road with introducing traffic signal controls, roundabouts and/or other intersection improvements.	Carried forward for further consideration.
	WIDEN TO A 4-6 LANE CROSS SECTION	Realistic Widening Banwell Road to a 4-6 lane cross section would provide a significant contribution to address the projected traffic growth, traffic capacity deficiencies, and traffic safety issues along the Banwell Road corridor.	Carried forward for further consideration.
	CONSTRUCT A FULL PARLCO A4 INTERCHANGE AT BANWELL ROAD AND EC ROW EXPRESSWAY	Realistic Constructing a full Parclo A4 interchange at Banwell Road and EC Row Expressway would be a major localized improvement and addresses the projected regional traffic growth, traffic capacity deficiencies, and traffic safety issues at Banwell Road and the EC Row Expressway.	Carried forward for further consideration.
MANAGE TRANSPORTATION DEMAND	SPREAD THE PEAK PERIOD	Not Realistic Spreading travel over longer periods of time to avoid designing facilities to meet the "peak" period needs is not practical because there is no opportunity or entitlement to adjust business operations in the area to make the peak period spread throughout a 24 hour work day.	Not carried forward for further consideration.
	SHIFT TRAVEL ELSEWHERE	Not Realistic To support an increase in density of development adjacent to the Banwell Road corridor, improvements to Banwell Road will be required. Shifting travel from Banwell Road to adjacent corridors is unrealistic since there will likely be little, if any, excess capacity available to accommodate this diverted traffic without creating additional operational and roadway deficiencies.	Not carried forward for further consideration.
	ELIMINATE GROWTH	Not Realistic Future growth and development in the area is essential to the continued health and vitality of the City of Windsor and Essex County. The elimination of growth is incompatible with the current area Official Plans.	Not carried forward for further consideration.
	REDUCE DEMAND BY ACCOMMODATING PUBLIC TRANSIT, PEDESTRIANS AND CYCLISTS	Realistic Reduce vehicle demand by encouraging the use of public transit, walking and cycling.	Carried forward for further consideration.



## 6 Alternative Designs and Evaluation

As outlined in Section 5.1.1, the Do Nothing Alternative cannot support the anticipated growth in traffic projected for the Banwell Road corridor, and was used only as the base case scenario for the evaluation of alternative planning solutions.

The three alternatives identified in Exhibit 5-1, “Operational Improvements”, “Widen Banwell Road to a 4/6-Lane Cross Section”, and “Manage Transportation Demand” were combined to develop design alternatives that would include all of the individual transportation elements.

Three design alternatives were evaluated in detail:

- Do Nothing (Base Case);
- Widen Banwell Road on the Centreline; and
- Widen Banwell Road on the Centreline (EC ROW to Tecumseh) and to the West (south of EC ROW to CPR Tracks) of Existing Road Right-of-Way.

Refer to **Exhibit 6-1** for complete details of the evaluation.

Overall, Alternatives 2 and 3 resulted in similar low impacts to the natural environment and result in the same impacts to properties and driveways accesses. However, Alternative 3 avoids crossing over into the Town of Tecumseh lands and avoids municipal jurisdiction issues. Therefore, Alternative 3 was selected by the Project Team as the “Technically Preferred Design”.

In addition to these design alternatives, this study also recommended that three other planning alternatives also be carried forward into the description of the technically preferred design in order to enhance the long-term transportation system benefits expected from the widening of Banwell Road:

- Operational improvements to traffic signal controls and intersection design which will include roundabouts;
- Reduce auto demand by accommodating public transit, cycling and walking; and
- Include a Parclo A4 interchange in the Banwell Road widening design.

Exhibit 6-1 Evaluation of Alternative Designs Concepts

FACTORS	CRITERIA	UNIT OF MEASURE	ALTERNATIVE 1 : DO NOTHING (BASE CASE)	ALTERNATIVE 2: WIDEN ON THE CENTRELINE	ALTERNATIVE 3: COMBINATION OF WIDENING ON THE CENTRELINE AND TO THE WEST	
TECHNICAL CONSIDERATIONS	i. Meets the requirements identified in the City's Official Plan, Transportation Master Plan, Windsor Area Long Range Transportation Study (WALTS), Essex Windsor Regional Transportation Master Plan	Support for long term road network plans, ability to accommodate long term traffic demands, transit priorities, multi-use path, bicycle lanes, and sidewalks provisions.	Rating	Does not support the long term network plans to accommodate the future traffic demands and does not provide opportunities for pedestrian and cyclist facilities.	Supports the long term network plans to accommodate the future traffic demands and provides opportunities for pedestrian and cyclist facilities.	Supports the long term network plans to accommodate the future traffic demands and provides opportunities for pedestrian and cyclist facilities.
	ii. Banwell Road Level of Service / Capacity	Improvements for all users in the corridor.	Rating	Traffic congestion will remain and/or continue to worsen in the future resulting in poor level of service and affecting traffic safety.	Standard lane width is provided and a desired level of service is maintained.	Standard lane width is provided and a desired level of service is maintained.
	iii. Horizontal and Vertical Alignment	Compliance with geometric standards.	Rating	No change.	Geometry is compliant with a posted speed of 80 km/hr.	Geometry is compliant with a posted speed of 60 km/hr.
	iv. Cross Section Elements	Lane widths. Accommodation for multi-use path, bicycle lane and sidewalks. Illumination requirements.	Rating	Lane widths remain between 3.4 - 3.7 metres. Existing cross section does not allow for a multi-use trail, bicycle lane or sidewalks. Provisions for illumination cannot be accommodated.	4 lanes at 3.65 metres with a 4.0 metre median. South of EC Row Expressway, Banwell Road right-of-way decreases from 30 metres to 12 metres therefore limited space is available to accommodate a multi-use trail, bicycle lane and sidewalks without infringing on the City of Windsor and Town of Tecumseh boundary. Limited space available on Banwell Road south of EC Row Expressway to accommodate additional illumination requirements.	4 lanes at 3.65 metres with a 4.0 metre median. Shifting Banwell Road south of EC Row Expressway to the west will accommodate a 4.0 metre multi-use trail and a 1.50 metre sidewalk. Entire cross section is contained within the City of Windsor boundary. Additional illumination requirements can be accommodated.
	v. Constructability	Ability to facilitate staging.	Rating	No impact.	Minimum disruption to traffic since 2 lanes can remain open during construction.	Minimum disruption to traffic since 2 lanes can remain open during construction.
	vi. Utilities	Potential adverse effects on utilities located within the right-of-way.	Effects	No impact.	Relocation of cable, gas line, Bell, and hydro is anticipated.	Relocation of cable, gas line, Bell, and hydro is anticipated.
PREFERRED ALTERNATIVE			●	●	●	
NATURAL ENVIRONMENT	i. Vegetation / Terrestrial Species and Habitats	Number, area and type of vegetation/terrestrial species and habitats displaced or disrupted.	No. / Area (Ha) / Description (tree, shrub, field, etc.)	No impact.	Low impact. Only disturbed cultural vegetation is present along the corridor.	Low impact. Only disturbed cultural vegetation is present along the corridor.
	ii. Aquatic Species and Habitats	Number, area and type of aquatic species and habitats displaced or disrupted.	No. / Area (Ha) / Description (tree, shrub, field, etc.)	No impact.	Low impact. All watercourses are intermittent drains and no flow is present during the summer months. Extra precaution should be exercised at Lachance Drain given its designation as "Protected" by the Department of Fisheries and Oceans (DFO). This alternative has the ability to treat stormwater drainage and improve water quality.	Low impact. All watercourses are intermittent drains and no flow is present during the summer months. Extra precaution should be exercised at Lachance Drain given its designation as "Protected" by the Department of Fisheries and Oceans (DFO). This alternative has the ability to treat stormwater drainage and improve water quality.
	iii. Wildlife Species and Habitats	Number, area and type of wildlife species and habitats displaced or disrupted.	No. / Area (Ha) / Description	No impact.	Low impact. Only common disturbance-tolerant species are present in the corridor.	Low impact. Only common disturbance-tolerant species are present in the corridor.
	iv. Drainage	Potential adverse effects on water quality. Potential adverse effects on water quality.	Effects	No impact.	Low impact. All watercourses are intermittent drains and no flow is present during the summer months. Extra precaution should be exercised at Lachance Drain given its designation as "Protected" by the Department of Fisheries and Oceans (DFO). This alternative has the ability to treat stormwater drainage and improve water quality.	Low impact. All watercourses are intermittent drains and no flow is present during the summer months. Extra precaution should be exercised at Lachance Drain given its designation as "Protected" by the Department of Fisheries and Oceans (DFO). This alternative has the ability to treat stormwater drainage and improve water quality.
PREFERRED ALTERNATIVE			●	●	●	
SOCIO-ECONOMIC ENVIRONMENT	i. Property	Number and area of residential/commercial/ industrial properties	No. / Area (Ha)	No impact.	8 properties / 2 Ha	8 properties / 2 Ha
	ii. Accessibility to Properties	Number of accesses or driveways off Banwell Road effected.	No. / Location / Effects	No impact.	11 accesses / driveways.	11 accesses / driveways.
	iii. Noise	Potential increase in existing noise levels due to the proposed improvements to Banwell Road.	Value (dBA) / Location	Changes in sound levels without improvements to Banwell Road will not exceed the MTO/MOE noise protocol.	Changes in sound levels with improvements to Banwell Road will increase approximately 3dB but does not exceed the MTO/MOE noise protocol and noise mitigation is not required.	Changes in sound levels with improvements to Banwell Road will increase approximately 3dB but does not exceed the MTO/MOE noise protocol and noise mitigation is not required.
	iv. Landscaping / Streetscaping Opportunities	Ability to support trees and vegetation.	Rating / Effects	Not applicable.	Space is available to provide landscaping features.	Space is available to provide landscaping features.
PREFERRED ALTERNATIVE			●	●	●	
CULTURAL ENVIRONMENT	i. Archaeological	Area of archaeological potential located within the City's right-of-way.	Area (Ha) / Location	No impact.	Despite there being archaeological potential along Banwell Road south of EC Row Expressway on the agricultural fields and historic structures and possible former homesteads are also visible, it is not anticipated that improvements to Banwell Road will impact these archaeological potential.	Despite there being archaeological potential along Banwell Road south of EC Row Expressway on the agricultural fields and historic structures and possible former homesteads are also visible, it is not anticipated that improvements to Banwell Road will impact these archaeological potential.
	ii. Built Heritage and Cultural Landscape Features	Potential adverse effects on known built heritage features. Area of cultural landscape features located within the City's right-of-way.	Area (Ha) / No. / Location / Effects	No impact.	No impact.	No impact.
PREFERRED ALTERNATIVE			●	●	●	
COST	i. Capital Costs	Construction Costs.	Rating	Not applicable.	Moderate - High	Moderate - High
PREFERRED ALTERNATIVE			●	●	●	
LEGEND :		<p>THE DO NOTHING ALTERNATIVE WAS USED AS THE BASE CASE SCENARIO AND DESPITE BEING PREFERRED FROM AN ENVIRONMENTAL AND COST PERSPECTIVE IT WILL NOT ADDRESS THE FUTURE TRAVEL DEMANDS ALONG THE BANWELL ROAD CORRIDOR. ALTERNATIVES 2 AND 3 RESULT IN SIMILAR LOW IMPACTS TO THE NATURAL ENVIRONMENT AND RESULT IN THE SAME IMPACTS TO PROPERTIES AND DRIVEWAY ACCESSES. HOWEVER, ALTERNATIVE 3 AVOIDS ADDITIONAL PROPERTY REQUIREMENT FROM TOWN OF TECUMSEH LANDS. THEREFORE, ALTERNATIVE 3 IS THE PREFERRED ALTERNATIVE.</p> <p><b>PREFERRED DESIGN:</b></p>				
●	Major Impact					
●	Medium Impact					
●	No/Low Impact					

## 7 Preferred Design

This section summarizes the key elements of the technically preferred design. Based on the problem statement and the analysis of alternative solutions reported in this ESR, it was concluded that deficiencies in available capacity to meet the expected demand along the Banwell Road Study Area are best resolved by:

- Widening Banwell Road to a 4 through lane cross section from the City boundary (CPR tracks) to Tecumseh Road East;
- Reserving the Right-of-way along the west side of the Banwell Road (north of CP Rail Tracks and south of proposed EC Row Expressway interchange) to provide an ultimate 6-lane cross-section. The inclusion of two additional travel lanes may provide potential rapid transit or High Occupancy Vehicle lanes;
- Constructing a Parclo A4 interchange at EC Row;
- Reserve land for potential future grade separation at the CP Rail crossing at the southern study area limit;
- Multi-use trail along the full project corridor;
- Sidewalk along the project corridor (excluding EC ROW interchange);
- Introduce modern two-lane roundabout on Banwell Road/Mulberry Drive/Wildwood Drive intersection; and,
- Signalize existing intersections of Palmetto Street, Intersection Road, and future connection at Maisonneuve Street.

The preferred design alternative is based on the following principles:

- The existing 30m Right-of-way between Tecumseh Road East and Mulberry Drive/Wildwood Drive is only sufficient to accommodate the future 4 lane with basic elements.
- A 37.3m Right-of-way is proposed to accommodate future 6 lane section of Banwell Road south of EC Row Expressway;
- Widening for the preferred alternative is kept to the west side of Banwell Road, for the section between the CPR tracks and EC Row Expressway with the eastern City Limit as a controlling factor;
- Banwell Road will be improved as a controlled access Class II Arterial with restricted access to adjacent private properties to protect capacity; and
- Proposed improvements such as a 1.5 m sidewalk and 4.0 m multi-use trail will encourage non-auto travel (walking, cycling and transit). Lane widths of 3.65 m in combination with a center median can better support traffic in a safe operating environment. The proposed sidewalk should be provided based on the standards & guidelines compliant with the most current Accessibility for Ontarians with Disabilities Act (AODA). The design of Multi-Use Trail should be based on new building guidelines and standard for public places including additional features such as rest areas, benches, additional signage etc. where required.

## 7.1 Design Criteria

The design criteria established for Banwell Road improvements is summarized in **Exhibit 7-1**.

**Exhibit 7-1 Design Criteria for Banwell Road**

Design Element	Criteria
Design Speed	80 km/h
Posted Speed	50 km/h from EC Row Expressway to Tecumseh Rd. 60 km/h from south City limits to EC Row Expressway
Number of Through Lanes	4 lanes from CP Rail Track to Tecumseh Road East 6 lanes on Banwell Road from Intersection Rd. to EC Row Expressway as an ultimate configuration
Through Lane Width	3.65 m
Auxiliary Lane Width	3.65 m
Maximum/Minimum Grades	5% max; 0.4% min
Maximum Grades Pathways and Trails	5% (1:20) on pathways and trails
Minimum Stopping Sight Distance	135 m
Sidewalk Width	1.5 m
Multi-Use Trail Width	4.0 m
Basic Right-of-Way	30 m north and 37.3m south of E.C. Row Expressway <sup>(1)</sup>

*Note: (1) Property will be acquired along the Banwell Road between the south City limits and Tecumseh Road East.*

## 7.2 Road Geometry

### 7.2.1 Horizontal and Vertical Alignment

On Banwell Road between the CPR tracks and EC Row Expressway, the road centreline will be shifted approximately 3.0m to 8m to the west to maintain eastern City limit at its current location. The horizontal alignment north of EC ROW Expressway is centered within the available 30m ROW.

Approximately 1.0 km north of CPR tracks the proposed roadway diverges from the existing Banwell Road alignment and curves easterly to accommodate a grade separated interchange at EC Row Expressway. The road north of this interchange area merges back into the existing Banwell Road approximately 1.8 km north of the CPR tracks.

To achieve the realignment of Banwell Road to the east, a curve of radius 400 m is used. For merging back into Banwell a flatter curve radius of 800 m is proposed. It is also recommended that beyond station 6+800 Banwell Road be designed as a straight facility between the Wildwood Dr. /Mulberry Dr. modern roundabout and Tecumseh Road East with minor alignment deflections along the tangent sections for tie-in into the existing alignment within accepted geometric design standards.

On EC Row Avenue a cul-de-sac is proposed to prevent direct access to Banwell Road because of its proximity to the EC Row Expressway/Banwell southwest ramp.

The proposed vertical alignment is designed with a minimum grade of 0.4% in with high points at strategic locations are proposed to facilitate drainage. However at the proposed grade separated structure a 'k' value of minimum 24 is used to achieve safe stopping sight distance. Efforts are made to use incoming and outgoing grades of 5% to get down to existing grade as quickly as possible so that the proposed ramps run at grade only. This grade is consistent with current design standards for the multi-use trail. Based on the topographic survey information grades should be worked out at the detailed design stage.

### 7.2.2 Intersections

Along the Banwell Road Study Area, partial development has taken place between EC Row Expressway and Tecumseh Road East.

**Along Banwell Road from Tecumseh Road to the City limit, access to and from Banwell Road will be restricted to the existing driveways, existing and proposed intersections in order to protect the operational capacity of the road.** Exact locations and configurations for these access features will be confirmed at the detailed design stage. The detailed design will also include a one foot (0.3 m) reserve public reserve strip along both edges of the Banwell Road right of way to control access to and from abutting property between E. C. Row Expressway and south City Limit.

To provide access to future developments, it is proposed to convert the existing 'T' intersection at Banwell Road and Palmetto Drive and at Banwell Road and Intersection Road to four legged intersections.

An urban two-lane roundabout with 55m Inscribed Circle Diameter (ICD) is proposed at the Mulberry Drive/Wildwood Drive intersection to address future traffic demand. The roundabout is planned to enhance the roadway and intersection capacity at this location. Depending on the timing of construction, operation of this roundabout may have to be programmed with a public education process outlining the advantages of a modern roundabout compared to a signalized intersection, and the proper method of traversing a modern roundabout for motorists, cyclists and pedestrians. Substantial literature is



available from other cities in Ontario and Canada that are actively using roundabouts as a successful form of intersection control.

The modern two-lane roundabout at the intersection of Banwell Road with Wildwood Drive/Mulberry Drive was selected over a standard signalized intersection for the following reasons:

- The proven ability of a modern roundabout to move large volumes of traffic through the intersection continuously, and the Transportation Study recommendation (see **Appendix B**) to use roundabouts at major Banwell Road intersections to accommodate the large increase in traffic volume forecast from area land development;
- The proven ability of a modern roundabout to avoid major collisions and fatalities caused by high speeds, red light running and head-on collisions. Those collisions that do occur at modern roundabouts tend to be at low speed and involve side impacts;
- The traffic volumes and associated left turn movement forecasts on Banwell Road and can be accommodated but at the cost of performance with a standard intersections;
- An existing commercial driveway is located on each side of Wildwood Drive mid-block between Banwell Road and the "T" intersection with Wildwood to the west. The south side commercial driveway on Wildwood may require the addition of a dedicated left turn lane to facilitate westbound turning movements from the commercial property. Special care should be taken to ensure that vehicles turning left at this driveway are not rear-ended. Because of the size of the roundabout, the distance between this driveway and Roundabout will be shorter than the existing situation, but is expected to function without adding a centre median barrier that would restrict driveway access to right-in/right-out; and

A signalized four legged intersection is proposed for the future W-N/S/E OFF Ramp with limited westbound movement. Existing stop controls at Palmetto Drive and Intersection Road intersections along Banwell Road to be upgraded to traffic signals.

It is also proposed to eliminate the existing 'T' Intersection at Banwell Road and EC Row Avenue, by constructing a cul-de-sac.

A new four legged signalized intersection is proposed approximately 460m South of W-N/S/E OFF Ramp to service proposed future development. Locations of these intersections are in line with Tecumseh Hamlet Plans. However, the proposed location of new intersection is needed to be confirmed at the detailed design stage.

### **7.2.3 Mid-Block Road Sections**

The proposed improvements along Banwell Road suggests the following:

- Urbanized roadway throughout the corridor
- Two 3.65m wide northbound and southbound through travel lanes
- Standard curb and gutter on both sides of the road
- 1.50m wide sidewalk on one side & 4.0m wide Multi-Use Trail on the other side
- 4.0 m raised or flush median
- Street lighting

**IBI GROUP REPORT**

BANWELL ROAD

ENVIRONMENTAL STUDY REPORT **Tecumseh Road East to CP Railway Tracks**

Prepared for City of Windsor

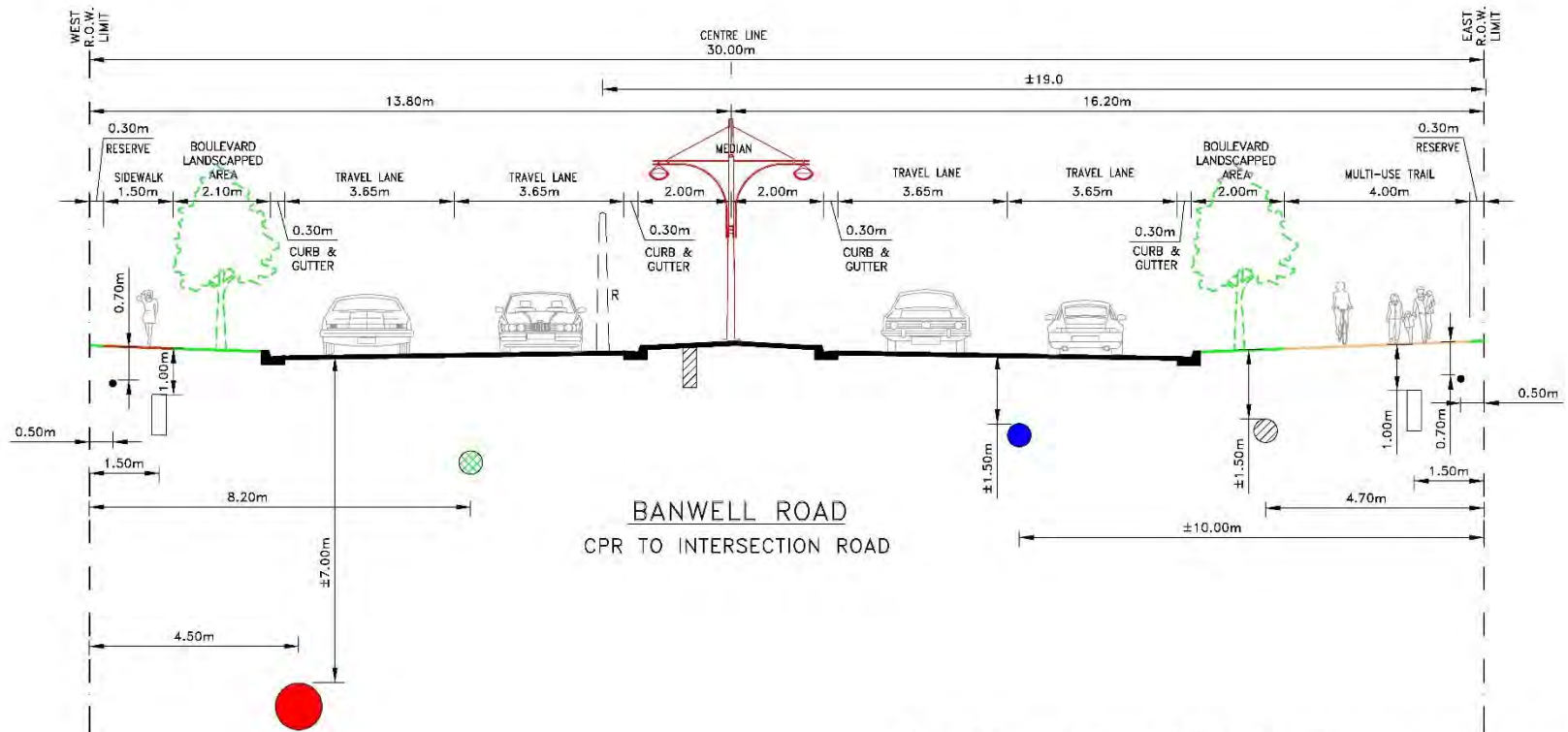
The above design improvements are illustrated in **Exhibits 7-5 to Exhibit 7-8** of basic Mid-Block cross-sections. A potential  $\pm 1.5\text{m}$  high retaining wall may be required adjacent to Palmetto Garden Development (between STA. 7+150 and 7+400) on the east side of Banwell Road. Details of the retaining wall such as type, elevation, height, etc. to be determined during detail design stage.



**Exhibit 7-2 Proposed Basic Mid-Block Cross Section Elements – CPR to Intersection Road (4 Lanes)**

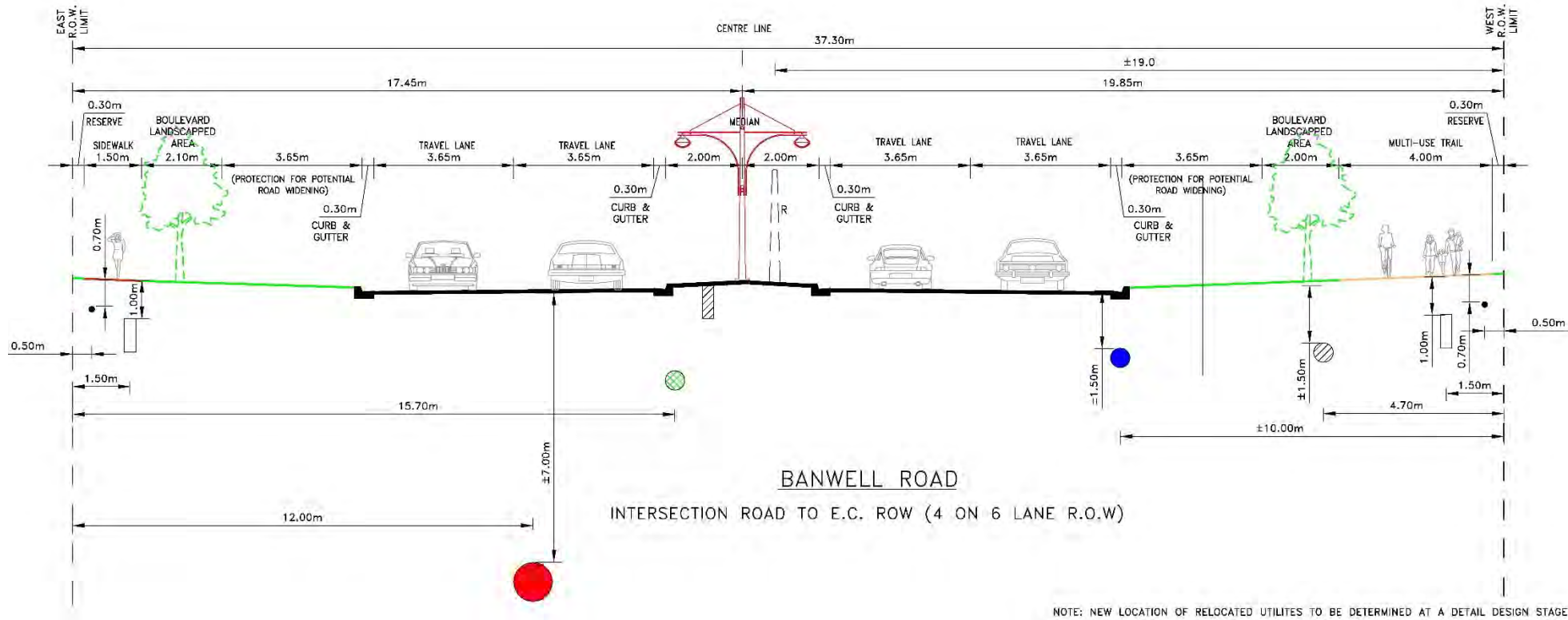
**LEGEND**

- GAS
- ▭ JOINT-USE UTILITY TRENCH
- ▨ STREET LIGHTING
- ⎓ EXISTING UTILITY POLE (RELOCATE)
- ⎓ PROPOSED STREETLIGHTS
- ⊗ PROPOSED STORM SEWERS
- PROPOSED SANITARY TRUNK SEWER (UNDER CONSTRUCTION NOV. 2010)
- ⊘ PROPOSED WATERMAIN (FEEDERMAIN)
- PROPOSED WATERMAIN

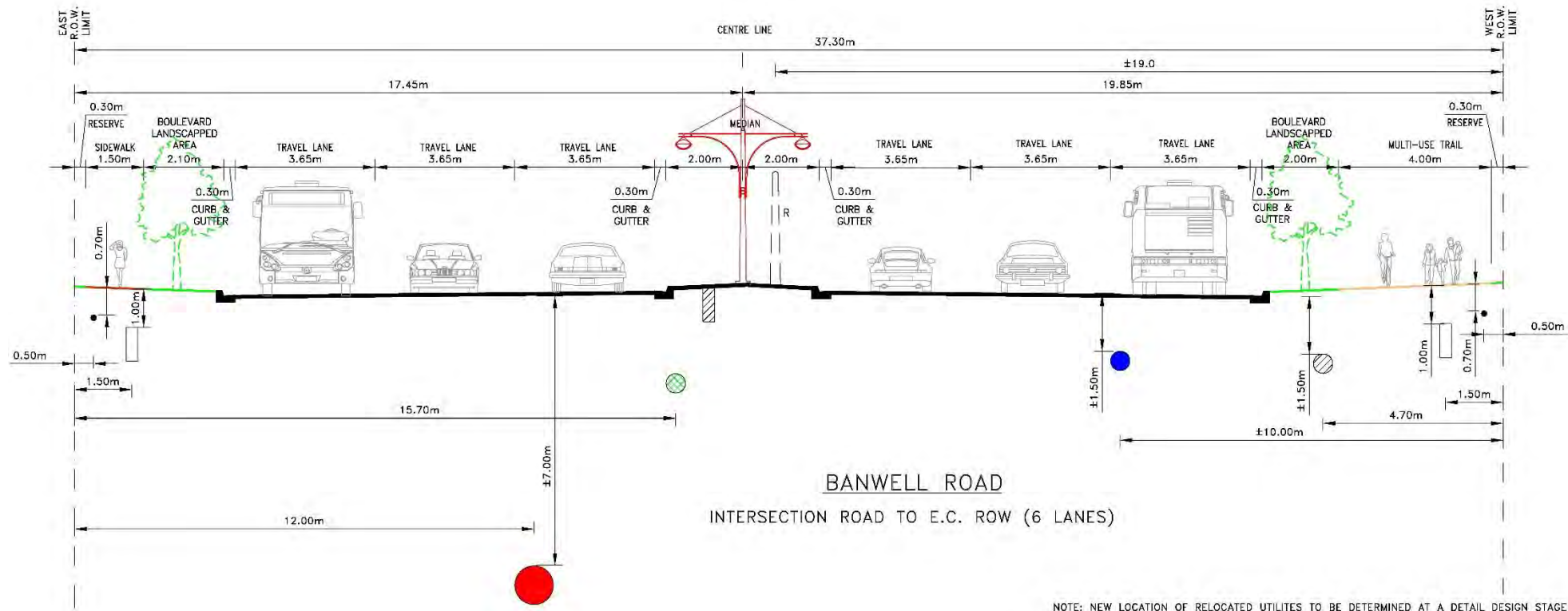


NOTE: NEW LOCATION OF RELOCATED UTILITIES TO BE DETERMINED AT A DETAIL DESIGN STAGE

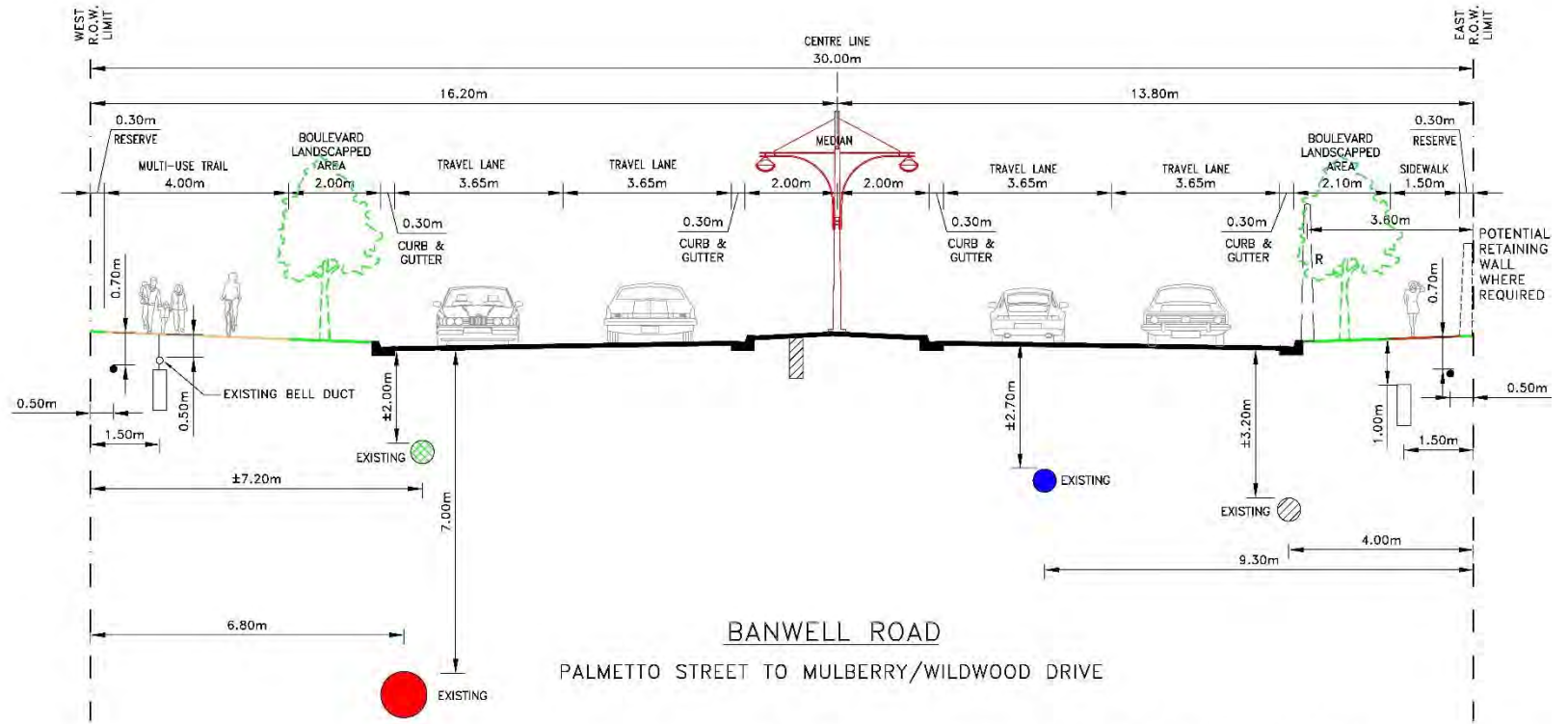
**Exhibit 7-3 Proposed Basic Mid-Block Cross Section Elements – Intersection Road to EC ROW (4 Lanes)**



**Exhibit 7-4 Proposed Basic Mid-Block Cross Section Elements – Intersection Road to EC ROW (6 Lanes)**



**Exhibit 7-5 Proposed Basic Mid-Block Cross Section Elements – Palmetto Street to Mulberry Drive/Wildwood Drive (4 Lanes)**



NOTE: NEW LOCATION OF RELOCATED UTILITES & DETAILS OF RETAINING WALL TO BE DETERMINED AT A DETAIL DESIGN STAGE

## 7.3 Banwell Road and EC Row Expressway Interchange

The proposed E.C. Row expressway and Banwell Road Overpass structure is a two span pre-cast concrete girder bridge. The foundation system is an integral abutment supported on H-piles and a fixed centre pier supported on spread footings.

The structural dimensions of the bridge are as follows:

- Span - 2 @ 35.0 m;
- Width – 33.10 m;
- Skew Angle - 32° 24' 26"; and
- Structural Depth – 2.3 m.

The proposed 35.0 m span lengths will accommodate the ultimate EC Row Expressway crossing. The proposed Banwell Road cross-section at the structure is as follows (West to East):

- Parapet wall – 0.35 m;
- Sidewalk/Multi-Use Trail – 4.0 m;
- Travel Lanes – 3 @ 3.65 m;
- Median – 5.0 m;
- Travel Lanes – 3 @ 3.65 m;
- Side Clearance – 1.5 m; and
- Parapet wall – 0.35 m.

The parapet and railing on the bridge should be a minimum of 1.37 m high, to be confirmed at the detailed design stage, to meet CHBDC requirements for combination bicycle barriers.

It is expected that the construction phasing/staging of Banwell/EC Row interchange will be finalized during detailed design subject to allowable city budget.

### 7.3.1 Civic Gateway

The EC Row Expressway is identified on Schedule G of the Official Plan as a Civic Way. The segment of the Expressway near the eastern municipal boundary is identified on Schedule G as a Gateway location. Official Plan Policies regarding Civic Ways and Gateways are outlined in Section 4.4.2 of this report.

The civic image function of the Gateway should be realized through a high level of design quality in all aspects of the Banwell/EC Row interchange. This includes designs for landscaping, lighting, gateway identification signage, and aesthetic treatment of the bridge structure, to emphasize the entrance to the city. The Banwell/EC Row interchange and its environs, rather than any single element, should serve to fulfill the gateway function. The level of design should convey an image of Windsor as a regional centre for Southwestern Ontario. Details of this design treatment to be addressed at the detailed design stage.

A potentially useful reference for best practices on civic gateways is the Interstate 75 / Paddock Road overpass in Cincinnati, Ohio. Other references include the Airport Parkway approach to Macdonald-Cartier airport in Ottawa and the Highway 416 and 417 interchange in Ottawa. The latter includes a minimalist treatment using two contrasting bands of concrete for the overpass parapet walls: one with textured relief and charcoal grey integral colour, the other with plain

concrete. It also includes a decorative horizontal steel rail using a colour finish to contrast with the parapet walls.

The detailed design stage should identify coordinating treatments for the bridge structure and a stand-alone gateway identification sign wall. The preferred location for the sign wall is at the municipal boundary, between the EC Row Expressway westbound lanes and the Banwell Road exit ramp. The location has three advantages:

- Signage will be visible to traffic exiting onto Banwell Road and traffic continuing westbound on EC Row;
- Ample separation distance (300 m) between the signage and the bridge structure will allow motorists to view each element sequentially, rather than having to divide their attention in favour of one element or the other; and
- Less likelihood of vandalism versus a location adjacent to the Banwell Road multi-use trail.

There is one possible disadvantage to the preferred location, depending on changes to site grading. Signage would be at the same elevation as the EC Row Expressway. If it were located at the top of the embankment adjacent to the overpass structure, the signage would be visible from a slightly greater distance.

The design of the sign wall should be highly integrated into the surrounding topography and appropriate to the scale and spatial qualities of a high-speed roadway. Examples of design strategies to help fulfill the above criteria are; 1) low ratio of height to length, 2) tapering of the horizontal profile, 3) curvature in plan (footprint), 4) overlap or intersection with vegetation, 5) and inclusion of an elongated coppice of trees both behind and flanking the sign wall.

## 7.4 Right-of-Way Requirements and Property Acquisition

A basic four-lane Right-of-way width of 30.0 m is proposed along Banwell Road from the CPR Tracks to Tecumseh Road East. The Right-of-way will be widened to 37.3 m in the section between CPR Track and the south edge of the EC Row interchange to accommodate an ultimate six-lane cross-section and flared at south City limit for potential rail grade separation.

A total of 3.22ha of property will be required for the recommended Banwell Road widening from the City limit to Tecumseh Road. A complete list of property requirement is listed in **Exhibit 7-6** and shown on the design sheets exhibits.

Additional right-of-way requirements should further be examined during the detailed design stage where necessary, to accommodate detailed road widening and design features.

It should be noted that the size and dimension values identified in Exhibit 7-9 are approximate and some rounding has been used. Final dimensions and areas are subject to detailed design.



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 Prepared for City of Windsor

**Exhibit 7-6 Property Requirements**

#	Station/Location along Banwell Road	Size	Dimensions	Roll #	Plate #
1.	5+000 to 5+030 East side	0.03 ha ±	35m x 8m ±		1-1
2.	5+000 to 5+030 West side	0.03 ha ±	31m x 11m ±	Pt 3739.090.040.04300	1-1
3.	5+030 to 5+795 West side City of Windsor Roll # 090-040-0430	1.32 ha ±	763m (width varies from 11m to 35m)	Pt 3739.090.040.04300	1-3
4.	5+030 to 5+430 East side City of Windsor	0.30 ha ±	393m x 7.5m ±		1-2
5.	5+443 to 5+520 East side 11602 Intersection Rd.,	0.01 ha ±	77m x 1.3m ±		2-2
6.	5+520 to 5+565 East side 2040 Banwell Rd.	0.01 ha ±	46m x 1.3m ±		2-2
7.	5+565 to 5+610 East side 2020 Banwell Rd.	0.01 ha ±	46m x 1.3m ±		2-2
8.	5+795 to 5+910 West side 3463 Banwell Rd.	0.27 ha ±	115m (width varies from 22.5 to 35m)	Pt 3739.090.040.04200	3-3
9.	5+610 to 6+020 East side City of Windsor	0.28 ha ±	410m (width varies from 0m to 7.5m)		2-3
10.	5+910 to 5+965 West side of Banwell Rd.	0.13 ha ±	60m x 22m ± frontage only	Pt 3739.090.040.04100	3-3
11.	5+965 to 6+020 West side 3455 Banwell Rd.	0.64 ha ±	53m x 121m ± full taking	Pt 3739.090.040.04000	3-3
12.	6+020 to 6+120 West side 3447 Banwell Rd.	0.11 ha ±	98m (width varies from 0m to 20.5m)	Pt 3739.090.040.03900	3-3
13.	6+160 West side Abutting EC Row Avenue	0.03 ha ±	28m x 10m ±	Pt 3739.070.890.00600	4-4
14.	6+970 to 9+985 West side 3335 Banwell Rd.	0.01 ha ±	L: varies from 4.5m to 12.1m H: varies from 4.5m to 12.8m	Pt 3739.070.890.05908	6-6
15.	6+940 to 6+970 East side 3315 Banwell Rd.	0.01 ha ±	L: 25.0m H: 10.0m	Pt 3739.070.890.06248	6-6
16.	7+350 to 7+370 West side 3215 Banwell Rd.	0.01 ha ±	L: varies from 11.7m to 16.7m H: 5.2m	Pt 3739.070.890.02403	7-7



17.	7+490 to 7+540 West side 3175 Banwell Rd.	0.01 ha±	47m (width varies from 0.0m to 1.4m)	Pt 3739.070.890.02405	7-7
18.	7+540 to 7+580 West side 3155 Banwell Rd.	0.01 ha±	41m (width varies from 1.4m to 1.8m)	Pt 3739.070.890.00520	7-7
<b>TOTAL</b>		<b>3.22 ha ±</b>			

## 7.5 Drainage

### 7.5.1 Roadway Drainage System

Banwell Road is proposed to be designed with an urban type cross-section. Pavement drainage therefore will be collected by catchbasins and conveyed by storm sewers to the existing Municipal Sewer and Municipal Drain systems.

It is expected that the quantity of runoff from the improved section of the roadway will result in increased runoff. However, quantity control, sizing and final location of the drainage infrastructure will be determined during detailed design.

North of the EC Row Expressway, the Parent Outlet Drain has been enclosed by a 1200mm diameter sewer between Tecumseh Road and Palmetto Street. The proposed widening of Banwell Road will require that this sewer be extended southerly to the EC Row Expressway. Pavement drainage along this segment of Banwell Road will also be collected by catchbasins, which will discharge directly to the sewer. The catchbasins will have a minimum 600mm deep sump and will be fitted with Goss Traps to collect sediment and debris from roadway runoff.

Integration of roadway drainage with drainage systems associated with future plans of subdivision should be reviewed during detailed design. The means to integrating the roadway drainage with the development’s stormwater management system south of the EC Row Expressway will be explored as part of the development planning and engineering. Water quality measures will be designed in accordance with the “Stormwater Management Planning and Design Manual” (2003) of the Ministry of the Environment. The following criterion provided by the Essex Region Conservation Authority must be considered as part of the detailed design:

*The Stormwater storage on roadways and other traveled surfaces should not exceed 0.15 metres above the 1:5 year storm level, or 0.3 metres above the 1:100 storm level, whichever is greater.*

### 7.5.2 Culverts

Modifications to existing culverts as a result of the Banwell Road improvements will include the following:

- Extension of Culvert at Lachance Drain, east and west sides;
- Realignment/construction of Culvert at Gouin Drain;
- New Culvert at unnamed drain along the south side of EC Row Expressway; and
- Future culvert on East Bound Access Ramp.

The Roadside Drain along the south side of EC Row Expressway is regulated under the jurisdiction of the Essex Region Conservation Authority. A permit from the Essex Region Conservation Authority will be required for this work. Based on Appendix C Existing Condition Report (GLL 70-312 - July, 2007), these drains do not contain fish habitat. However, adequate mitigation measures should be provided at each of these crossings during and after construction to protect downstream fisheries habitat.

## 7.6 Illumination

Street lighting is proposed within the road median area as shown on the exhibits for Mid-Block cross sections along the reconstructed Banwell Road, except for the bridge structure over EC Row Expressway. The street lighting at the structure is recommended to be installed at the edges. The lighting design should serve to advance the objectives outlined in Section 8.2.2.5 and Section 8.13.2.4 in the City's Official Plan.

An opportunity exists to incorporate pedestrian level lighting, adjacent to the multi-use trail on the interchange bridge. The purpose of such lighting is to enhance the aesthetics of the structure with respect to its strategic location as a Civic Gateway. Additional decorative lighting of the parapet walls, abutments and/or underside of the bridge deck will serve to differentiate the bridge from similar structures along EC Row Expressway and County Road 22 and to emphasize the point of entry into the City of Windsor.

The lighting design for the bridge should make use of LED luminaires as per City's standard. Pedestrian lights should be spaced at close intervals to enhance their decorative function. Consideration should be given to illuminating the east parapet wall of the bridge as seen from the westbound lanes of EC Row. Such lighting would be most effective in combination with textured relief in the precast concrete wall panels (see Section 7.3.1).

## 7.7 Utilities and Infrastructure

As a general guideline, the relocation and placement of utilities is to be consistent with current policies and standards of the City of Windsor. It is recommended that all utilities be contacted early in the detailed design phase to confirm locates and establish relocation strategies.

### 7.7.1 Bell Canada

There are underground Bell cables running along the west side of existing Banwell Road south of EC Row Expressway and the cables would be affected due to the proposed widening of Banwell Road to the west and thus would need relocation. The proposed works requiring the Bell line relocation will have to be determined at the detailed design stage following discussions with Bell.

From EC Row Expressway to Tecumseh Road East underground Bell cables run predominantly along the west side with some lines running on the east side. The actual plant locations and depths will need to be confirmed during detailed design to determine if relocation will be necessary.

### **7.7.2 Hydro One / Enwin Utilities**

The majority of the hydro poles along existing Banwell Road will likely be affected by the proposed construction due to the following:

From CPR Tracks to EC Row Expressway road widening towards the west side is approximately 10-11m. The existing Hydro One poles which run on the west side of the Banwell Road would be impacted.

From EC Row Expressway to Tecumseh Road East road widening towards east side is approximately 4-8m. The existing Enwin poles which run on the east side of the Banwell Road would be impacted.

The proposed works requiring the hydro poles to be relocated will have to be determined at the detailed design stage following discussions with Hydro One Networks Inc. and Edwin Utilities.

### **7.7.3 Union Gas**

The gas line on the west side of existing Banwell Road, south of EC Row Expressway would be impacted due to the widening of the Banwell Road to the west and thus would need relocation. The proposed works requiring the gas line relocation will be determined at the detailed design stage following discussions with Union Gas.

Also, plans of Union Gas for servicing future developments need to be determined at the detailed design stage after discussions with them.

### **7.7.4 Storm Sewer**

A new storm sewer system is proposed for the majority of the reconstructed roadway and will outlet at several locations, as previously discussed in Section 4.2.6 and 4.3.2.

### **7.7.5 Sanitary Sewer**

The 2100 mm sanitary sewer on the west side of Banwell Road north of EC Row Expressway will not be impacted by the proposed construction according to the available information but has to be confirmed at the detailed design stage.

It is not anticipated that the widening of Banwell Road will have an impact on the 2100 mm sanitary sewer on the east side of Banwell Road between EC Row Expressway and EC Row Avenue, and the 1650 mm sanitary sewer on the west side of Banwell Road between EC Row Avenue and the CPR line. This will need to be confirmed at the detailed design stage.

### **7.7.6 Watermain**

It is not anticipated that the widening of Banwell Road will have an impact on the 900 mm watermain on the east side of Banwell Road between Tecumseh Road East and Wildwood Drive/Mulberry Drive and the proposed feeder watermain between Wildwood Drive/Mulberry Drive and the CPR line. This will need to be confirmed at the detailed design stage. Information concerning hydrants is not available at this stage but needs to be investigated at the detailed design stage.

## 7.8 Road Design

It is recommended to widen and realign Banwell Road from CP Railway Tracks to Tecumseh Road East as follows:

- The improvement should be done in two major stages:

### **Stage 1: 4 Lanes & a Parclo A4 Interchange**

The first stage would be a basic urban 4 through lane section with associated turn lanes, centre median, sidewalk, boulevards and multi-use trail on Banwell Road from the CPR Tracks to Tecumseh Road. This includes acquiring/reserving land for ultimate road widening between CPR Tracks to E.C. Row Expressway interchange by providing a wider grassed boulevard that can be removed for an ultimate six lane cross-section in Stage 2.

The preliminary design plan and profile drawings showing the recommended improvements under Stage 1 are provided on the **Exhibit 7-10 Design Sheets 1 to 8, R-1, and INT-1**.

### **Stage 2: 6 Lane Widening**

The need for additional roadway capacity is forecasted on Banwell Road between CPR Tracks and the E.C. Row Expressway with respect to planned growth and development in the surrounding area, as reported in Section 3 of this document and Appendix B.

At the time when widening is required, the outer curbs will be removed and Banwell Road will be widened to six travel lanes between north of CPR Tracks and south of E.C. Row Expressway interchange.

The preliminary design plan and profile drawings for the ultimate 6-lanes are provided on the **Exhibit 7-8 Design Sheets U-1 to U-4**.

- The median width shall be utilized for left-turn lanes where warranted. The raised medians can be discontinued as necessary to provide storage for and allow the movement of left-turning vehicles into existing driveways;
- The recommended design along Banwell Road includes a 1.5 m sidewalk on the west side of Banwell Road from the CPR tracks to proposed W-N/S/E OFF Ramp. The sidewalk is merged with a 4.0m wide multi-use trail within the interchange. The sidewalk then continues from the proposed Wildwood Dr./Mulberry Dr. roundabout to Tecumseh Road East on the east side of Banwell Road;
- A 4.0 m multi-use trail is planned on the east side of Banwell Road from the CPR to proposed W-N/S/E OFF Ramp. It is shifted on the Westside from the W-N/S/E OFF Ramp to Tecumseh Road East;
- An urban two lane roundabout is recommended at Wildwood Drive/Mulberry Drive intersection to provide better traffic flow. The recommended layout is shown in **Exhibit 7-7 – Sheet R-1**;
- Access to the EC Row Expressway is proposed to be through a Parclo A4 interchange at Banwell Road as shown on **Exhibit 7-7 – Sheet INT-1**;
- A one foot (0.3 m) reserve is proposed for the Banwell Road corridor to control access to and from future abutting developments;

- Drainage improvements in the Detailed Design stage, including a new storm sewer system for realigned Banwell Road, will also be undertaken as part of the proposed undertaking.
- EC Row Avenue is proposed as a cul-de-sac because of its proximity to the Banwell Road/EC Row Expressway interchange ramps as shown on **Exhibit 7-7 – Sheet 4** and **Sheet INT-1**; and
- The interchange at EC Row Expressway is proposed as that location for inclusion of landscaping, gateway identification signage and lighting in the area between the municipal boundary and the westbound Expressway on ramp. Also proposed is the aesthetic treatment of the bridge overpass structure to emphasize the entrance to the city. E.C. Row Expressway between Banwell Road and the municipal boundary is identified as a “Gateway” in the City’s Official Plan.

## 7.9 CP Rail Crossing

The estimated daily traffic by 2034 on Banwell Road at the CPR crossing is expected to be 13,500 vehicles per day. At the same time, CPR management does not anticipate any increase in train usage over the 15 trains per day which currently use this crossing. This volume could ultimately be higher depending on the impacts of rail rationalization in the Windsor/Essex area as considered in the City’s Community Based Strategic Rail Study (April 2008). The 15 trains/day would produce a 2034 Exposure Index of over 200,000 (13,500 x 15).

Therefore, by 2034 it is expected that the Exposure Index at Banwell Road and the CPR rail line will warrant grade separation because the current index threshold of 200,000 will be exceeded. Given the fact that this crossing is currently controlled with flashers and automatic gates, the City of Windsor considers a rail grade separation as being a long term requirement within their portion of the Banwell Road corridor. As a result, this EA identifies lands to be protected for the Banwell Road right-of-way within the City for a future grade separation of the CPR tracks.

Immediately south of the rail line in the County of Essex, the CR 43 EA concludes that a grade separation is not warranted, but that this conclusion may be influenced in the future by:

- Delays to CR 43/Banwell Road traffic during times of train activity becomes significant; and/or
- Safety concerns are raised.

Should a grade separation of the CPR line be considered in the future, it is important that it be designed in association with the grade separation planned by the City of Windsor on the north side and County of Essex on the south side of the rail line/municipal boundary.

## 7.10 Preliminary Cost Estimate

A preliminary construction cost estimate is prepared for the reconstruction of Banwell Road and is presented in **Exhibit 7-9**.

Widening the entire length of Banwell Road from an existing 2 lane to 4 lanes starting from the City boundary (CP Railway Tracks) to Tecumseh Road East including a two roundabout at Wildwood Drive/Mulberry Drive is estimated to cost approximately \$18.8

Million. A Parclo A4 interchange at the EC Row Expressway is estimated to cost approximately \$28.1 Million.

To further widen the section of Banwell Road from CP Railway Tracks to the south of EC Row Expressway to six through lanes is estimated to cost additional \$2.7 Million (approximately). The total project cost is estimated of \$49.7 Million. The preliminary construction cost estimate prepared for the reconstruction of Banwell Road is based on 2015 costs and excludes property acquisition, and retaining wall costs.

#### **Interim Condition cost estimate**

No formal cost estimates were developed, however order-of-magnitude costs estimates for the two options are provided below:

- Interim Dillon (2015) proposed layouts – \$1.5M, all throwaway with 5 years of potential usage. (Overall F to D in short-term, projected LOS F by 2024)
- Six lanes EC Row and 4 lanes Banwell Road at-grade – \$6M, \$3M is throwaway with 10 years of potential usage. (Overall F to D-E in 2024)

The above figures are based on MTO unit rates for road widening excluding property acquisition and utility relocations, if necessary.

**IBI GROUP** REPORT

BANWELL ROAD

ENVIRONMENTAL STUDY REPORT **Tecumseh Road East to CP Railway Tracks**

Prepared for City of Windsor

**Exhibit 7-7      Technically Preferred Design Sheets - 4-Lane Configuration**



**IBI GROUP** REPORT

BANWELL ROAD

ENVIRONMENTAL STUDY REPORT **Tecumseh Road East to CP Railway Tracks**

Prepared for City of Windsor

**Exhibit 7-8      Technically Preferred Design Sheets - Ultimate 6-Lane  
Configuration**

IBI GROUP REPORT

BANWELL ROAD  
 ENVIRONMENTAL STUDY REPORT Tecumseh Road East to CP Railway Tracks  
 Prepared for City of Windsor

**Exhibit 7-9 Preliminary Construction Cost Estimate**

BANWELL ROAD - 4 LANE WIDENING								
Component	Item Description	Units	Unit Price	Quantity (South of EC ROW)	Quantity (North of EC ROW)	Quantity (Total)	Sub Total	Total
Utility Relocation	General	km	200,000	1.5	1.2	2.7	\$540,000	\$594,000
	Contingency (10%)		10%				\$54,000	
	<b>Sub Total</b>							
Road Widening 4 Lanes	Clearing & Grubbing	m2	5	24,750	20,250	45000	\$225,000	\$8,338,875
	Asphalt removal full depth	m2	5	10,450	8,550	19000	\$95,000	
	Excavation/Earthworks	m3	12	48,950	40,050	89000	\$1,068,000	
	Install storm sewer	l.m.	370	1,007	824	1830	\$677,100	
	Granular 'A'	tonne	20	6,435	5,265	11700	\$234,000	
	Granular 'B'	tonne	20	17,160	14,040	31200	\$624,000	
	Asphalt Base course	tonne	100	6,435	5,265	11700	\$1,170,000	
	Asphalt surface course	tonne	120	2,145	1,755	3900	\$468,000	
	Install curb and gutter	m	50	2,970	2,430	5400	\$270,000	
	Install subdrains	m	25	2,970	2,430	5400	\$135,000	
	Install catch-basin leads	m	200	770	830	1400	\$280,000	
	Install catch-basin	each	2,500	99	81	180	\$450,000	
	Install manhole	each	3,500	17	14	30	\$105,000	
	Concrete Median	m3	250	440	360	800	\$200,000	
	Concrete Retaining Wall (± 1.5m high)	l.m.	1,000		220	220	\$220,000	
	Sodding Topsoil	m2	10	6,050	4,950	11000	\$110,000	
	Pavement Marking	m2	5	3,300	2,700	6000	\$30,000	
	Signage, Traffic Management	lump sum	300,000			1	\$300,000	
	Site Office	lump sum	10,000			1	\$10,000	
	Contingency (25 %)		25%				\$1,687,775	
<b>Sub Total</b>								
Watermain & Fire Hydrants	300 mm dia.	l.m.	225	1,100	900	2000	\$450,000	\$711,000
	Hydrants	each	7,000	7	6	13	\$91,000	
	300 mm dia. Value & box sets	each	3,500	4	3	7	\$24,500	
	Test	l.m.	6	1,100	900	2000	\$12,000	
	Connect to existing main	each	7,500	1	1	2	\$15,000	
	Contingency/Eng. (20%)		20%				\$118,500	
<b>Sub Total</b>								
Streetlights	Median/both sides	km	250,000	1.5	1.2	2.7	\$675,000	\$742,500
	Contingency (10%)		10%				\$67,500	
	<b>Sub Total</b>							
Modern Roundabout	2-lane 55 m outside diameter	lump sum	2,000,000		1	1	\$2,000,000	\$2,200,000
	Contingency (10%)		10%				\$200,000	
	<b>Sub Total</b>							
Traffic Signals	Permanent 3 - way (EC ROW E-N/S Off Ramp)	each	100,000		1	1	\$100,000	\$770,000
	Permanent 4 - way (Palmetto Street)	each	150,000		1	1	\$150,000	
	Permanent 4 - way (EC ROW W-N/S/E Off Ramp)	each	150,000	1		1	\$150,000	
	Permanent 4 - way (Future Maisonneuve Street)	each	150,000	1		1	\$150,000	
	Permanent 4 - way (Intersection Road)	each	150,000	1		1	\$150,000	
	Contingency (10%)		10%				\$70,000	
<b>Sub Total</b>								
Landscaping/Sidewalks/Noise Walls	Sidewalk	m2	60	1,568	1,283	2850	\$171,000	\$2,362,800
	Multi-Use Trail	m2	75	5,808	4,752	10560	\$792,000	
	Trees and shrubs	m2	60	5,500	4,500	10000	\$600,000	
	Noise Walls	l.m.	1,000			585	\$585,000	
	Contingency (10%)		10%				\$214,800	
<b>Sub Total</b>								
<b>TOTAL</b>								<b>\$15,719,175</b>
	Design (5%)		5%				\$785,959	\$3,143,835
	Contract Administration (5%)		5%				\$785,959	
	Contingency (10%)		10%				\$1,571,918	
	<b>Sub Total</b>							
<b>TOTAL (BANWELL ROAD - 4 LANES WIDENING)</b>								<b>\$18,863,010</b>

**IBI GROUP REPORT**

BANWELL ROAD  
 ENVIRONMENTAL STUDY REPORT **Tecumseh Road East to CP Railway Tracks**  
 Prepared for City of Windsor

<b>BANWELL ROAD - 6 LANE WIDENING (South of EC ROW)</b>						
Component	Item Description	Units	Unit Price	Quantity (Total)	Sub Total	Total
Widen to 6 Through Lanes	North of CPR Tracks to South of EC Row	l.m.	3,000	700	\$2,100,000	\$2,310,000
	Contingency (10%)		10%		\$210,000	
	<b>Sub Total</b>					
	Design (5%)		5%		\$115,500	\$462,000
	Contract Administration (5%)		5%		\$115,500	
	Contingency (10%)		10%		\$231,000	
	<b>Sub Total</b>					
<b>TOTAL (BANWELL ROAD - 6 LANE WIDENING)</b>						<b>\$2,772,000</b>
<b>BANWELL ROAD / EC ROW - INTERCHANGE</b>						
Component	Item Description	Units	Unit Price	Quantity (Total)	Sub Total	Total
Parclo A4 Interchange	New structure	m2	5,000	2240	\$11,200,000	\$23,416,800
	WB Off Ramp	l.m.	4,000	500	\$2,000,000	
	EB Off Ramp	l.m.	4,000	380	\$1,520,000	
	NB to EB On Ramp	l.m.	1,600	330	\$528,000	
	SB to WB On Ramp	l.m.	1,600	400	\$640,000	
	Inner Ramps	l.m.	1,600	3000	\$4,800,000	
	Civic Gateway Features	lump sum	500,000	1	\$500,000	
	Decorative Enhancement	lump sum	100,000	1	\$100,000	
	Contingency (10%)		10%		\$2,128,800	
	<b>Sub Total</b>					
	Design (5%)		5%		\$1,170,840	\$4,683,360
	Contract Administration (5%)		5%		\$1,170,840	
	Contingency (10%)		10%		\$2,341,680	
	<b>Sub Total</b>					
<b>TOTAL (BANWELL ROAD / EC ROW - INTERCHANGE)</b>						<b>\$28,100,160</b>
<b>TOTAL PROJECT</b>						<b>\$49,735,170</b>

**Interim Condition cost estimate**

No formal cost estimates were developed, however order-of-magnitude costs estimates for the two options are provided below:

- Interim Dillon (2015) proposed layouts – \$1.5M, all throwaway with 5 years of potential usage. (Overall F to D in short-term, projected LOS F by 2024)
- Six lanes EC Row and 4 lanes Banwell Road at-grade – \$6M, \$3M is throwaway with 10 years of potential usage. (Overall F to D-E in 2024)

The above figures are based on MTO unit rates for road widening excluding property acquisition and utility relocations, if necessary.

## 8 Environmental Mitigation Measures

### 8.1 Natural Environment

#### 8.1.1 Terrestrial Habitat

In terms of terrestrial habitat, the main features are deciduous hedgerows planted between agricultural fields. All plant species recorded are considered common and widespread throughout southern Ontario and not expected to support any ecological functions beyond support of common, disturbance-tolerant species.

Disturbance to vegetation as a result of improvements to Banwell Road is considered negligible since majority of the vegetation located adjacent to the right-of-way has been previously disturbed by agricultural practices.

The following environmental protection measures designed to reduce vegetation removals should be considered on a site-specific basis during detail design:

- Reduce the area of the footprint to the extent possible through the use of urban cross-sections and other road design elements;
- Identify and protect any trees to be retained during construction using a temporary tree protection barrier. Trees to be protected will be confirmed at the detailed design stage;
- Trees identified for replacement at the detailed design stage should be replaced with minimum 75mm-80mm caliper trees;
- Plant new native vegetation to compensate for vegetation removals as a result of improvements to Banwell Road. The majority of vegetative species shall be native, however non-native species are also acceptable for areas such as streetscaping and other significant areas that are difficult for certain species to thrive; and
- Plant list of suggested replacement trees should comply with the City of Windsor Landscape Manual adopted by City Council.

#### 8.1.2 Fisheries and Aquatic Habitat

With regard to aquatic resources, several agricultural drains are present within the study area. DFO has classified all of these drains as Class F- Channelized. Class F drains are intermittent and contain no sensitive fish species. All drain areas likely dry for the most of the summer, except after significant rainfall events. These drains contribute seasonally to fish habitat during times of high flow (i.e. spring freshet) but are otherwise for drainage purposes only and do not provide direct fish habitat.

Lachance Drain has been classified by DFO as "Protected" due to its indirect connection to Lake St. Clair in which several Species-at-Risk (SAR) species are present. The probability of encountering a SAR species (particularly during the summer months) is minimal however particular care should be taken to ensure that the proper mitigation measures are being used while working near this drain. Various mitigation measures such as timing window for work in and around drains should be considered. Suggestions include:

- Digging should be do so as to avoid local fish spawning or nursing periods;
- Summer may be a good time to do maintenance work when drains are dry or have little flow; and

- Sediment traps, silt fences, straw bales, sandbags can all be used as alternatives, where necessary.

Refer to **Appendix C-** Existing Environmental Conditions Report for more details on mitigation.

### 8.1.3 Species at Risk

The Ministry of Natural Resources and Forestry (MNR) has identified that there are no known occurrences of Species at Risk (SAR) in the project area but there are known occurrences of the following in the general area:

- Butler's Gartersnake (END with species and general habitat protection)
- Willowleaf Aster (THR with species and general habitat protection)
- Kentucky Coffee-tree (THR with species and general habitat protection)
- Barn Swallow (THR with species and general habitat protection)
- Shumard Oak (SC)
- Climbing Prairie Rose (SC)
- Eastern Foxsnake

If the SAR species and/or habitat are found, all mitigation measures should adhere to Ministry's regulation and guidelines.

## 8.2 Socio-Economic Environment

### 8.2.1 Property Impacts

Approximately 3.36 ha of property will need to be acquired for the ultimate Banwell Road improvement plan as listed on **Exhibit 7-9 and illustrated in design sheets of Exhibits 7-10 and 7-11.**

### 8.2.2 Property Access

There will be minor impacts to three rural residential entrances/accesses by the proposed widening of Banwell Road south of EC Row Expressway. All existing property access from the Expressway to Tecumseh Road East will be maintained.

### 8.2.3 Noise

A noise impact assessment including noise calculations was conducted by RWDI Air Inc. (see **Appendix D**). Three single family homes were used as the representative noise sensitive receptors for the noise calculations to determine the projected noise impacts for a future "no build" compared to future "build" of the preferred Banwell Road improvements. The future "no build" considered the noise level contributions from the existing road configuration in the year 2006, while the future "build" considered noise level contribution from the proposed future road configuration for the year 2021. Refer to **Exhibit 8-1** for the noise sensitive area receptor locations.

**Exhibit 8-1 Representative Noise Sensitive (NSA) Area Locations**

Receptor Location	Description	Distance to Edge of Pavement <sup>[1]</sup> (m)	Approx. No. of NSAs Represented <sup>[2]</sup>
NR1	Home at 3169 Viola Crescent	24	37
NR2	Home at 11300 Timber Bay Crescent	21	30
NR3	Home at 3463 Banwell Road	8	6

Notes:

[1] Distance is with respect to the closest lane of the proposed Banwell Road to the receptor location.

[2] NSAs represented are houses in the area of the modelled receptor.

The point of reception for impact assessment is the Outdoor Living Area (OLA) of noise sensitive land uses. The OLA may be situated on any side of the receptor, but is generally taken to be the back yard. For assessment purposes, it is taken as a point 3 metres from the façade of the receptor, and 1.5 metres (composite average height of a standing/sitting person) above the ground surface.

Where the actual position of the OLA is unknown, the side closest to the proposed roadway has been assumed.

The locations of the points of reception used in the analysis are shown in **Exhibit 8-2**.



**Exhibit 8-2 Noise Sensitive Area Receptor Locations**



Future build traffic data (included directional volumes) was provided by Giffels as PM peak hour traffic volumes considered to reflect capacity at full development (2027 year) within the study area. Existing traffic data (2005 year) was provided by Giffels as PM peak hour traffic volumes as well. The PM peak hour traffic volumes are representative of approximately 10% of the AADT for the roadway. Commercial truck percentage of 3.5% on Banwell Road was documented in the report created by Paradigm Transportation Solution Limited report dated July 2007. Commercial truck percentage was assumed to be 40% on EC Row Expressway. Medium and heavy truck breakdown of 38%/62% and 25%/75% on Banwell Road and EC Row Expressway, respectively.



Road traffic noise levels were modelled using the “Ontario Road Noise Analysis Method for Environmental Transportation (ORNAMENT)” algorithms (MOE 1989) and the STAMSON v5.03 computer program produced by the MOE (MOE 1996). Results from the ORNAMENT calculations and STAMSON are equivalent. Sound levels were predicted using the spreadsheet for both the future “no-build” and future “build” cases. The ORNAMENT model was selected as road receiver geometries and intervening terrain within the project are relatively “simple”, and the potential for impacts (sound level increases greater than 5 dB) to result from the proposed undertaking is small.

The following factors were taken into account in the analysis:

- Horizontal and vertical road-receiver geometry;
- Road gradients;
- Intervening terrain types (ground absorption);
- Traffic volumes and percentage of trucks;
- Vehicle speeds; and
- Screening provided by terrain, and houses.
- 

Distances, roadway heights, gradients and receptor locations were obtained from plan drawings and aerial photographs. Currently there is one existing noise barrier on the west side of Banwell Road north of the Expressway along the rear property line of Timberbay Crescent residential lots.

Under the applicable MOE and MTO Protocols and Directives, the assessment of impact is conducted by comparing future “build” sound levels (with the project in place) with future “no-build” sound levels. Year 2005 traffic volumes have been conservatively used and in the “no-build” situation, traffic volumes would be expected to grow beyond existing levels. Therefore using 2005 traffic volumes exaggerates the potential change due to the project and so is extra conservative.

**Exhibit 8-3 Future Noise Levels With and Without Improvements - Unmitigated**

Receptor Location	No. of NSAs Represented	Future “Build” Leq (16h)	Future “No-Build” Leq (16h)	Change <sup>[1]</sup> (“Build” minus “No-Build”)
NR1	37	62	57	5
NR2	30	63	63	-1
NR3	6	70	64	6

Notes:  
 – All sound levels are in dB  
 [1] Discrepancies in values are due to rounding

In keeping with MTO/MOE requirements, impacts are also ranked by increasing future “build” sound level (Exhibit 8-4) and increasing change in sound level (Exhibit 8-5).

**Exhibit 8-4 Ranking Absolute Future “Build” Noise Levels – Unmitigated**

Future Build Sound Level	Receptors in Category	Total No. of Affected NSAs
45 to < 50 dBA	-	-
50 to < 55 dBA	-	-
55 to < 60 dBA	-	-
60 to < 65 dBA	NR1 and NR2	67
65 to < 70 dBA	-	-
70 dBA or greater	NR3	6

*Notes:* – All sound levels are in dBA

**Exhibit 8-5 Ranking of Change in Sound Levels – Unmitigated**

Future Build Sound Level	Receptors in Category	Total No. of Affected NSAs
Increase in Sound Level	> 15 dBA	-
	> 10 to 15 dBA	-
	> 5 to 10 dBA	NR1 and NR3
	0 to 5 dBA	-
Decrease in Sound Level	-5 to < 0 dBA	NR2
	-10 to < -5 dBA	-
	-15 to < -10 dBA	-
	> -15 dBA	-

*Notes:* – All sound levels are in dBA

The representative NSA’s NR1 and NR3 are shown to have changes greater than 5 dB in sound exposures, resulting from the proposed project. As a result, under the applicable MOE and MTO Protocols and Directives, investigation of noise mitigation is required in these areas.

The Noise Impact Assessment report prepared by RWDI and included as Appendix D to this ESR evaluated three types of potential noise mitigation for the NR1 and NR3 NSAs, namely changes to the vertical and horizontal alignment of Banwell Road, changes to the type of pavement surface and acoustical barriers (noise walls and berms).

This EA proposes to use noise walls as the noise mitigation measure. Noise barrier characteristics and effectiveness are evaluated in **Exhibit 8-6** below:

**Exhibit 8-6 Noise Barriers and Barrier Cost Effectiveness**

Barrier Name	Affected Modelled NSAs	No of Affected Residences <sup>[1]</sup>	Average reduction (dB)	Barrier Height (m)	Barrier Length (m)	Approximate Barrier Cost Per Receptor <sup>[2]</sup>	Economically Feasible? <sup>[3]</sup>
Bar1	NR1	37	9	3.0	450	\$18,300	Yes

*Notes:*

- [1] The number of affected residences in the first row of houses which will be protected by the noise barrier
- [2] Based on a barrier cost of \$500 per m<sup>2</sup> of face area, divided by the number of affected residences
- [3] “Yes” if barrier costs is less than \$75,000 per receptor; else, “No”

Noise barriers are expected to be administratively infeasible for NR3 as the homes within this NSA are constructed with driveways that are facing toward Banwell Road. The single barrier for NR1 is economically feasible based on a cost of \$75,000 per receptor. This barrier also meets the criteria for administrative and technical feasibility.

Noise levels with the proposed noise barriers in place are shown in **Exhibit 8-7**.

**Exhibit 8-7 Future Noise Levels With and Without the Undertaking – Mitigated**

Receptor Location	No. of NSAs Represented	Future Build Leq (16h)	Future No-Build Leq (16h)	Change <sup>[1]</sup> (Build – No-Build)
NR1	37	53	57	-3
NR2	30	63	63	-1
NR3	6	70	64	6

Notes:

- All sound levels are in dBA
- “Mitigated” includes the effects of the additional barrier outlined above and shown in Exhibit 1.
- [1] Discrepancies in values are due to rounding

The proposed location of a noise wall is shown on Exhibit 7-2 design sheets 6, 7 and RA-1 along the rear of 33 planned single family residential lots on Viola Crescent, 4 lots fronting onto Seville Avenue and 2 lots with flankage on Wildwood Drive/Mulberry Drive. Noise barrier heights, location, extents, and aesthetic features should be further reviewed during the detailed design to ensure that the barriers are adequate acoustically and meet the local aesthetic requirements.

**8.2.4 Construction Noise Impacts**

The following construction activities are anticipated as part of this project:

- Removing existing surface pavements;
- Construction and rehabilitation of the base course;
- Addition of new lane(s); and
- Paving (and repaving) of the roadway surface.

Construction activities will vary temporally and spatially as the project progresses. Noise levels from construction at a given receptor location will also vary over time as different activities take place, and as those activities change location within the right-of-way. To minimize the potential for construction noise impacts, it is recommended that provisions be written into the detail design and contract documentation for the contractor, as outlined below.

- Construction should be limited to the time periods allowed by the locally applicable bylaws (6 AM to 8 PM Monday to Sunday as per City of Windsor Noise Bylaw 6716). If construction activities are required outside of these hours, permits/exemptions must be sought from the City of Windsor and Town of Tecumseh in advance.
- There should be explicit indication that contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws is the responsibility of the City and Town for all work done by contractors.

- All equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order.
- The contract documents should contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to be in effect. In the presence of persistent noise complaints, all construction equipment should be verified to comply with MOE NPC-115 guidelines. In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative and economic feasibility of the various alternatives.

## 8.3 Cultural Environment

### 8.3.1 Archaeological Resources

The Stage 1 archaeological assessment revealed that while no archaeological sites have previously been registered within the study corridor, one site has been registered within a one kilometre of its limit. Additionally, a review of the general physiography and local nineteenth century land use suggested that it exhibits archaeological site potential.

The study corridor is comprised of mixed use lands, and there is potential for archaeological sites within 100 metres of the roads, excluding lands that have been disturbed by existing right-of-way or by residential or commercial development.

In view of these results, the following recommendations are made:

- A Stage 2 archaeological assessment should be conducted in selected areas within the study corridor (**Appendix E: Stage 1 Archaeological Assessment, Exhibit 3:** areas marked in green) in accordance with the Ministry of Culture's Stage 1-3 Archaeological Assessment Technical Guidelines (1993, 2006), in order to identify any archaeological remains that may be present;
- Should deeply buried archaeological remains be found during construction activities, the Heritage Operations Unit of the Ontario Ministry of Culture should be notified immediately; and
- In the event that human remains are encountered during construction, the proponent should immediately contact both the Ontario Ministry of Culture and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ontario Ministry of Government Services, (416) 326-8392.

### 8.3.2 Built Heritage and Cultural Landscape Features

According to the built heritage and cultural landscape features assessment, the study area has no heritage concern.

## 8.4 Summary of Identified Concerns and Mitigation Measures

The identified concerns associated with the project are summarized in **Exhibit 8-8**. Mitigation measures are summarized where they have been recommended to minimize or eliminate changes to the environmental conditions described in this report.

**Exhibit 8-8 Summary of Identified Concerns and Mitigation Measures**

Environmental Concern	Mitigation Measure
Terrestrial Habitat	<ul style="list-style-type: none"> <li>• Reduce the area of the footprint to the extent possible through the use of urban cross-sections and other road design elements.</li> <li>• Identify and protect trees to be retained during construction using a temporary tree protection barrier.</li> <li>• Plan new native and non-native vegetation to compensate for vegetation removals as a result of improvements to Banwell Road.</li> </ul>
Aquatic Habitat	<ul style="list-style-type: none"> <li>• Digging should be do so as to avoid local fish spawning or nursing periods.</li> <li>• Summer may be a good time to do maintenance work when drains are dry or have little flow.</li> <li>• Sediment traps, silt fences, straw bales, sandbags can all be used as alternatives, where necessary.</li> </ul>
Species at Risk (SAR)	<ul style="list-style-type: none"> <li>• It is recommended by the Ministry of Natural Resources and Forestry that netting type erosion control measures not be used for projects over drains and rivers. At these locations an alternative product such as Curlex Netfree® blanket or the use of riprap over geotextile fabric should be used for erosion control to prevent entanglement of Eastern Foxsnake.</li> <li>• If the SAR species and/or habitat are found within the project footprint, mitigation measures outlined by the Ministry should be followed.</li> </ul>
Future Road Noise	<ul style="list-style-type: none"> <li>• An acoustical barrier (noise wall) will be installed along the rear of planned single family residential lots along Viola Crescent and the lots flanking Wildwood Drive/Mulberry Drive at Seville Avenue and Arpino Avenue.</li> </ul>
Construction Noise	<ul style="list-style-type: none"> <li>• Construction should be limited to the time periods allowed by the locally applicable bylaws 0600h to 2000h for City of Windsor Monday to Sunday. If construction activities are required outside of these hours, permits/exemptions must be sought from the City in advance.</li> <li>• There should be explicit indication that Contractors will comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws is the responsibility of the City for all work done by Contractors.</li> <li>• All equipment should be properly maintained to limit noise emissions. All construction equipment should be operated with effective muffling devices that are in good working order.</li> <li>• In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative and economic feasibility of the various alternatives.</li> </ul>

Environmental Concern	Mitigation Measure
Archaeological	<ul style="list-style-type: none"> <li>• A Stage 2 archaeological assessment should be conducted in areas selected by the Ministry of Culture and Tourism within the study corridor (<i>Appendix E: Stage 1 Archaeological Assessment, Exhibit 3: areas marked in green</i>) in accordance with the Ministry's Stage 1-3 Archaeological Assessment Technical Guidelines (1993, 2006), in order to identify any archaeological remains that may be present;</li> <li>• Should deeply buried archaeological remains be found during construction activities, the Heritage Operations Unit of the Ontario Ministry of Culture and Tourism should be immediately notified.</li> <li>• In the event that human remains are encountered during construction, the proponent should immediately contact both the Ontario Ministry of Culture and Tourism, and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ontario Ministry of Government Services, (416) 326-8392.</li> </ul>

## 8.5 Commitments to Further Investigations

Commitments to further investigation during detail design stage are:

- Utilities coordination to determine types, location, and depths of the existing and any new facilities
- Coordination and designing Railway crossing at CN Railway tracks (southern limit of study area) with CN Railway, Transport Canada and related agencies
- Stormwater Management facility design and coordination with ERCA
- Illumination design / Streetscaping
- Retaining Wall design for the provision of noise wall on the east side of Banwell Road north of EC Row expressway

## 8.6 Monitoring

A monitoring program will be established to ensure that the mitigation measures specified in Exhibit 8-7 are undertaken. The key impacts to the environment are the short-term impacts that require monitoring during construction. The long-term impacts are expected to be taken into consideration during the detailed design of the project.

The construction of this project will be monitored on site by the City of Windsor to ensure that the Contractor is implementing standard construction practices. This will include erosion and sedimentation control, dust and noise control, protection of existing vegetation, assurance of traffic safety and maintenance of traffic flow without causing unnecessary delays, etc. The overall performance and effectiveness of the environmental mitigating measures specified will be monitored and assessed during and subsequent to the construction of the project.

As the environmental impacts outlined in this section are the normal impacts associated with the construction of roads, the established standard construction practices outlined as the mitigating measures will be incorporated in the contract documents. The Contract Administrator will ensure that these mitigating measures are undertaken during construction. Should unforeseen environmental concerns and/or issues arise during the construction period, the appropriate ministry and agencies will be contacted and appropriate measures will be taken to mitigate the environmental concerns/issues.