AECOM

County of Oxford

Transportation Master Plan Study

Prepared by:

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42-80398

Date:

May 19, 2009

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May 19, 2009 Project Number: 42-80398

Mr. Michael Campbell, M.Sc., P.Eng.
Operations Manager
Public Works
County of Oxford
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Dear Mr. Campbell:

Re: Oxford County Transportation Master Plan Study

It is with great pleasure that I deliver to you this final version of the County's Transportation Master Plan which will guide transportation development for the next 20 years. I trust that you will find it a useful document to reference as the transportation system in Oxford County matures.

On behalf of everyone involved with the development of this Transportation Master Plan, it has been a pleasure working with you and the other members of the Steering Committee throughout. Your vision and contributions to the plan's specific details have been most valuable and ensures that the plan truly reflects a made-in-Oxford County product.

Sincerely,
AECOM Canada Ltd.

John A. McGill, P.Eng., PTOE.
Business Line Leader, Transportation – Central Canada, Ontario West District

Encl.

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Distribution List

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description

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Executive Summary

The County of Oxford has experienced continued growth in the residential, commercial and industrial sectors and economic prosperity over the last decade. In recognition of this, in 2005, the County of Oxford initiated the undertaking of a comprehensive Transportation Master Plan (TMP). A fundamental reason for conducting the TMP Study was to identify the transportation needs of the community as it continues to grow and evolve. Present County Official Plan directions for growth with the focus of expansion in the existing urban areas served as the basis for this work.

The TMP summarized herein, has developed strategies and guidelines for managing the County's transportation network for the next 20 years. The TMP recognizes existing and future mobility and development issues confronting County residents in order to preserve the quality of life supported by an effective transportation network.

E1 Purpose

The Transportation Master Plan (TMP):

1. Provides a context for how best to utilize transportation resources;
2. Gives direction on ***what policies, services and infrastructure should be implemented*** to address community values, desires and mobility needs in an effective and responsible manner;
3. Recognizes that the County of Oxford is a ***vital economic centre within Southwestern Ontario***, with unique transportation challenges of significance to the entire area;
4. Reflects the ***rural and urban character*** of the County of Oxford, and its ***high quality of life***;
5. Recognizes the importance of the transportation network to the economic competitiveness of the County;
6. Examines how community values, emerging trends, environmental considerations, financial constraints and other societal trends have changed the public's focus on transportation; and
7. Provides a framework, from a transportation perspective, for the establishment of an ***economically sustainable and environmentally respectful growth management strategy***, which supports the growth objectives articulated in the County's Official Plan.

E2 Consultation

In undertaking this Master Planning exercise, it was important to hear from County residents and stakeholders on their concerns and issues. With this focus, a number of stakeholder contacts were made, including:

- Community Focus Groups were held May 19, 2005 and June 8, 2006;

- The first set of Public Information Centres were held in September 2005 and October 2005 in Woodstock, Ingersoll, Tillsonburg and Norwich;
- The stakeholder interview "scans" were completed in December 2005; and
- Public Information Centres (Springford and Innerkip) were held in June 2007 to review draft policies and recommendations of the plan.

A Municipal Advisory Committee was formed in order to receive input from each of the Area Municipalities. The committee met numerous times throughout the study.

A roadside travel survey was also conducted to obtain information on driver's trip origin, location and trip purpose. Sixteen sites distributed throughout the County of Oxford were surveyed.

E3 Master Plan Components

The various issues and concerns regarding transportation were studied and documented in seven Policy Papers:

- Road Rationalization - a review of the road system to determine whether it is appropriate to transfer ownership (up or down) with the area municipalities;
- Travel Demand Forecasting - to determine future road capacity expansion needs;
- Access Management - to determine policies that will provide for access to development adjacent to County roads while maintaining the arterial nature and safe operation of County roadways;
- Travel Demand Management - development of policies to help manage and possibly reduce demand on County roads;
- Cycling - a review of how cycling needs can be accommodated;
- Pedestrians - a review of how pedestrian facilities should be accommodated along County roads; and
- Goods Movement - outlining an approach for accommodating goods movement in the County.

The key conclusions and recommendations arising from these policy areas are summarized below.

E4.1 Road Rationalization

The following principles were followed as the basis of undertaking the road rationalization study as part of the Transportation Master Plan for the County of Oxford:

- Upper Tier (County) roads, which are primarily arterial transportation corridors, should provide relatively good connectivity and a good level of roadway service throughout the County;
- Upper Tier roads should be capable of being upgraded to a reasonable standard consistent with the service to be provided;
- Upper Tier roads should be along the shortest practical route, along existing roads and streets; and

- Upper Tier roads should not extend through the downtown areas of the urban municipalities where there is a relatively high level of pedestrian activity. This is to minimize the opportunity for pedestrian-vehicle conflicts and encourage a more pedestrian friendly environment.

The methodology utilized for the purpose of determining the role and function of the County road network is based in part on the methodology prepared by the Ontario Good Roads Association (OGRA) and the County of Oxford Service Sharing Committee.

Road jurisdiction transfer does not come without consideration of cost implications. The County does not wish to transfer roads that may be in a poor state of repair. This is not the goal of the rationalization process. Based on average annual maintenance expenses, a summary of expected annual costs per lane kilometre is included for those roads to be transferred up to and down from the County level.

The results of the rationalization and estimated costs of those transfers are illustrated in **Exhibit 1 and 2** provided in **Appendix B** and are based on the summary provided in **Appendix C.**

Negotiated Transfers between Oxford County and Local Municipalities

The final step in the road rationalization process was to review the various transfers with the respective lower-tier municipalities to discuss cost and maintenance issues prior to seeking Council approval. The negotiated final road rationalization and associated transfers to and from the County are listed below:

Table E.1 Final Road Rationalization Listing

Transfer From	Transfer To	Road Name	Description
Oxford County	Woodstock	Dundas St.	0.35 km W of Oxford Rd. 4 to Oxford Rd. 4
Oxford County	Woodstock	Oxford Rd. 48	Oxford Rd 59 to 0.3km south of Oxford Rd. 59
Oxford County	Woodstock	Oxford Rd. 52	Oxford Rd. 35 to Oxford Rd. 2 (Dundas St.)
Oxford County	Ingersoll	Oxford Rd. 9	Harris St. to Thames St.
Oxford County	Tillsonburg	Oxford Rd. 53	Rail Line to County Boundary
Oxford County	Norwich	Oxford Rd. 21	Oxford Rd. 59 to Brant County
Oxford County	Norwich	Oxford Rd. 40	Municipal Boundary to Oxford Rd. 59
Oxford County	South-West Oxford	Oxford Rd. 41	Oxford Rd. 12 to Oxford Rd. 40
Oxford County	South-West Oxford	Oxford Rd. 40	Municipal Boundary to Oxford Rd. 41
Oxford County	Blandford-Blenheim	Oxford Rd. 5	Oxford Rd. 8 to Oxford Rd. 4
Oxford County	Blandford-Blenheim	Oxford Rd. 42	Oxford Rd. 22 to Oxford Rd. 8
Oxford County	Blandford-Blenheim	Oxford Rd. 43	Oxford Rd. 8 to Municipal Boundary
Oxford County	Blandford-Blenheim	Oxford Rd. 44 (Boundary Rd.)	Oxford Rd. 43 to County Rd. 13 (K-W)
Oxford County	East-Zorra Tavistock	Oxford Rd. 5	County Rd. 4 (Innerkip) to Oxford Rd. 8
Oxford County	Zorra	Oxford Rd. 25	Oxford Rd. 119 o 15m east of 25^{tth} Line
Woodstock	Oxford County	Dundas St.	Oxford Rd. 9 to Oxford Rd. 12
Woodstock	Oxford County	Vansittart Ave.	Oxford Rd. 35 to Oxford Rd. 48 (Tecumseh)
Ingersoll	Oxford County	Bell St.	Thames to Ingersoll St.

Ingersoll	Oxford County	Harris St.	Canterbury St. to Charles St.
Blandford-Blenheim	Oxford County	Brant-Oxford Rd	Oxford Rd. 29 to Oxford Rd. 36
Blandford-Blenheim	Oxford County	Trussler Rd.	Oxford-Waterloo Rd. to Oxford Rd. 29

In summary, after negotiations, a total of six (6) roads are recommended to be transferred up to the County level of jurisdiction from the local municipalities and a total of fifteen (15) roads are recommended to be transferred down to the lower-tier municipalities from the County.

Future Master Plan Updates

During this road rationalization review, the intent was to produce a reasonable balance of downloaded and uploaded roads between the County and area municipalities. While this has been done, it has resulted in a number of roadways being retained in the County road system that are questionable in meeting some of the principal goals of the County road network.

These roadways included:

- Oxford Road 23, 25;
- Oxford Road 22, north of Bright and south of Oxford Road 2; and
- Oxford Road 37, east of Oxford Road 59.

In any future Transportation Master Plan updates, these roadways should be reviewed again in order to ensure they are appropriately retained under the jurisdiction of the County or transferred to the local municipality.

The next step in the road rationalization process was to review the various transfers with the respective lower-tier municipalities to discuss cost and maintenance issues prior to seeking Council approval.

E4.2 Future Road Expansion Needs

A travel demand forecasting model was developed in order to provide vehicular volume forecasts for the years 2021 and 2031. The vehicular volume forecasts were developed based on population and employment forecasts provided by the County. This information was used to identify deficiencies and evaluate capacity-related infrastructure solutions. Travel patterns were extrapolated from the roadside travel survey which captured the travel patterns of 1,500 motorists. The assessment of future road needs was made at critical screenline locations throughout the County of Oxford.

Based on the traffic forecasts, the only road link where volume exceeds capacity is southbound on Oxford Road 6, north of Highway 401 and east of Ingersoll.

The model also indicates two main issues regarding capacity deficiencies for the Woodstock area:

1. Additional east-west capacity is needed that *may* be addressed by the planned widening of Highway 401; and
2. Additional north-south capacity is required on links connecting Woodstock to Highway 401.

These capacity deficiencies all relate to connections between the urban areas of Ingersoll and Woodstock to Highway 401.

A study will be carried out to assess the need for a potential connection of Oxford Road 4 to Highways 401 and/or 403.

E4.3 Access Management Policies

Managing access onto County roads is an important part of controlling and enhancing roadway operations. Based on a Transportation Association of Canada (TAC) study, there is a direct relationship between the number of access points and the collision frequency on a roadway. Access management can help minimize conflict points and also contribute to the successful sharing of a road right-of-way (ROW) between autos, trucks, pedestrians, cyclists, and transit.

Based on TAC Guidelines, policies have been developed to assist County staff, municipal staff, residents, businesses and community groups in considering retrofit applications for redevelopment proposals; new development applications; new road additions; and infrastructure design guidelines in order to maintain an effective road network.

The policy guidelines address issues such as:

1. Driveway locations, including:

- Residential / Commercial / Industrial Access;
- Key Driveway/Access Design Elements;
- Corner Clearance/Daylight triangles;
- Shared Access;
- Maximum Number of Driveways;
- Spacing between Adjacent Driveways;
- Driveway Alignment and Dimensions;
- Angle of Intersection; and
- Driveway Grades.

2. Sight Distance Requirements, including:

- Stopping Sight Distance;
- Crossing Sight Distance;

- Turning Sight Distance; and
- Minimum Clearance from Obstructions.

3. Considerations and Methodology for Allowing On-Street Parking.

4. Warrants/Justifications for:

- Traffic Studies;
- Traffic Signals;
- Mid-block Traffic Signal Control (Pedestrian Crossing);
- All-Way Stops; and
- Roundabout Criteria.

E4.4 Cycling Policies

The TMP provides policy directions on cycling network development and ways to encourage and promote cycling in the County. It is recommended that the County recognizes the important role cycling plays as an alternative transportation mode and will provide for the development of a safe and efficient hierarchical cycling network on its roadways to serve sporting, recreational and utilitarian needs.

A skeletal network has been recommended as a first step in the development of a bicycle network. The skeletal network is based on the need to provide bicycle connections to the existing facilities and future expansion potential. This network might change as a result of considering cycling initiatives by the area municipalities. The main focus in the early years will be on responding to cycling initiatives by the area municipalities through the consideration of the extension of local routes onto the adjacent County road network.

It is recommended that the County:

- Consider extending any area municipal urban cycling routes onto adjacent County roads;
- Initiate a Bicycle Master Plan Study, in collaboration with the constituent municipalities, to guide the implementation of bicycle policies, programs and networks; and
- Implement the identified skeletal network to provide a basis for future expansion.

E4.5 Other Policies

Further policies and guidelines have been developed which cover the accommodation of pedestrians, encouragement of transportation demand management and accommodation of goods movement.

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1. Introduction

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The TMP recognizes existing and future mobility and development issues confronting County residents in order to preserve the quality of life supported by an effective transportation network.

A fundamental reason for conducting the TMP Study was to identify the transportation needs of the community as it continues to grow and evolve. Present County Official Plan directions for growth with the focus of expansion in the existing urban areas served as the basis for this work.

1.1 Purpose

The TMP:

1. Provides the County with a coordinated context for how best to utilize its transportation resources;
2. Gives direction on what policies, services and infrastructure should be implemented to address community values, desires and mobility needs, in an effective and responsible manner;
3. Recognizes that the County of Oxford is a vital economic centre within Southwestern Ontario, with unique transportation challenges of significance to the entire area;
4. Reflects the rural and urban character of the County of Oxford, and its high quality of life;
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6. Examines how community values, emerging trends, environmental considerations, financial constraints and other societal trends have changed the public's focus on transportation; and
7. Provides a framework, from a transportation perspective, for the establishment of an economically sustainable and environmentally respectful growth management strategy, which supports the growth objectives articulated in the County's Official Plan.

1.2 Consultation

Consultation with agencies, stakeholders and the public is an important component of the planning process for the development of the TMP. A consultation program consisting of Transportation Focus Group meetings with Stakeholders; an Advisory Group of Member Municipalities; and Public Information Centres at key intervals in the process were designed to provide input to the project team. Furthermore, newsletters, newspaper advertisements and information posted on the Oxford County website were used to provide information to the public regarding the TMP.

Advisory Groups

Advisory groups were formed with representation from all the lower tier municipalities who were responsible for technical input and feedback into the Oxford County TMP. Their primary interface was with the Project Team. Specific responsibilities included:

- Providing input and advice to the Project Team on their respective areas of expertise and interest;
- Consulting with other members of their Municipality to obtain consolidated comments and input; and
- Keeping their Municipality informed of progress and conclusions.

Advisory Group Meeting #1 – April 26, 2005 from 1:30 p.m. to 3:30 p.m. at the Woodingford Lodge Auditorium in Woodstock, ON.

Key local issues included:

- Operation Issues;
- Road Rationalization;
- Airport;
- Truck Routes;
- Arterial Roads; and
- Funding.

Advisory Group Meeting #2 – July 20, 2005 from 9:00 a.m. to 11:30 a.m. in the County of Oxford Public Works Boardroom on Market Square in Woodstock, ON.

The purpose of the meeting was to provide a status of the project including the Origin-Destination Survey, Travel Demand Forecasting Model, Consultation Plan and summary of Focus Group Issues.

Advisory Group Meeting #3 – May 8, 2006 from 1:30 p.m. to 3:30 p.m. in the County of Oxford Public Works Boardroom on Market Square in Woodstock, ON.

The purpose of the meeting was to provide a status of the project including the Origin-Destination Survey, Travel Demand Forecasting Model, Consultation Plan and summary of Focus Group Issues.

Advisory Group Meeting #4 – December 4, 2006 from 10:00 a.m. to 12:00 noon in the County of Oxford Public Works Boardroom on Market Square in Woodstock, ON.

Advisory Group Meeting #5 – May 17, 2007 from 10:00 a.m. to 12:00 noon in the County of Oxford Public Works Boardroom on Market Square in Woodstock, ON.

The purpose of the meeting was to review the latest materials that contributed to the TMP development.

Community Focus Groups

Focus Group #1

The first Community Focus Group was held on May 19, 2005 at the Quality Hotel & Suites on Bruin Boulevard, in Woodstock from 7:00 p.m. to 9:00 p.m. Advertisements were published in the Oxford Review, and the Tillsonburg Independent News. Letters of invitation were mailed directly to previously identified stakeholders.

Three representatives of Oxford County, two representatives of Totten Sims Hubicki Associates (now AECOM), and two representatives of Lura Consulting represented the Project Team attended the Focus Group.

Twenty-five people attended the meeting, including representatives from municipal councils, government departments, local businesses, community groups, and the general public. The meeting agenda included:

- Presentation: The Purpose and Scope of the Oxford County Transportation Plan;
- Public Consultation Process ;
- A Working Session on the following topics:
    - Vision and Objectives for the Oxford County Master Plan;
    - Transportation Issues, Options and Funding; and
    - Evaluation Criteria;
- Reports; and
- Next Steps.

The purpose of the first Focus Group was to assist the Project Team in scoping the issues and opportunities around future transportation programs in Oxford County.

Questions that were raised during the Meeting included:

- Can the study use Transportation Master Plans from other cities as examples?
- Why are some roads used more than others?
- Will an assessment of the integrity of the road counts be completed because they come from different sources?
- How did they analyze employment lands and what is the absorption for industrial lands?
- Will bike lanes be considered on county roads?

Focus Group #2

The second Community Focus Group was held on June 8, 2006 at the Quality Hotel & Suites on Bruin Boulevard, in Woodstock, ON, from 7:00 p.m. to 9:00 p.m. Advertisements were published in the Oxford Review, and the Tillsonburg Independent News. Letters of invitation were mailed directly to previously identified stakeholders.

Three representatives of Oxford County, two representatives of Totten Sims Hubicki Associates (now AECOM), and two representatives of Lura Consulting represented the Project Team at the Focus Group.

Eight people attended the meeting. The meeting agenda included:

- Study Purpose;
- Organization of the Study;
- Role of the Focus Group;
- Study Area Characteristics;
- Travel Demand Forecasting;
- Planning for Growth;
- Assessment Criteria for Alternative Solutions; and
- Next Steps.

Newsletter

The project team developed a Project Newsletter to distribute before the PICs held in September 2005 and October 2005. The Newsletter provided a project update, an explanation of the study process and an invitation to participate. The Newsletter can be found in **Appendix A.**

Public Information Centres

PIC#1

The first round of Public Information Centres (PICs) ran from 5:00 p.m. to 8:00 p.m. on:

- Wednesday September 28, 2005 at Goff Hall on Finkle Street, in Woodstock, ON;
- Thursday, September 29, 2005 at the Town Centre – Council Chambers, in Ingersoll, ON;
- Wednesday, October 5, 2005 at the Canadian Legion on Stover Street South in Norwich, ON; and
- Thursday, October 6, 2005 at the Tillsonburg Community Centre – Marwood DeCloet Room on Hardy Avenue in Tillsonburg, ON.

Advertisements were published in the Oxford Review, and the Tillsonburg Independent News. Letters of invitation were mailed directly to previously identified stakeholders.

The purpose of the first PICs was to introduce the first phase of the Transportation Master Plan (TMP) and seek public feedback on:

- The identification of transportation problems and issues;
- The preliminary study objectives;
- Prioritization of transportation issues;
- The rationalization of the County road network;
- Alternative modes of travel;
- Funding transportation infrastructure; and

- How the project team should evaluate alternative improvement options.

Approximately 42 individuals attended the PIC meeting in Woodstock. Four people went to the meeting in Norwich, two to the Ingersoll meeting and five to the meeting in Tillsonburg. The attendees included individual community members and representatives from non-governmental organizations. Each meeting participant was provided with a handout that included the following: community, stakeholder and municipal feedback received prior to the PIC; a copy of the PIC presentation; and a questionnaire to be completed after the PIC meeting.

Questions and Comments received during the PICs included:

- Will new industrial plants be considered in this study?
- Why doesn't the map include all county roads?
- What is the planning time frame for the study?
- The Kyoto Protocol should be considered in the planning phase.
- Will local roads be examined as part of the study?
- Will provincial highways be considered in the study?
- Should consider the issue of commuters using secondary roads.
- Roads should be widened to accommodate cyclists.
- Changing demographics should be considered in the study.
- By-pass truck routes should be considered in the study.
- Does the study support agricultural vehicles?
- Will inter-urban transit be addressed within the County?

A full summary of the PIC Questionnaire is found in **Appendix A**.

PIC#2

The second round of Public Information Centres (PICs) were held on:

- Tuesday June 5, 2007 at the Innerkip Community Hall on Oxford Road 5 in Innerkip, ON.; and
- Wednesday June 13, 2007 at the Springford Women's Institute Hall on Main Street West (Oxford Road 19) in Springford, ON.

Advertisements were published in the Oxford Review, and the Tillsonburg Independent News. At the Innerkip PIC, 4 people attended, and 3 attended the Springford PIC. Letters of invitation were mailed directly to previously identified stakeholders.

Stakeholder Scan

Representatives of interested groups and individuals from industry, the agriculture community, environmental and conservation groups, community associations and business associations were surveyed over December of 2005. The purpose of the survey was to determine their perceived transportation issues and interest in participating in the development and implementation of the Transportation Master Plan.

The stakeholders surveyed had a varied range of understanding of the transportation issues as they related to the County of Oxford and of the benefits long term planning can have on the community. While the majority of stakeholders have a good grasp of current and future transportation issues and shortcomings, many did not have solutions to those problems but looked forward to the development of the plan to bring forth possible solutions.

The results provide confirmation of the County's current approach, for example:

- Nearly everyone interviewed said they would commit time and energy to the development of the Plan;
- When talking about their main concerns, almost all mentioned access first, with alternative transportation issues coming second;
- All of those interviewed thought that money, and the lack of it, was the main barrier to progress;
- Half of those interviewed thought one of the main challenges was the lack of public engagement;
- Almost all respondents thought that public involvement and education on the issues was a key component of the Plan's development;
- Given the important role that the agriculture sector plays in the County's economy, farmers' hope that the Plan will educate governments and the general public about their connection to and dependency on a strong agricultural base; and
- All agreed that it will be difficult to attract the public to meetings, but they thought an active engagement approach would be successful.

Roadside Travel Survey

A roadside travel survey was also conducted to obtain information on driver's trip origin, destination and trip purpose. Sixteen sites distributed throughout the County of Oxford were surveyed.

Copies of the PIC Displays and the Stakeholder Scan Report are shown in **Appendix A**.

1.3 Master Plan Components

The various issues and concerns with respect to transportation in Oxford County were studied and documented in seven Policy Papers. These Policy Papers were reviewed with the Municipal Advisory Group and the public before being finalized and incorporated into this report as indicated below:

- **Road Rationalization** - a review of the road system to determine whether it is appropriate to transfer ownership to or from the area municipalities **(see Section 2);**
- **Travel Demand Forecasting** - to determine future road capacity expansion needs **(see Section 3);**
- **Access Management** - to determine policies that will provide for access to County roads while maintaining the arterial nature and safe operation of County roadways **(see Section 4);**
- **Travel Demand Management** - development of policies to help manage and possibly reduce demand on County roads **(see Section 5);**
- **Cycling** - a review of how cycling needs can be accommodated **(see Section 6);**

- **Pedestrians** - a review of how pedestrian facilities should be accommodated along County roads **(see Section 7);** and
- **Goods Movement** - outlining an approach for accommodating goods movement in the County **(see Section 8).**

2. ROAD RATIONALIZATION

Upper Tier Municipal Roads (typically County or Regional roads) are primary transportation corridors and are designed to provide continuous efficient movement of traffic as part of the overall road network. They are in place to support commercial and industrial business, economic development and growth. As well, they meet the transportation needs of existing communities. These roads function as arterials or major collectors and carry large volumes of traffic at relatively high traffic speeds where feasible. Upper Tier roads collect traffic from local roads and minor collectors and provide a traffic service connection for small towns, villages and rural farming areas.

The status quo for the delivery of roads programs has been developed over many years recognizing the different road maintenance needs of the rural and urban areas that make up the County of Oxford as well as the establishment of levels-of-service at the political level. Presently Oxford's eight municipalities as well as the County provide all road maintenance and capital construction services to their respective Council's approved level-of-service. In June of 1998, County of Oxford Council directed that a Service & Road Rationalization Study be undertaken with the objective of realizing greater efficiencies in the maintenance of roads. The County's Study Committee included invited representatives from area municipalities. This group reported to County Council in early 1999 with its initial findings, and has met on an ongoing basis to continue its work in this area.

2.1 The Concept of Road Rationalization

When first established, the Provincial "Kings Highway System" provided a major inter-centre connector. An Upper Tier, County or Regional, road system provides this same service on a reduced scale, connecting smaller centres of population and providing a "farm to market" road link. The local road acted as the final link in the system providing access to the abutting properties. These roles have changed very little over time. However, in many areas of the province significant changes in settlement patterns, population and employment have left some areas with designations of roads that are no longer appropriate. The Province of Ontario took the lead in the re-designation of their road system and began to shift responsibility for some roads to the local, County and regional levels with the majority of transfers occurring in the 1998/99 timeframe.

Road service providers are requested to demonstrate accountability for road maintenance services. The efficient and effective delivery of road services is a priority of municipal customers (the road user and taxpayer). One step in demonstrating accountability is in rationalizing road jurisdiction between Upper and Lower Tier municipalities. This rationalization will ensure that local roads serve primarily a local function and Upper Tier roads serve a through traffic function.

One of the benefits of rationalizing the role and function of roadways throughout the County is that a low priority roadway currently under the jurisdiction of the County, once transferred, may become a high priority for the local municipality and see significant improvements over time. Conversely a high volume local road carrying primarily through traffic may receive higher levels of service under the jurisdiction of the County.

The road rationalizing method utilized for the purposes of this analysis is based primarily on the method prepared by the Ontario Good Roads Association (OGRA). Consideration was also provided to the methodology prepared by the County of Oxford Service Sharing Committee. This approach in using the two methods provides a transparent and traceable means of quantifying the role and function of the current County Road system, as well as evaluating existing local municipal roads that have been recognized as potential County roadways. The outcome of the review is a determination of the appropriate jurisdiction of a road or road section assuming that it makes sense from a connectivity perspective.

2.1.1 Results of the Triple Majority Process of the 11 Services

In 2000 the County undertook a "Triple Majority Process" to evaluate and rationalize the services that it was providing at that time. The specific recommendations with respect to the delivery, service and maintenance of the road network that came forth through this process are as follows:

- That the County of Oxford retain a two-level road system (County and the local area municipalities) under the "County of Oxford Co-operative and Innovative Service" model; and
- That details of the "County of Oxford Co-operative and Innovative Service" model be provided to County Council and the local area municipalities.

2.2 Principles of Road Rationalization

The following principles were followed as the basis of undertaking the road rationalization study as part of the Oxford County TMP:

- Upper Tier (County) roads, which are primarily transportation corridors, should provide relatively good connectivity and a good level of roadway service throughout the County;
- Upper Tier (County) roads, which are primarily transportation corridors, should provide relatively good connectivity and a good level of roadway service throughout the County;
- Upper Tier roads should be capable of being upgraded to a reasonable standard consistent with the service to be provided;
- Upper Tier roads should be along the shortest practical route, along existing roads and streets; and
- Upper Tier roads should not extend through the downtown areas of the urban municipalities where there is a relatively high level of pedestrian activity. This is to minimize the opportunity for pedestrian-vehicle conflicts and encourage a more pedestrian friendly environment.

2.3 Methodology

The methodology utilized for the purpose of determining the role and function of the County road network is based in part on the methodology prepared by the OGRA and the County of Oxford Service Sharing

Committee. It has been reproduced as part of this report for reference purposes. The steps taken in rationalizing the County road network are as follows:

- Apply the OGRA/Service Sharing Committee criteria to all existing County roads and roads identified by the local municipalities as candidates for upper tier road classification;
- Weight the criteria as shown in Section 5 of this report. The weighting utilized by the County is consistent with the weighting utilized in the OGRA method with the exception of Criterion 2 (Kings Highway/Upper Tier Connector). This 'essential item' was adjusted from a point value of 2 to a new value of 3;
- Determine a "cut-off" weight for inclusion/exclusion of roadways or individual road sections in the County system. A roadway or road section with a score of greater than 6.5 points should either remain part of the County network or be transferred to the County. A road section with a score of 6.5 points or less should be transferred from the County to the local municipality, or remain a local municipal roadway;
- Identify existing municipal roads which continue to serve a municipal function despite the fact they received a point total in excess of 6.5;
- Reassess the County road system giving consideration to local municipal roads that are perceived to provide a higher order role and function in the overall County and local municipal road network;
- Determine the needs to be addressed (i.e. surface condition) prior to the transfer of roads to the local municipality or the acceptance of roads by the County;
- Determine cost impact on local municipalities as well as the County;
- Involve the local municipalities in the decision making process by encouraging feedback and comments;
- Transfer roads to the local municipalities which serve primarily a local function;
- Transfer roads to the County which primarily serve a through traffic function; and
- Consider road condition and compensation throughout the discussion of road transfers.

2.3.1 Cut-off Weight

After the criteria have been applied to each road being analyzed, it is possible to determine how much weight each road has accumulated. By utilizing the minimum weighting of greater than 6.5 points, a cut-off threshold is established for including a road in the County (upper tier) system. This becomes the yardstick to be used for recommending the re-designation of roads.

2.4 Application of the Criteria

Road Rationalization Criteria

Ten criteria were utilized to confirm the role and function of existing County roadways and a number of existing municipal roads that were identified by staff from the respective municipality as potential roadways that may be functioning more like a County roadway. A detailed matrix was developed to clearly show the application of the weighting to each of the roads under consideration as part of the road rationalization. The resulting matrix is shown in **Appendix B**. A description of each of the criteria and its application is provided below.

To apply the following criteria, maps from the County of Oxford Official Plan were utilized to aid with the criteria point assignment. **Table 2.1** identifies the criteria and the relevant map(s) used in assigning a weighting.

Table 2.1 Road Rationalization Criteria

Criteria	Maps
Urban Centre Connector	Settlement Strategy Plan
Kings Highway/Upper Tier Connector	Settlement Strategy Plan
Heavy Industry Service	Mineral & Petroleum Resources
	Aggregate Licences
Barrier Service	Environmental Features Plan
	Environmental Constraints Plan
	Transportation Network Plan

Municipal roads located within urban centres and considered for, or in the process of, receiving beautification, landscaping and streetscaping, were eliminated from transferability status. Additionally, roads with a high density of driveways per lane kilometre within urban centres were eliminated from transferability status.

Criterion 1 Urban Centre Connector

Connect Urban Centres to each other or an Urban Centre to a Kings Highway unless such a service is now provided by a Kings Highway. The connection of the roadway to urban centres does not have to only include direct connections to urban centres within the County. An urban centre connection can also be defined as a roadway that forms part of a through connection with higher order, more populated urban centres that are external to the County.

Criterion 1 (Urban Centre Connector) is considered the most important criteria, as upper tier roads should serve as inter-municipal corridors to connect the small urban centres within the County.

This criterion is intended to identify roads which provide service to and from centres having commercial and possibly industrial development. The County of Oxford Official Plan map entitled Settlement Strategy was utilized to complete this criterion assessment.

Urban centres are areas of concentrated development, not "ribbon" development.

The criterion is not intended to be applied to residential subdivisions which are developing in rural areas. When the residential development grows to a sufficient size, upper tier road service may be considered through the application of all of the criteria.

Weighting Applied = 3

Criterion 2 Kings Highway/Upper Tier Connector

Connect major commercial and industrial areas, universities, hospitals, international border crossings and provincial boundaries, etc. to a Kings Highway or Upper Tier road.

The road section can also provide service on those roads which are extensions of roads designated as County (upper tier) roads in neighbouring counties and thence to a County road or a Provincial Highway.

The intent of this criterion is to extend the Kings Highway or upper tier road to connect to the facilities mentioned and not to provide for lateral connections between highways/upper tier roads. Where a municipal road appears as a connector and parallels an existing County or provincial upper tier connector, these roads did not receive points.

Major institutional/commercial/industrial complexes are areas generating more than 1000 vehicle trips per day. The County of Oxford Official Plan map entitled Settlement Strategy was utilized to complete this criterion assessment.

Weighting Applied = 3

Criterion 3 Heavy Industry Service

Provide service within 4 kilometres of consistent major attractors or generators of heavy vehicles.

It is not intended that it be an upper tier responsibility to provide service to the entrance of every attractor or generator of heavy commercial vehicles in an area. Rather, it is intended that upper tier service be provided close to the industry and that the distribution within the area of the industry be a lower tier responsibility.

"Consistent major attractor or generator", in the case of gravel pits and quarries, is defined as approximately 9 months or more of operation per year.

Landfill sites serving the upper tier municipality may also be considered as attractors of heavy vehicles and may be serviced by upper tier roads. The County of Oxford Official Plan maps entitled Aggregate Licences and Mineral and Petroleum Resources were utilized to complete this criterion assessment.

Weighting Applied = 2

Criterion 4 Barrier Service

Provide service parallel to and across major barriers to free traffic movement such as freeways, railways, watercourses or congested areas. Service is provided "parallel to" only if there is no other upper tier or provincial road providing that service within a 4 kilometre distance and only along roadways which are used to reach barrier crossings.

The intent of this criterion is to alleviate traffic on local roads by providing service parallel to or across barriers to traffic movement where upper tier service is justified. The barrier must be an obstacle to traffic wishing to cross it and it must be feasible to cross (i.e. freeways by interchanges and rivers by bridges).

The County of Oxford Official Plan maps entitled Environmental Features, Environmental Constraints and the Transportation Network Plan were utilized to aid with the completion of this criterion assessment.

Weighting Applied = 1

Criterion 5 Resort Criterion

Provide service within 4 kilometres of a major resort and/or recreational areas. A major resort/recreational area is an area generating a minimum of 700 vehicle trips per day during normal season of operation.

The intent of this criterion is to provide upper tier service close to resort/recreational areas or to a lower tier road system that distributes the traffic.

Weighting Applied = 1

Criterion 6 Urban Arterial Extension

Provide service on those roads which are extensions of urban arterial streets, from the urban limits to the first intersection where the AADT is below 700 vehicles per day, then connect to an upper tier road or a Kings Highway by the shortest route.

The intent of this criterion is to provide for the extension of urban arterial streets into the rural areas to connect with an upper tier road or a Kings Highway. Traffic counts should be taken on both sides of the intersection with the upper tier, and the extension continued through the intersection only if both AADT's equal or exceed 700 vehicles per day.

Weighting Applied = 3

Criterion 7 Traffic Speed

Provide service on roads where the speed limit is generally 80 km/hr.

This criterion is intended to identify those roads which have a speed limit of 80 km/h over the majority of their length. This is deemed to be a desirable speed limit allowing roads which predominately serve as inter-municipal links in a road network to do so efficiently.

Weighting Applied = 1

Criterion 8 Road Surface

Provide service on roads with an asphalt or hard surface.

This criterion is intended to identify those roads with asphalt or hard surface and generally good vertical and horizontal geometrics. These roads were deemed to be more appropriate to serve as upper tier roads, as these conditions would be more able to accommodate greater traffic volumes, heavier vehicles and higher speeds as anticipated on upper tier roads.

Weighting Applied = 0.5

Criterion 9 Traffic Volume

Provide service on roads with current traffic volumes greater than 1500 vehicles per day. This criterion was intended to identify roads with current traffic volumes greater than 1500 vehicles per day.

Weighting Applied = 0.5

Criterion 10 Road Right of Way

Provide service on roads with at least a 20 metre (66 ft) wide right of way.

The intent of this criterion is to identify roads with a right of way width of 20 metres (66 ft). It is appropriate to be considered for an upper tier road designation that the road have at least a standard right of way.

Weighting Applied = 1

Each of the criteria noted above were applied to the existing upper tier road system and to local roads identified by each municipality as a provider of through traffic service.

Since the Municipal Act speaks to the issues of sidewalks and street lighting, these issues are not addressed in this report.

2.5 Evaluation

The following tables summarize County and Municipal roads within Oxford County that were identified as potential candidates for transfer to the County or transfer to the lower-tier municipalities based on the application of the above road rationalization criteria. The objective was to complete an impartial assessment of the current role and function of the municipal road infrastructure to determine which current municipal roads should be considered for transfer to the County level and vice versa. The results of the rationalization are illustrated in **Exhibit 1 and 2** provided in **Appendix B** and are based on the summary provided in **Appendix C.**

2.5.1 Transfers to the County

Table 2.2 lists the area municipal roads that were recommended to be transferred up to the County.

Table 2.2 Roads Recommended to be Transferred to the County

Road Name	From	To	Transferred From
Brant-Oxford Rd.	CR 29	CR 36	Blandford-Blenheim
Dundas St.	CR 9	CR 12	Woodstock
New Vienna Rd.	Simcoe St.	Hwy 3	Tillsonburg
Simcoe/Oxford St.	Broadway St.	Vienna Rd.	Tillsonburg
Trussler Rd.	Oxford-Waterloo Rd.	CR 29	Blandford-Blenheim

2.5.2 Transfers from the County

The County roads listed in **Table 2.3** were recommended to be transferred to the area municipal level. For various reasons these candidate roads did not meet the minimum weighting to retain them under their current County jurisdiction; not enough of the criteria, such as connectivity with urban centres and/or upper tier highways as well as service/access to heavy industries were satisfied.

Table 2.3 Roads Recommended to be Transferred from the County

County Roads			
Transfers to Municipality			Transferred To:
Road No.	From	To	
5	CR 4, Innerkip	CR 8	E.Zorra-Tavistock & Blandford-Blenheim
21	CR 59	County of Brant	Norwich
25	CR 119	15m east of 25th Line	Zorra
32	CR 37	County of Norfolk	Norwich
42	CR 22	CR 8	Blandford-Blenheim
48	CR 59	.3 km S of CR 59	Woodstock
52	CR 35	CR 2 (Dundas St)	Woodstock

2.5.3 Roads to Maintain at the Municipal Level

Table 2.4 lists roads that meet the points total to warrant being transferred to the County jurisdiction but were recommended to be maintained at the municipal level due to their locations within urban downtown areas. These particular roadways/road sections, while serving some County functions, also play an important role in providing access to businesses and amenities in the downtown areas of the three urban municipalities. Most of these "downtown" roadways have undergone beautification upgrades or have been identified as requiring beautification.

These roads provide access not only for the automobile but for pedestrians and cyclists as well. By maintaining these downtown roadways as an area municipal facility it allows for local initiatives (such as beautification) that contribute to de-emphasizing the through route function and making these roadways more pedestrian friendly.

Table 2.4 Roads Recommended to be Maintained at the Area Municipal Level

Municipal Roads				
Maintain at Municipal Level				
Road No. and Name	**From**	**To**	**Municipality**	**Points**
Bell St.	Ingersoll St.	Thames St.	Ingersoll	7
Canterbury St.	Thames St.	Harris St.	Ingersoll	7
Dundas St.	CR12	CR4	Woodstock	7
Thames St.	Bell St.	Canterbury St.	Ingersoll	7
Van Sittart Ave.	South Limits of Devonshire Ave.	Dundas St.	Woodstock	7

2.5.4 Future Master Plan Updates

During this road rationalization review, there was intent to produce a reasonable balance in downloaded and uploaded roads between the County and area municipalities. While this has been done, there are a number of roadways being retained in the County road system that are questionable in meeting some of the principal goals of the County road network.

These roadways included:

- Oxford Road 23, 25;
- Oxford Road 22, north of Bright and south of Oxford Road 2; and
- Oxford Road 37, east of Oxford Road 59.

In any future Transportation Master Plan updates, these marginal roadways should be reviewed again in order to ensure they are appropriately retained under the jurisdiction of the County or transferred to the local municipality.

2.6 Cost Implications

Road jurisdiction transfer does not come without consideration of cost implications. The County does not wish to transfer roads that may be in a poor state of repair. This is not the goal of the rationalization process. Based on average annual maintenance expenses, a summary of expected costs was developed for those roads to be transferred up to and down from the County level.

2.7 Summary of Road Rationalization

The influencing factors for the roads transferred up to the County were the more heavily weighted criteria such as Kings Highway/Upper Tier Connector, Heavy Industry Service and Urban Arterial Extensions.

Negotiated Transfers between Oxford County and Local Municipalities

The final step in the road rationalization process was to review the various transfers with the respective lower-tier municipalities to discuss cost and maintenance issues prior to seeking Council approval.

Table 2.5 presents the transfers that were not initially recommended but eventually added as negotiated with the lower-tier municipalities.

Table 2.5 Negotiated Changes to Roads Rationalization – Transfers Added

Transfer From	Transfer To	Road Name	Description	Negotiation Results
Oxford County	Woodstock	Dundas St.	0.35 km W of Oxford Rd. 4 to Oxford Rd. 4	Transfer added.
Woodstock	Oxford County	Dundas St.	Oxford Rd. 9 to Oxford Rd. 12	Transfer added.
Woodstock	Oxford County	Vansittart Ave.	Oxford Rd. 35 to Oxford Rd. 48 (Tecumseh)	Transfer added.
Oxford County	Ingersoll	Oxford Rd. 9	Harris St. to Thames St.	Transfer added.
Ingersoll	Oxford County	Bell St.	Thames to Ingersoll St.	Transfer added.
Ingersoll	Oxford County	Harris St.	Canterbury St. to Charles St.	Transfer added.
Oxford County	Tillsonburg	Oxford Rd. 53	Rail Line to County Boundary	Transfer added.
Oxford County	Norwich	Oxford Rd. 40	Municipal Boundary to Oxford Rd. 59	Transfer added.
Oxford County	South-West Oxford	Oxford Rd. 41	Oxford Rd. 12 to Oxford Rd. 40	Transfer added.
Oxford County	South-West Oxford	Oxford Rd. 40	Municipal Boundary to Oxford Rd. 41	Transfer added.
Oxford County	Blandford-Blenheim	Oxford Rd. 43	Oxford Rd. 8 to Municipal Boundary	Transfer added.
Oxford County	Blandford-Blenheim	Oxford Rd. 44 (Boundary Rd.)	Oxford Rd. 43 to County Rd. 13 (K-W)	Transfer added.

Table 2.6 presents the transfers that were recommended but eventually not supported as negotiated with the lower-tier municipalities.

Table 2.6 Negotiated Changes to Roads Rationalization – Transfers Not Supported

Transfer From	Transfer To	Road Name	Description	Negotiation Results
Tillsonburg	Oxford County	New Vienna Rd.	Simcoe St. to Highway 3	Transfer not supported.
Tillsonburg	Oxford County	Simcoe/Oxford St.	Broadway St. to Vienna Rd.	Transfer not supported.
Oxford County	Norwich	Oxford Rd. 32	Oxford Rd. 37 to Norfolk County	Transfer not supported.

The results of the rationalization and estimated costs of those transfers are illustrated in **Exhibit 1 and 2** provided in **Appendix B** and are based on the summary provided in **Appendix C.**

The negotiated final road rationalization and associated transfers to and from the County are listed below in **Table 2.7**:

Table 2.7 Final Road Rationalization Listing

Transfer From	Transfer To	Road Name	Description
Oxford County	Woodstock	Dundas St.	0.35 km W of Oxford Rd. 4 to Oxford Rd. 4
Oxford County	Woodstock	Oxford Rd. 48	Oxford Rd 59 to 0.3km south of Oxford Rd. 59
Oxford County	Woodstock	Oxford Rd. 52	Oxford Rd. 35 to Oxford Rd. 2 (Dundas St.)
Oxford County	Ingersoll	Oxford Rd. 9	Harris St. to Thames St.
Oxford County	Tillsonburg	Oxford Rd. 53	Rail Line to County Boundary
Oxford County	Norwich	Oxford Rd. 21	Oxford Rd. 59 to Brant County
Oxford County	Norwich	Oxford Rd. 40	Municipal Boundary to Oxford Rd. 59
Oxford County	South-West Oxford	Oxford Rd. 41	Oxford Rd. 12 to Oxford Rd. 40
Oxford County	South-West Oxford	Oxford Rd. 40	Municipal Boundary to Oxford Rd. 41
Oxford County	Blandford-Blenheim	Oxford Rd. 5	Oxford Rd. 8 to Oxford Rd. 4
Oxford County	Blandford-Blenheim	Oxford Rd. 42	Oxford Rd. 22 to Oxford Rd. 8
Oxford County	Blandford-Blenheim	Oxford Rd. 43	Oxford Rd. 8 to Municipal Boundary
Oxford County	Blandford-Blenheim	Oxford Rd. 44 (Boundary Rd.)	Oxford Rd. 43 to County Rd. 13 (K-W)
Oxford County	East-Zorra Tavistock	Oxford Rd. 5	County Rd. 4 (Innerkip) to Oxford Rd. 8
Oxford County	Zorra	Oxford Rd. 25	Oxford Rd. 119 o 15m east of 25^{tth} Line
Woodstock	Oxford County	Dundas St.	Oxford Rd. 9 to Oxford Rd. 12
Woodstock	Oxford County	Vansittart Ave.	Oxford Rd. 35 to Oxford Rd. 48 (Tecumseh)
Ingersoll	Oxford County	Bell St.	Thames to Ingersoll St.
Ingersoll	Oxford County	Harris St.	Canterbury St. to Charles St.
Blandford-Blenheim	Oxford County	Brant-Oxford Rd	Oxford Rd. 29 to Oxford Rd. 36
Blandford-Blenheim	Oxford County	Trussler Rd.	Oxford-Waterloo Rd. to Oxford Rd. 29

In summary, after negotiations, a total of six (6) roads are recommended to be transferred up to the County level of jurisdiction from the local municipalities and a total of fifteen (15) roads are recommended to be transferred down to the lower-tier municipalities from the County.

3. Future Travel Demand

The main objective of the demand forecasting component of the Master Plan was to determine the expected travel demand associated with the forecasted land use and to evaluate physical and operational improvements and policy initiatives that will satisfy the transportation needs identified. A strategic assessment of the County's existing and future transportation networks was performed by assessing the demand versus the provided capacity.

The demand forecasting model was used to provide information which could be used to directly identify deficiencies and evaluate capacity-related infrastructure solutions. Population and employment forecasts, land use, traffic count data, and transportation network files were provided by the County of Oxford. Travel patterns were extrapolated from a survey of over 1,500 motorists. Travel demand forecasts for this study were based on travel during an average weekday afternoon peak hour. The weekday P.M. peak hour represents the highest hourly vehicular travel conditions in the County. The assessment was made at critical screenline locations throughout the County of Oxford.

3.1 Existing Conditions

3.1.1 Road Network

The major facilities within the Study Area are: Highways 401, 403, 3 and 19; Plank Line and County Roads 2, 6, 8, 59 and 119. Highway 401 and 403 are provincial facilities that link Oxford County to major urban centres to the east and west.

The existing traffic volumes on key road sections are as follows:

- The Annual Average Daily Traffic (AADT) is 62,000 on Highway 401 between Highway 403 and Oxford Road 59;
- The AADT on Highway 403 is 17,200 between Highway 401 and Oxford Road 14;
- Plank Line and Oxford Road 59 both have an AADT greater than 10,000 south of Highway 401. Oxford Road 13 and 20 connect Tillsonburg to Oxford Road 59, while Plank Line connects Ingersoll and Tillsonburg; and
- Oxford Oxford Road 2 has an AADT greater than 10,000 through some sections. This facility provides additional capacity for east-west travel through Woodstock and Thamesford.

3.1.2 Travel Survey

A travel survey was conducted at stations distributed throughout the County of Oxford. **Figure 3.1** illustrates the survey station locations.

The survey was used to determine trip origin, location, and purpose by asking drivers the following questions:

1. What time of day did you receive this survey?
2. Where did you begin your trip today?
3. Where did you end this trip?
4. What was the primary purpose of your trip?
5. How frequently do you make this trip?
6. How many people were in the vehicle for this same trip, including yourself?
7. What is the location of your principal residence?

Figure 3.1 shows the locations of the survey stations as identified in the following **Table 3.1**.

Table 3.1: Oxford County, Travel Survey Station Locations

Area	Approach	Facility	Location
Thamesford	North	CR 119 (Allen)	@ CR 2 (Dundas)
	West	CR 2 (Dundas)	@ CR 119 (Allen)
Ingersoll`	South	CR 10 (Whiting)	@ CR 9 (King)
	South	CR 119 (Canterbury)	@ King (N of 401)
	West	CR 2	@ CR 6
	North	CR 6	@ CR 2
Tillsonburg	North	Hwy 19	@ Gateway Centre (Sobeys) N of CR 20
	East	CR 51	@ CR 37 (Potters)
Woodstock	East	CR 2	@ CR 4
	South	CR 12 (Mill)	@ CR 15 (Towerline)
	South	CR 59	@ Julianna (N of 401)
	North	CR 4	@ CR 2
Norwich	North	CR 59 (Stover)	@ CR 18 (Main)
Tavistock	West	CR 24 (Hope)	@ CR 59 (Woodstock)
	North/West	16th Line	@ CR 8
Plattsville	South	CR 8 (Douro)	@ CR 42 (Albert)
Drumbo	North	CR 3 (Wilmot)	@ CR 29 (Oxford)

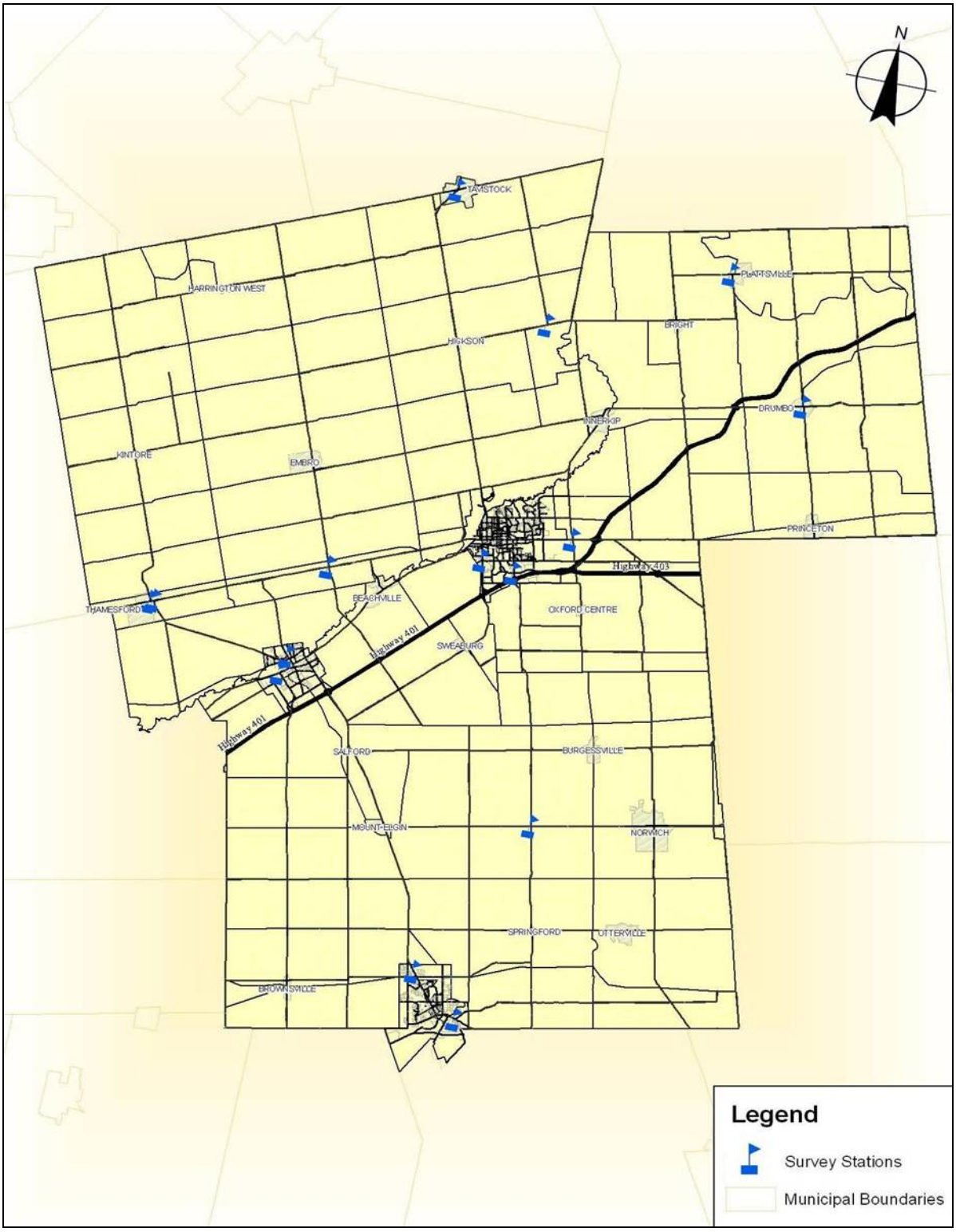
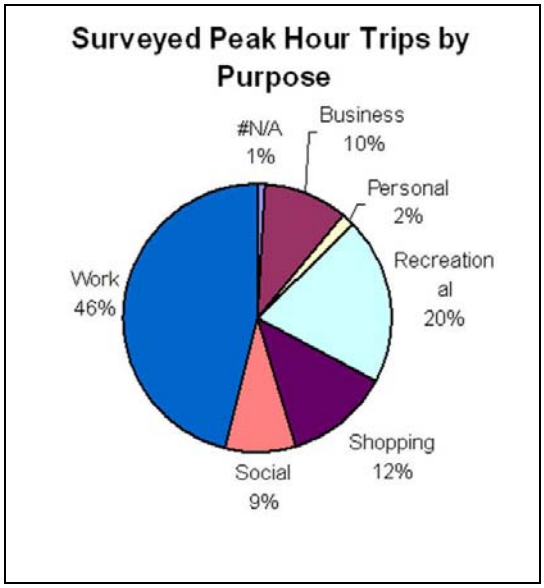


Figure 3.1: Location of Survey Stations



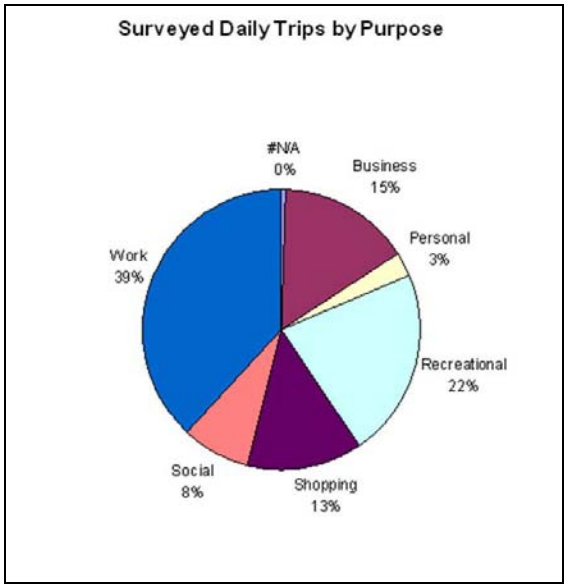


Figure 3.2: Trip Purpose Summary

3.2 Travel Demand Forecasting Approach & Methodology

3.2.1 Land Use Data

Land use data was derived from the Oxford County Official Plan. The data received in a GIS format, was aggregated into 4 categories: Residential, Commercial/Industrial, Agricultural, and Green Space. This data was disaggregated to a traffic zone level.

Population and Employment Data

Population and employment data were derived from municipal population and employment forecasts using the modified land use data. Municipal forecasts for population and employment were divided into the following categories: employment land, rural & rural based, and population related. Population and employment densities were calculated for these three generalized land uses. Population and employment density for Green Space such as Environmental Protection was considered to be zero. Using these densities along with the GIS land use data, population and employment were calculated at the traffic zone level. Subsequently, population and employment values at the transportation zone level were reviewed and revised by County Staff to improve the accuracy of the data. Further revisions were made to include the planned Toyota Lands in the analysis of the Woodstock area.

Trip Production and Attraction Rates

Multiple regression analysis was used to determine trip production and attraction rates. In calculating regression rates for both trip origins and trip destinations, both population and employment were used as dependent variables. Data for trip origins and destinations was derived from the travel survey and aggregated by municipality. This data was then weighted by station counts relative to AADT rates. Since rural areas in the County of Oxford have different travel patterns than urban areas, trip generation rates for Woodstock, Ingersoll, and Tillsonburg were calculated separately from the rest of the County. Root Mean Square Error (RMSE), R^2 values for urban and rural origins were 0.983 and 0.928 respectively. R^2 values for urban and rural destinations were both 0.999.

3.2.2 Model Development

Existing Network

The existing network was developed using GIS data provided by the County of Oxford. The projection of this data is Universal Transverse Mercator (UTM) Zone 17, Ellipsoid GRS 1980 which is a geographic co-ordinate system used throughout Canada. The user fields in the network include the following:

- ID – unique identifier;
- Length – length of link in metres;
- DIR – used to keep track of one-way streets. 0 = 2-way link, 1 or -1 = 1-way link. 1 is one-way travel in the same direction in which the coordinates of the line feature are stored. -1 is one-way travel in the opposite direction from which the coordinates of the line feature are stored;
- Lanes – number of lanes per link, includes both directions;
- Capacity – capacity per link, includes both directions;
- Speed – km/h;
- Facility Type – centroid connector, highway, minor urban, ramp, rural, urban, proposed urban, and proposed rural;
- Community;
- Full Name – full street/facility name;
- ccstyle – feature display settings;
- Bulk coding – all urban minor roads are coded with 1 and an exaggerated length. This coding permits these facilities to still remain part of the network, but do not attract any traffic during the assignment process;
- AADT – Average Annual Daily Traffic volumes;
- Screenline Tag – a tag attached to links within the network that are part of the screenline summary assessment;
- Travel Time – a field to store the travel time from the assignment process; and
- Volume – a field to store the volumes from the assignment process.

2011, 2021 & 2031 Network

Several network improvements are planned within the next few years. The future network was developed using a GIS Shapefile for proposed roads that was provided by the County of Oxford. Additional improvements had been identified by County of Oxford staff. These improvements include road widening and the Juliana Drive extension. The network improvements are reflected in the future road network that was used to in the analysis of travel patterns for 2011, 2021 and 2031.

Zone System

- There are 347 zones in the network (see **Figure 3.3**), including 30 gateways;
- There are 209 rural zones and 108 urban zones; and
- Zones correspond spatially to Centroids in the Network.

Figure 3.3: Transportation Analysis Zones

Matrix Development

The base year matrix was developed using a PM peak trip table derived from survey data along with aggregated population and employment data. **Figure 3.4** illustrates how the model was developed. Future

matrices were developed using forecasted population and employment data and regression equations that were derived from base year data.

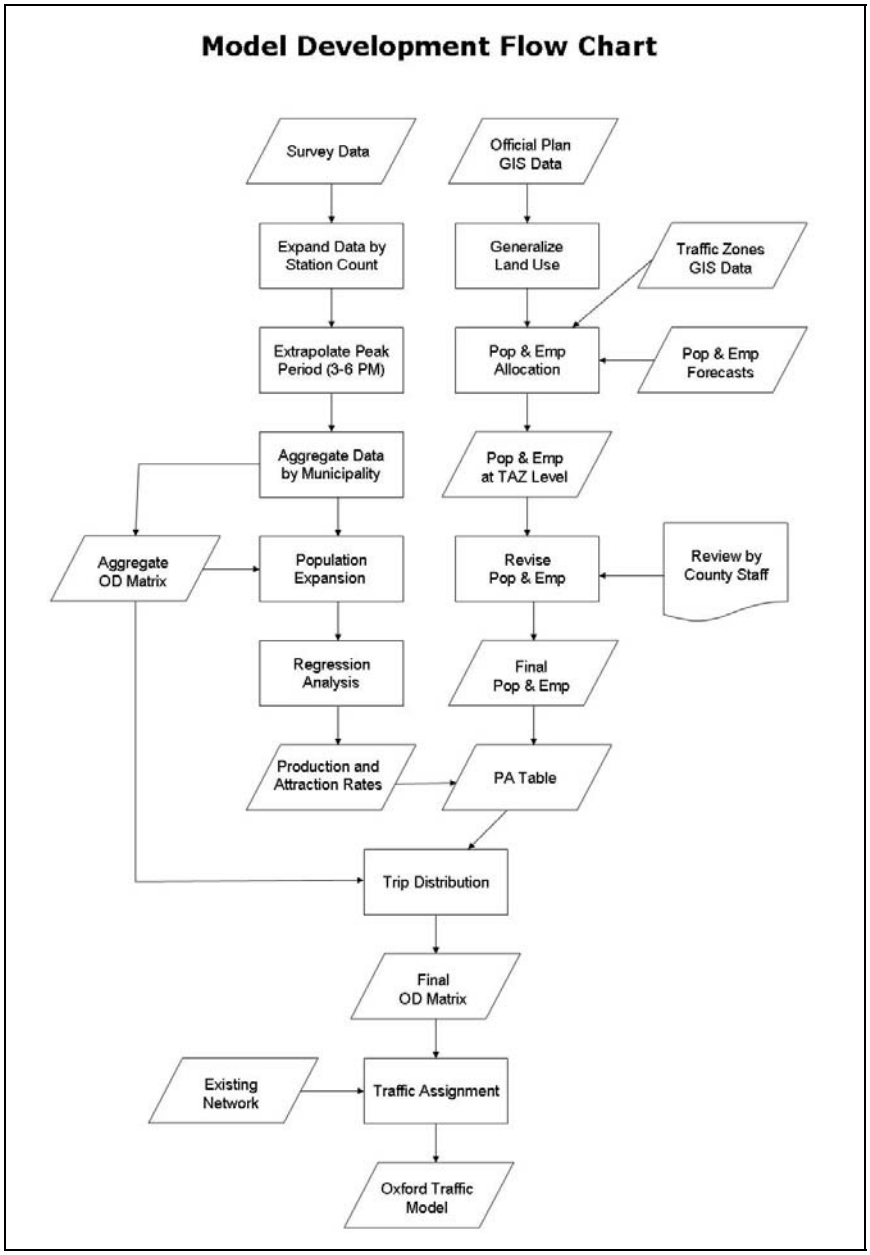


Figure 3.4: Model Development Diagram

3.2.3 Demand Analysis Methodology

Screenlines

Screenlines are imaginary lines drawn in as east-west and north-south directions cutting various north-south and east-west roads respectively, for analysis purposes. **Figure 3.5** shows the screenlines used to calibrate the Oxford County traffic volumes and for analysis of horizon year traffic forecasts.

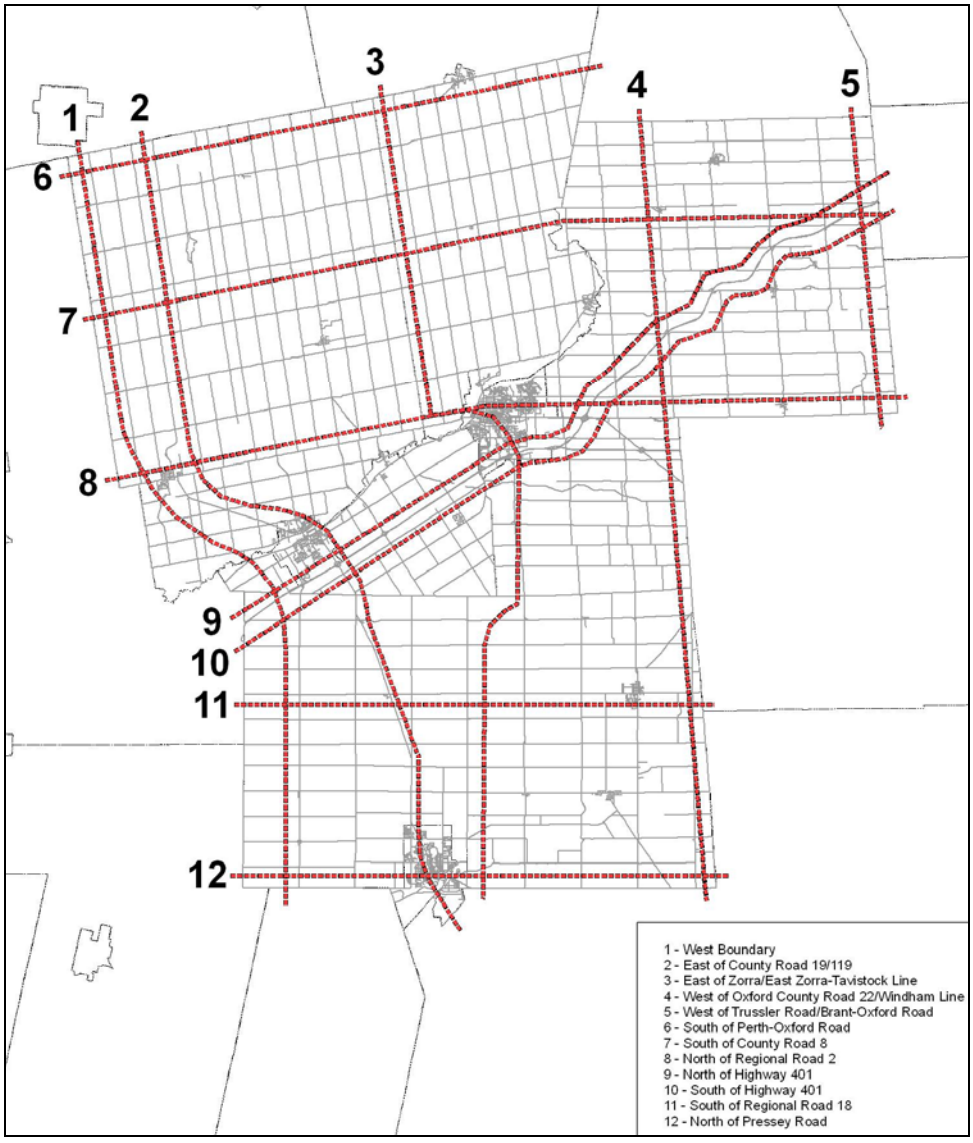


Figure 3.5: Model Screenlines

Calibration

The ability of the model to replicate observed traffic volumes provides an indication that the travel demand forecasting tool provides reasonable results and is useful for forecasting future demands. The key to a

model's reliability is the level of calibration, which is the degree to which a model replicates the pattern and level of existing traffic. It is generally considered that to model within 15% at a screenline level means the model is calibrated to an acceptable level. Another statistically acceptable measure of accuracy is the Root Mean Square Error (RMSE) approach. This measure statistically quantifies the difference between the observed and modeled volumes.

Traffic data was obtained from the County of Oxford and the MTO. The MTO data was recorded in 2005, while the County data was from 2003/2004. Comparison of the 2001 model assigned volumes with inventory traffic counts showed that the major screenlines were calibrated to acceptable levels and within industry standards of reasonableness. Furthermore, the value of the Root Mean Square Error was calculated to be 12%. The result of the Root Mean Square Analysis demonstrates that the model is well calibrated. Based on the model calibration process, it was concluded that the model is an acceptable tool to forecast future traffic volumes and examine capacity deficiencies. The results of the model calibrations are presented in **Table 3.2**

Table 3.2: Model Calibration

County of Oxford Transportation Master Plan
Calibration - Exisiting PM Peak Hour

		Eastbound / Northound			Westbound / Southound		
Screenline	Link	Observed	Modelled	RMS	Observed	Modelled	RMS
Zorra	Sub Screenline	698	676	0.1%	497	682	13.8%
Highway 401 Corridor	Sub Screenline	2,785	2,702	0.1%	2,970	2,750	0.5%
Southwest Oxford	Sub Screenline	130	102	4.8%	107	187	56.4%
1. WEST BOUNDARY	Full Screenline	3,613	3,480	0.1%	3,574	3,619	0.0%
Zorra	Sub Screenline	638	870	13.2%	567	916	37.9%
Ingersoll	Sub Screenline	3,250	3,582	1.0%	3,094	3,115	0.0%
Southwest Oxford	Sub Screenline	565	544	0.1%	571	629	1.0%
Tillsonburg	Sub Screenline	699	976	15.7%	671	987	22.2%
2. EAST OF COUNTY ROAD 19/119	Screenline Total	5,152	5,972	2.5%	4,903	5,648	2.3%
East Zorra-Tavistock	Sub Screenline	1,030	976	0.3%	927	738	4.2%
Highway 401 Corridor	Sub Screenline	3,414	3,101	0.8%	3,027	2,878	0.2%
Norwich	Sub Screenline	887	284	46.2%	799	640	4.0%
3. EAST OF ZORRA/EAST ZORRA TAVISTOCK	Screenline Total	5,331	4,361	3.3%	4,753	4,255	1.1%
Blandford-Blenheim	Sub Screenline	2,310	3,476	25.5%	2,219	2,905	9.5%
Norwich	Sub Screenline	1,330	1,835	14.4%	1,295	1,685	9.1%
4. WEST OF OXFORD COUNTY ROAD 22/WINDHAM	Screenline Total	3,640	5,311	21.1%	3,514	4,589	9.4%
5. WEST OF TRUSSLER ROAD / BRANT-OXFORD ROAD	Screenline Total	3,047	3,205	0.3%	1,997	2,505	6.5%
Zorra	Sub Screenline	299	259	1.8%	276	202	7.2%
East Zorra-Tavistock	Sub Screenline	282	244	1.8%	248	407	41.0%
6. SOUTH OF PERTH-OXFORD ROAD	Screenline Total	581	504	1.8%	524	609	2.6%
Zorra	Sub Screenline	482	815	47.6%	640	629	0.0%
East Zorra-Tavistock	Sub Screenline	200	388	88.6%	150	293	91.3%
Blandford-Blenheim	Sub Screenline	253	569	155.8%	366	627	50.8%
7. SOUTH OF COUNTY ROAD 8	Screenline Total	935	1,772	80.1%	1,156	1,549	11.5%
Zorra	Sub Screenline	339	1,016	399.4%	443	948	129.9%
Woodstock	Sub Screenline	3,413	4,707	14.4%	3,392	4,211	5.8%
Blandford-Blenheim	Sub Screenline	332	359	0.6%	399	275	9.7%
8. NORTH OF COUNTY ROAD 2	Screenline Total	4,084	6,082	23.9%	4,234	5,434	8.0%
Ingersoll	Sub Screenline	740	1,482	100.4%	682	1,622	190.1%
Woodstock	Sub Screenline	1,536	3,290	130.4%	1,371	2,387	54.9%
Blandford-Blenheim	Sub Screenline	102	361	642.7%	114	457	902.8%
9. NORTH OF HIGHWAY 401	Screenline Total	2,378	5,132	134.1%	2,167	4,465	112.5%
Southwest Oxford	Sub Screenline	571	899	33.0%	753	1,047	15.3%
Norwich	Sub Screenline	654	539	3.1%	647	583	1.0%
Blandford-Blenheim	Sub Screenline	393	1,061	288.6%	571	354	14.5%
10. SOUTH OF HIGHWAY 401	Screenline Total	1,618	2,499	29.6%	1,971	1,984	0.0%
Southwest Oxford	Sub Screenline	636	557	1.6%	462	719	30.9%
Norwich	Sub Screenline	371	503	12.6%	405	474	2.9%
11. SOUTH OF COUNTY ROAD 18	Screenline Total	1,007	1,059	0.3%	677	691	0.0%
Southwest Oxford	Sub Screenline	144	265	70.9%	97	298	431.0%
Tillsonburg	Sub Screenline	382	168	31.3%	367	440	3.9%
Norwich	Sub Screenline	388	391	0.0%	259	315	4.7%
12. NORTH OF PRESSEY ROAD	Screenline Total	914	824	1.0%	723	1,053	20.9%
ROOT MEAN SQUARE				15.1%			8.6%
				RMS - TOTAL 2- WAY			12.0%

3.3 Transportation Assessment

3.3.1 Existing Conditions

A strategic assessment of the corridor and facility performance was conducted by assessing critical screenline locations throughout the County to identify capacity deficiencies. The traffic forecasting and travel demand analysis is structured to provide sufficient detail to define the future need for major transportation corridor improvements within the County of Oxford.

In the case of link volumes, a level of service (LOS) is assigned on the basis of volume to capacity (v/c) ratios (the volume of traffic versus the ability of the roadway to accommodate traffic flow). The v/c ratio provides a measure of traffic volume demand to the available capacity, with a capacity condition represented by a v/c ratio of 1.0 (i.e. volume equals capacity).

The capacity of a link is dependant on the prevailing speed, the number of lanes to serve demand, and the role and function of the roadway. The more side street access, driveway access and intersection of roadways, the less effective capacity is available on the roadway. The relationship between LOS and v/c ratio is defined in **Table 3.3.**

Table 3.3: Level of Service Definitions

Level of Service	V/C Ratio	Flow type	Service
A	0 to 0.59	Free flow	(uncongested)
B	>0.60 to 0.69	Stable flow	(Low potential for congestion)
C	>0.70 to 0.79	Stable flow	(Low potential for congestion)
D	>0.80 to 0.89	Unstable flow	(High potential for congestion)
E	>0.90 to 1.0	Capacity	(Congested)
F	>1.0	Forced Flow	(Congested with high potential for diversion in network that results in system wide failure)

Acceptable conditions are generally considered to be LOS C or better; however, LOS D or E may be considered acceptable during peak hours in urban areas. For longer term planning LOS D is used as a threshold.

For the base year scenario the entire network is operating at level of LOS C or better, meaning that there is low potential for congestion throughout the network. This is illustrated in **Figure 3.6**.

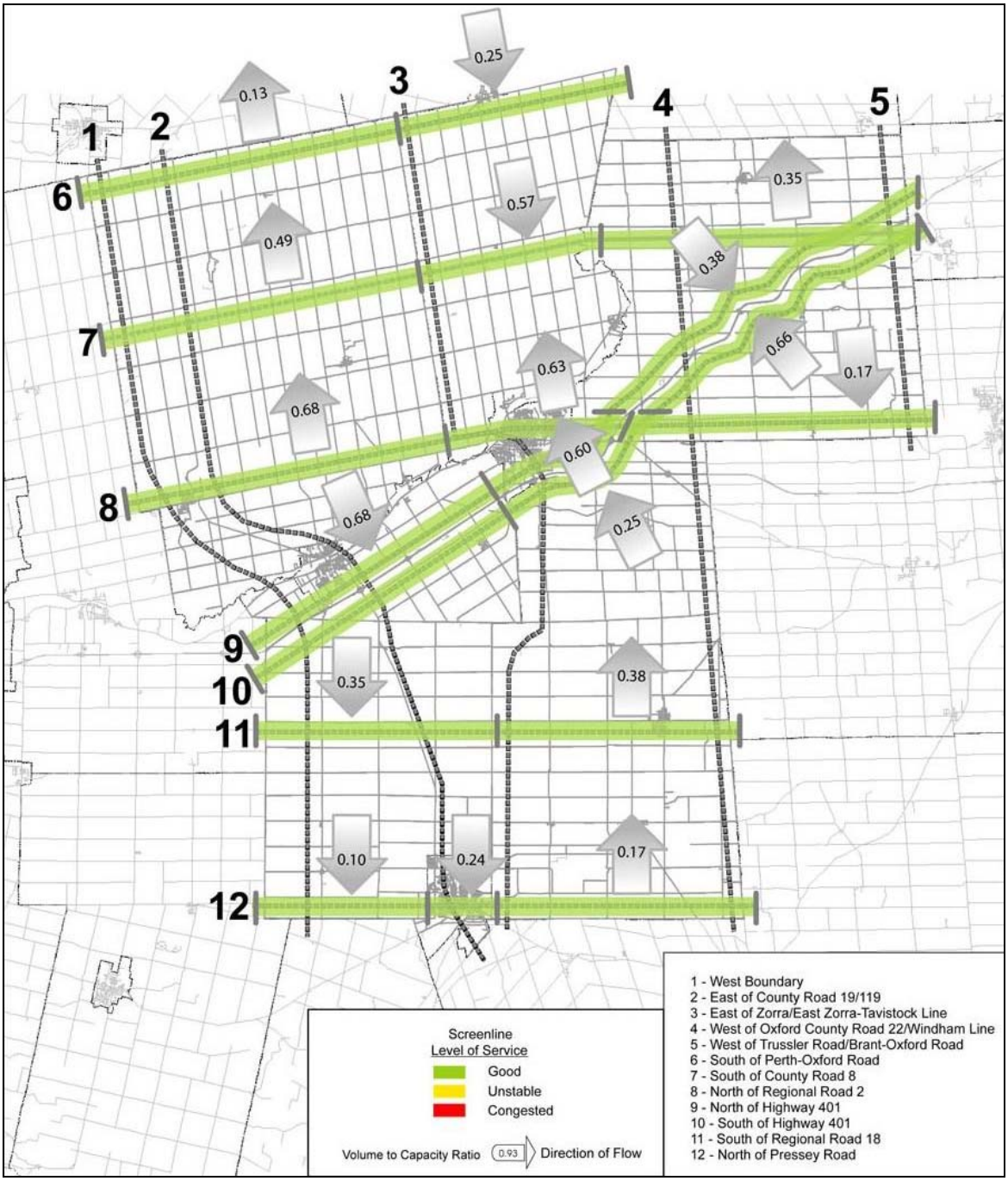


Figure 3.6: Existing Conditions – North-South Screenlines

3.3.2 Horizon Years

East-West Screenline Analysis

Table 3.4 shows that throughout the network the majority of screenlines are operating at free flow conditions (LOS A) during the peak hour in 2031. The exceptions are:

- The screenline west of Trussler Road is operating at stable flow conditions in 2011 and 2021 (LOS B and C respectively). However, by 2031 unstable flow exists on the eastern boundary of the County (the ratio of volume to capacity is 0.8);
- While conditions in Blandford-Blenheim west of Oxford Road 22 had a v/c ratio of 0.79 in 2001; by 2011 the sub-screenline is operating at LOS E; and
- West of Oxford Oxford Road 22 in the Township of Blandford-Blenheim the sub-screenline will be operating at LOS F (forced flow) by 2031.

Table 3.4: 2031 East-West Screenline Forecasts

County of Oxford Transportation Master Plan Volume to Capacity - 2031 PM Peak Hour									
		Eastbound / Northbound				Westbound / Southbound			
Screenline		Capacity	Modelled	Vol/Cap	LOS	Capacity	Modelled	Vol/Cap	LOS
1. West Boundary	**Screenline Total**	**12,050**	**4,224**	**0.35**	**A**	**12,050**	**5,149**	**0.43**	**A**
Zorra	Sub Screenline	2,700	782	0.29	A	2,700	840	0.31	A
Highway 401 Corridor	Sub Screenline	6,650	3,248	0.49	A	6,650	3,890	0.58	A
Southwest Oxford	Sub Screenline	2,700	193	0.07	A	2,700	419	0.16	A
2. East of County Road 19/119	**Screenline Total**	**20,400**	**9,009**	**0.44**	**A**	**20,400**	**9,092**	**0.45**	**A**
Zorra	Sub Screenline	3,600	1,417	0.39	A	3,600	1,071	0.30	A
Ingersoll	Sub Screenline	8,400	4,817	0.57	A	8,400	5,025	0.60	A
Southwest Oxford	Sub Screenline	3,600	802	0.22	A	3,600	1,061	0.29	A
Tillsonburg	Sub Screenline	4,800	1,972	0.41	A	4,800	1,934	0.40	A
3. East of Zorra/East Zorra-Travistock Line	**Screenline Total**	**18,250**	**6,640**	**0.36**	**A**	**18,250**	**6,739**	**0.37**	**A**
East Zorra-Tavistock	Sub Screenline	6,050	1,852	0.31	A	6,050	1,148	0.19	A
Highway 401 Corridor	Sub Screenline	6,050	3,756	0.62	B	6,050	4,152	0.69	B
Norwich	Sub Screenline	6,150	1,032	0.17	A	6,150	1,440	0.23	A
4. West of Oxford County Road 22/Windham Line	**Screenline Total**	**14,750**	**6,649**	**0.45**	**A**	**14,750**	**8,943**	**0.61**	**B**
Blandford-Blenheim	Sub Screenline	5,000	3,289	0.66	B	5,000	5,392	1.08	F
Norwich	Sub Screenline	9,750	3,360	0.34	A	9,750	3,551	0.36	A
5. West of Trussler Road/Brant-Oxford Road	**Screenline Total**	**7,200**	**3,078**	**0.43**	**A**	**7,200**	**5,622**	**0.80**	**D**

North-South Screenline Analysis

Similar to the east-west screenlines, the majority of north-south traffic throughout the County is moving at level of service C (stable flow) or better in 2031. However, by 2031, southbound traffic north of Highway 401 in Ingersoll and Woodstock is operating at LOS D (unstable flow) while northbound traffic through the City of Woodstock is also operating at LOS D on the same sub-screenline (**see Table 3.5**).

Table 3.5: 2031 North-South Screenline Forecasts

County of Oxford Transportation Master Plan Volume to Capacity - 2031 PM Peak Hour		Eastbound / Northbound				Westbound / Southbound			
Screenline		**Capacity**	**Modelled**	**Vol/Cap**	**LOS**	**Capacity**	**Modelled**	**Vol/Cap**	**LOS**
6. South of Perth-Oxford Road	**Screenline Total**	**4,400**	**1,002**	0.23	A	4,400	1,153	0.26	A
Zorra	Sub Screenline	1,800	384	0.21	A	1,800	315	0.17	A
East Zorra-Tavistock	Sub Screenline	2,600	618	0.24	A	2,600	838	0.32	A
7. South of County Road 8	**Screenline Total**	**6,400**	**2,417**	**0.38**	**A**	**6,400**	**2,994**	**0.47**	**A**
Zorra	Sub Screenline	1,800	1,129	0.63	B	1,800	898	0.50	A
East Zorra-Tavistock	Sub Screenline	1,400	170	0.12	A	1,400	1,084	0.77	C
Blandford-Blenheim	Sub Screenline	3,200	1,118	0.35	A	3,200	1,012	0.32	A
8. North of County Road 2	**Screenline Total**	**16,350**	**9,464**	**0.58**	**A**	**16,450**	**10,159**	**0.62**	**B**
Zorra	Sub Screenline	1,800	1,358	0.75	C	1,800	1,169	0.65	B
Woodstock	Sub Screenline	10,950	7,347	0.67	B	11,050	8,000	0.72	C
Blandford-Blenheim	Sub Screenline	3,600	759	0.21	A	3,600	991	0.28	A
9. North of Highway 401	**Screenline Total**	**11,200**	**7,210**	**0.64**	**B**	**11,200**	**8,657**	**0.77**	**C**
Ingersoll	Sub Screenline	2,700	2,296	0.85	D	2,700	2,308	0.85	D
Woodstock	Sub Screenline	4,900	3,672	0.75	C	4,900	4,149	0.85	D
Blandford-Blenheim	Sub Screenline	3,600	1,243	0.35	A	3,600	2,200	0.61	B
10. South of Highway 401	**Screenline Total**	**11,050**	**5,640**	**0.51**	**A**	**11,050**	**4,917**	**0.44**	**A**
Southwest Oxford	Sub Screenline	3,450	1,619	0.47	A	3,450	1,378	0.40	A
Norwich	Sub Screenline	3,100	961	0.31	A	3,100	1,080	0.35	A
Blandford-Blenheim	Sub Screenline	4,500	3,061	0.68	B	4,500	2,458	0.55	A
11. South of County Road 8	**Screenline Total**	**6,550**	**2,967**	**0.45**	**A**	**6,550**	**1,366**	**0.21**	**A**
Southwest Oxford	Sub Screenline	4,250	1,843	0.43	A	4,250	1,976	0.46	A
Norwich	Sub Screenline	2,300	1,124	0.49	A	2,300	913	0.40	A
12. North of Pressey Road	**Screenline Total**	**8,100**	**1,529**	**0.19**	**A**	**8,100**	**2,112**	**0.26**	**A**
Southwest Oxford	Sub Screenline	2,700	296	0.11	A	2,700	442	0.16	A
Tillsonburg	Sub Screenline	2,700	643	0.24	A	2,700	1,308	0.48	A
Norwich	Sub Screenline	2,700	590	0.22	A	2,700	363	0.13	A

3.4 Conclusions and Recommendations

The screenline analysis indicates where network deficiencies exist. Analysis of links can specify where network improvements such as road widening are necessary. In the network performance, a forced flow condition is realized where the volume to capacity ratio exceeds 1.0. Based on the preceding analysis the following conclusions are reached with respect to the transportation network.

3.4.1 East-West Link Analysis

A review of screenline (#4) west of Oxford Road 22 reveals that two links are operating at LOS F in the 2021 scenario. Westbound traffic on Oxford Oxford Road 8 exceeds capacity by 2021. Westbound Highway 401 is also operating at LOS F west of Oxford Road 22 and west of Trussler Road. Similarly volumes are high (but not shown to be over capacity) on Oxford Road 2 along this screenline. The capacity of Highway 401 was assumed to be only 3600 VPH, based on a four lane facility (two lanes in each direction). However, the highway is currently being widened to 6 lanes. This widening with an additional capacity of 1800 VPH would address the screenline capacity deficiency being forecasted at these two locations.

This conclusion is somewhat preliminary as screenline #4 extends the whole length of the County, which could hide potential problems on a specific link if future growth is focussed in one area. In order to fully consider east-west capacity issues, the result also has to be looked at in the context of what the model is predicting for north-south deficiencies.

3.4.2 North-South Link Analysis

Southbound traffic on Oxford Oxford Road 12 and Oxford Road 59 north of Highway 401 are both shown to be operating at LOS F in the 2031 scenario. Furthermore, southbound traffic on Oxford Road 59 is operating at LOS E. East of Ingersoll, north of Highway 401 the only link where volume exceeds capacity is southbound on Oxford Road 6. These deficiencies are highlighted in **Figure 3.6** Further discussion on these preliminary findings is provided in **Section 3.4.3**.

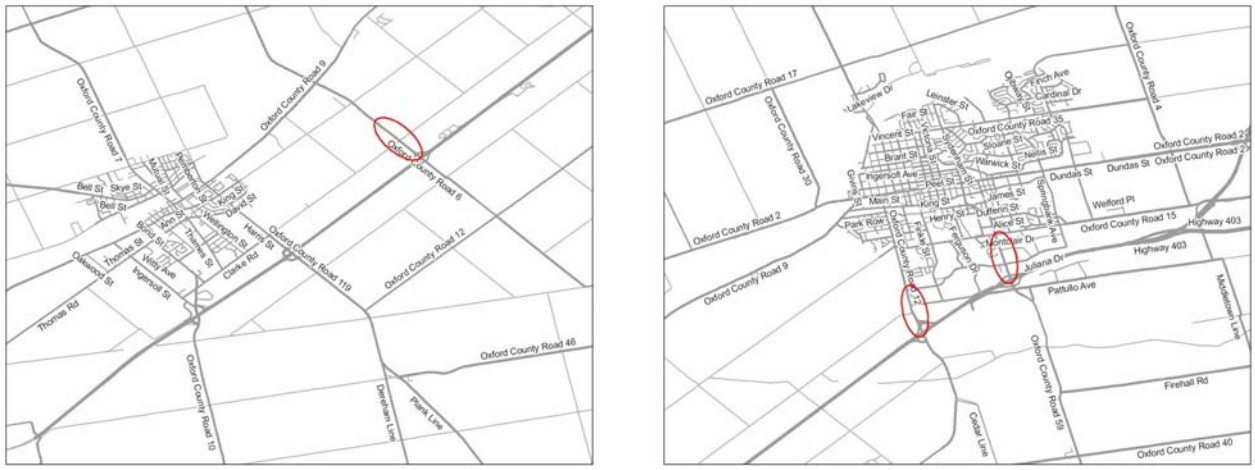


Figure 3.6: North-South Capacity Deficiencies

3.4.3 Highway 401 Access

The model appears to be indicating two main issues regarding capacity deficiencies for the Woodstock area:

- Additional east-west capacity is needed that may be addressed by the widening of Highway 401; and
- Additional north-south capacity is required on links connecting Woodstock to Highway 401.

However, the model is strategic in nature and cannot ascertain whether or not a north-south problem can be solved by an east-west solution. For example, if Oxford Road 2 (an east-west link) is considered the main access to Highway 401, its widening could potentially solve the identified north-south link capacity problem on the County Roads 12 and 59. It is possible that either a north-south or east-west improvement could solve the Highway 401 access capacity problem. However, it requires a finer, more detailed travel demand model to assess this issue than the strategic model developed for this study.

Similarly, the preliminary conclusion of a capacity deficiency on Oxford Road 6 east of Ingersoll should be considered further in an Environmental Assessment Study, which would also examine the needs of both local and through traffic in the urban area as a whole.

3.4.4 Recommendations

Due to ongoing development growth, traffic forecasts for the future (2021 to 2031) indicate a need for additional capacity on existing roads connecting both Woodstock and Ingersoll to Highway 401. Therefore, it is recommended that:

- Environmental Assessment studies be undertaken in concert with the affected area municipalities, for the urban areas of Woodstock, Ingersoll in order to identify a future road network that can handle through, as well as local, traffic in these urban centres. This will include consideration of new by-pass routes; and
- For the Woodstock study, there is also an outstanding issue of connecting Oxford Road 4 to both Highways 401 and 403.

While no future capacity deficiency has been identified in this project, there is a similar need to rationalize the future local and County road network through its urban area.

4. Access Management

The current County of Oxford Official Plan identifies a transportation policy. The policy recognizes the need to categorize, upgrade and expand the network of public roads during the planning stages in order to accommodate potential growth. Subsequent policies specifically address road classification, development criteria, common accesses, road widening, road allowances and implementation among others.

In keeping with the objectives found within the County practices, this policy focuses on Access Management within the County Roads System.

An Access Management policy is needed in order to manage traffic in the arterial road corridors, and maintain and enhance capacity for through traffic movement and growth. The policy will cover all roads under the jurisdiction of the County and will serve as a tool for the continuing preservation of a safe and efficient road/transportation network.

4.1 Defining Access Management

Access Management is a key element in the process by which the County of Oxford will effectively maintain control, operational function, and hierarchy of roads under their jurisdiction.

Establishing and maintaining a transportation network capable of providing safe, efficient and convenient traffic/transportation access to/from existing and proposed future developments and properties within the County is one of the most important objectives of this access management policy. Additionally, access management can influence and contribute to the successful sharing of a right-of-way between autos, trucks, pedestrians, cyclists, transit and other alternative modes of travel.

4.2 Approach to Access Management

Managing and controlling impacts from roadside development in order to maintain the efficient movement of traffic can be achieved, in part through the control of the number of accesses, desirable traffic signal location and spacing, minimizing conflict points, adequate access location and spacing, and sufficient auxiliary turn lane provision. With this in mind, the type, classification and function of a roadway must be understood and maintained in order to effectively assess proposed and existing accesses/intersections.

Based on a study published by the Transportation Association of Canada (TAC) there is a direct relationship between the number of access points and the collision frequency on selected types of roadways. The greater number of accesses equate to a higher collision rate. Similarly, the higher the number of at-grade public road intersections equates to higher collision rates.

The goal is to manage conflict points by minimizing, reducing or eliminating areas where vehicles, pedestrians, cyclists and other modes of transport may converge with one another. Additionally the road

user can be assisted with the provision of aids to help identify a potential conflict. These aids can be as simple as street lighting, pavement markings, signs and signals (i.e., at a rail crossing), and road surface treatments, vertical deflections and sidewalk extensions (i.e., at a crosswalk).

Road classifications within the Oxford County have been assigned based on existing land use and future land use allocations. The County of Oxford Official Plan categorizes roads as Provincial, County and Township in **Schedule C-4**. The Official Plan defines the classification of roads as follows:

- **Provincial Highway** – are highways under the jurisdiction and control of the ministry of transportation. The provincial highway network plays a key role in linking communities and supporting economic prosperity across Ontario. Highways in the provincial highway network are classified by function based on the priority given to through-traffic vs. land access;
- **County Roads (Arterials)** – serve moderate to high volumes of intra-urban and long distance traffic movements at moderate speeds between Provincial Highways and Township Roads and has limited property access; and
- **Township Roads (Collectors)** – serve light to moderate volumes of traffic for short distances between local and arterial roads and may provide access to individual properties.

Prescribing a road network hierarchy minimizes potential conflicts between local and non-local traffic by defining the roads within the County based on their intended role and function. The text below identifies the function and access policy for arterial roadways currently under the jurisdiction of Oxford County.

Rural arterials serve a principal role of long distance traffic movement with design speeds ranging from 80 km/h to 130 km/h.

Urban arterials serve a principal role of traffic movement with varying levels of access control depending if the arterial is a major or minor route. Design speeds range on urban arterials from 50 km/h to 70 km/h for minor urban arterials and from 60 km/h to 100 km/h for major urban arterials.

4.2.1 County Requirements

The transportation system, from a County perspective, focuses on the arterial road network. The area municipalities are generally concerned with collectors and local roadways. The definition of an arterial road varies between legislative agencies; **Table 4.1** is taken from the MTO document Geometric Design Standards for Ontario Highways and is one of the most heavily referenced roadway classification tools. The Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads classifies arterial roadways in a similar manner as that of MTO, except that arterial roads are further defined in terms of major and minor roadways. **Table 4.2** is an excerpt from TAC guidelines **(Table 1.3.4.2).**

4.2.2 MTO Requirements

The transportation system, from an MTO perspective, defines access management as the process that manages entrances onto provincial highways and onto roads in the vicinity of a provincial highway, within MTO's permit control area. We refer to these entrances as access connections, and include private access, commercial access, and municipal road access.

Land development and new access connections within the MTO permit control area shall be subject to the approval of the MTO. This may well supersede the access management policies of the County identified in **Section 4.5** of this document.

Table 4.1: Characteristics of Urban Road Classification (MTO)

Characteristics of Urban Road Classification (MTO)				
Functional Classification	**Urban Freeways**	**Urban Arterials**	**Urban Collectors**	**Urban Locals**
Traffic Service	optimum mobility	traffic movement primary consideration	traffic movement & land access equal importance	traffic movement secondary consideration
Land Service	no access	land access secondary consideration	traffic movement and land access equal importance	land access primary consideration
Range of Traffic Volume A.A.D.T.	more than 75,000	5,000 – 50,000	1,000 – 20,000	not applicable
Traffic Flow	free flow	uninterrupted flow except at signals and cross walks	interrupted flow	interrupted flow
Design Speed	80 – 120 km/h	80 – 110 km/h	60 – 90 km/h	60 – 80 km/h
Average Running Speed Off-peak Conditions	60 – 110 km/h	50 – 90 km/h	40 – 70 km/h	40 – 60 km/h
Vehicle Type	all types up to 20% trucks	all types up to 20% trucks	all types	passenger and service vehicles
Percentage of Total Length of Road Network	up to 10	up to 30	up to 30	70 approx.
Connects to	freeways arterials	freeways arterials collectors	arterials collectors locals	collectors locals

Table 4.2: Characteristics of Urban Roads (TAC)

Characteristics of Urban Roads (TAC)		
	Major Arterial	**Minor Arterial**
Traffic Service Function	Traffic movement primary consideration	Traffic movement major consideration
Land Service / Access	Rigid access control	Some access control
Traffic Volume (veh/day) (typical)	10,000 - 30,000	5,000 - 20,000
Flow Characteristics	Uninterrupted flow except at signals and crosswalks	
Design Speed (km/h)	60 - 100	50 - 70
Average Running Speed (km/h) (off-peak)	50 - 90	40 - 60
Vehicle Type	All types up to 20% trucks	All types

Desirable Connections	Collectors, arterials, expressways, freeways	
Transit Service	Express and local buses permitted	
Accommodation for Cyclists	Lane widening or separate facilities desirable	
Accommodation for Pedestrians	Sidewalks may be provided, separation for traffic lanes preferred	
Parking (typically)	Prohibited or peak hour restrictions	Peak hour restrictions
Minimum intersection spacing (m)	400	200
Right-of-way width (m) (typically)	20 - 45	

The TAC Geometric Design Guide for Canadian Roads also classifies rural roadways. **Table 4.3** is an excerpt from TAC guidelines (***Table 1.3.4.1***).

Table 4.3: Characteristics of Rural Roads

Characteristics of Rural Roads (TAC)	
	Rural Arterial
Traffic Service Function	Traffic movement primary consideration
Land Service	Land access secondary consideration
Flow Characteristics	Uninterupted flow except at signals and crosswalks
Design Speed	80 - 130 km/h
Average Running Speed	60 - 100 km/h
Vehicle Type	All types, up to 20% trucks
Normal Connections	Collectors, arterials, freeways
Traffic Volume (veh/day) (typical)	< 12,000 AADT

Factors influencing roadway classification include the density of access, service function, traffic volume, flow characteristics and design speed. The number of access points and their spacing is a major influence on the running speed and flow characteristics of a roadway. While at the other extreme there are local roads and laneways which function as 100% land access right-of-ways, and are typically not divided with the exception of isolated intersection medians, and which operate under interrupted conditions.

The County does not maintain control of freeways, expressways, collector roads, local roads and laneways. Therefore this policy is focused strictly on the management and service of arterial roadways.

4.3 Goals of Access Management

The goal of Access Management is to provide County staff, municipal staff, residents, businesses and community groups with arterial roadway access standards to provide design guidance when:

- Reviewing retrofit applications for redevelopment proposals or reconstruction projects;
- Processing new development applications adjacent to County roads in order to control and protect the provision of new road alignments and access to/from new and existing road facilities;
- Promoting the consideration of traffic service when considering new road additions or existing road deletions; and
- Supporting infrastructure design guidelines in order to maintain an efficient and effective road network.

Access Management policies will be reviewed periodically by County staff and County Council in order to:

- Monitor effectiveness in achieving safety and efficiency of the road network while permitting an appropriate degree of access for residents, businesses and institutions;
- Ensure the planned road alignments found in **Schedule C-4** of the official plan are not modified to a point where planned road alignments and function is not diminished; and
- Initiate revisions when necessary to address changing needs and priorities.

4.4 Land Use

Access management is influenced by land use planning and land use density. Increased density generally leads to an increase in the number of transportation options available allowing for a higher percentage of travel by walking, cycling and transit modes. The alternative of low density development reinforces reliance on the automobile due to greater distances to be travelled, and also increases the necessity to provide access to properties along arterial corridors.

The three major land use categories are residential, commercial and industrial. These land uses are generally not mixed so as to allow residential neighbourhoods to be kept free of unnecessary and heavy traffic volume. In this respect, planned communities are better able to control traffic patterns, attract jobs and attract investment.

Residential land use generally attracts autos with occasional school buses and heavy traffic volume. Commercial land use generally attracts autos with little to no school buses and high volumes of heavy traffic, typically delivery trucks and transport trucks. Industrial land use generally attracts heavy truck traffic volumes with minimal auto traffic volumes.

The intersections, accesses, parking and sight distances required by each land use can vary significantly. The road networks found within different land use areas will therefore be required to perform different roles and functions. The County arterial roads serving each land use are what this access management policy will focus on.

4.5 Access Management Policies

The County may restrict the placement of an access onto a County road, or the traffic movements allowed at an access, in the interest of public safety. New accesses must be located so as to provide, in the opinion of the County of Oxford's Director of Public Works:

- No undue interference with the safe movement of public traffic, pedestrians, or other users of the highway; and
- Favourable sight distance, grade and alignment conditions for all traffic using the proposed access to the County road.

Sight Distance Standards

When measuring sight distance, the following methodology from the Transportation Association of Canada (TAC), are used:

1. The driver's eye level is defined as 1.05 metres (3.5 feet) above the road surface;
2. The height of the object (representing the approaching vehicles) is defined as 1.3 metres (4.25 feet) above the road surface; and
3. For vehicles entering the highway, visibility is measured from the driver's eye level, at a point set back 3.0 metres from the edge of pavement of the through lane, in both directions.

4.5.1 Road Widening

Provisions for the widening of existing road allowances and details for specific circumstances are found within the Transportation Policy of the County Official Plan. Privately owned land required for road allowance widening may be provided through subdivision review process, land acquisition, land severance, site plan approval or other legislative means.

Right-of-Way

Right-of-way may vary from 20-45 metres (65 ft. to 148 ft.). The wider rights-of-way are required to accommodate roadside infrastructure including hydro, sidewalks, lighting and landscaping, and possible future road widening. Recommended guidelines for designated settlements are to provide a 26 metre (85 ft.) right-of-way and in rural areas to provide a 30 metre (100 ft.) right-of-way.

In addition, transportation policies from the County of Oxford Official Plan **Sections 7.6**, **8.7** and **9.6** will also apply to County Roads within the Large Urban Centres.

4.5.2 Intersections

As traffic conditions warrant, road widening and improvements may be required to provide daylight triangles, installation of traffic signals or traffic control devices, eliminate jogs and provide lane channelization.

Intersection Policy

Grade separated interchanges are typically provided only on provincial freeways, which most other intersections will remain at-grade.

Residential Intersections

Typically, residential streets have low volumes, and intersect with collector and/or local residential roads where there is little impact on adjacent roads. County interests come to the forefront where residential accesses are located on or adjacent to County roads. The design of residential subdivisions shall minimize the number of intersections of local roads with County roads.

Commercial Intersections

Commercial intersections are defined by their proximity to, and service of, commercial developments. Commercial accesses have higher volumes and may contribute to increased delays on the adjacent road network. Longer queues into and out of commercial parking lots often result during peak shopping periods. Industry accepted standards, as well as innovative designs and common accesses, may be considered to pre-empt possible on and off-site congestion.

Industrial Intersections

Industrial intersections are defined by their proximity to, and service of industrial subdivisions. These intersections typically accommodate larger slower moving vehicles and have larger turning radii. Access driveways to industrial lots are typically wider and require larger curb return radii to accommodate trucks. As a result, industrial access and common accesses should be located at suitable distance, from intersections to allow vehicles sufficient space to complete their manoeuvres with minimal interference to adjacent lanes and served public traffic.

Daylight Triangles

New entrances will not be permitted within daylight triangles at any intersection. A daylight triangle is the area between street lines drawn from a point on one street to a point on another street measured from the intersecting point of these lines. The distance from the intersecting points varies between 3.0 metres and 15.0 metres depending on the classifications of the intersecting streets.

All of the related accesses mentioned above are elaborated upon in the followings sections.

4.5.3 Railway Crossings and Bridge Improvements

All new road improvements and alignments will be in accordance with the proposed road network found on **Schedules C-4**, **I-4**, **T-4** and **W-5** from the County of Oxford Official Plan.

4.5.4 Driveways/Accesses

The County of Oxford has prepared a Property Entrance Guideline for considering all applications for new entrances or alterations to existing entrances. For proponents of such applications, the County's Operations Department should be contacted for the latest version of this guideline.

The locations of driveways are important elements in the effective operation of safe and orderly access to developments. Driveway location and design are both primarily influenced by:

- Road classification; and
- Land use.

Road Classification

Driveways proposed along roads of higher classification, such as arterial roads, should be widely spaced and designed so as to minimize interference with mobility, which is the primary function of arterials.

Rural Arterials

Land access on rural arterial roadways is a secondary consideration and shall be limited where possible. Commercial, industrial and public facilities will be provided access to arterials but where feasible, these accesses will be grouped to effectively control the number of access points. New residential subdivisions adjacent to arterials shall be designed with reverse frontage lots and access shall be limited except where existing infrastructure makes this objective impractical. Lighting shall be provided where traffic signals are warranted and installed and parking will be restricted.

Urban Arterials

Land access on urban arterials will be allowed but controlled with the use of industry accepted standards elaborated on later in the document. Commercial, industrial and public facilities will be provided access to arterials but where feasible, these accesses will be grouped to effectively control the number of access points. New residential subdivisions adjacent to arterials shall be designed with reverse frontage lots and access shall be limited except where existing infrastructure makes this objective impractical.

As a policy, for all corner lots, all factors being equal, driveways shall be located on the lower classified roadway.

Land Use

Driveway designs are influenced by the land use they typically serve. The three land use categories commonly used to establish different design criteria are as follows:

- Residential - developments consisting of single family or multiple family dwelling units;
- Commercial - office, retail, or institutional developments primarily serving passenger vehicles but occasionally accommodating service trucks; and
- Industrial - developments that primarily serve truck traffic, such as warehousing and truck terminal facilities.

4.5.4.1 Residential Access

Recommendations for policy and access location control are as follows:

- High degree of access control should be considered for arterial roads;
- Access via adjacent local or collector roads should be encouraged for new developments;
- In single family zones and duplex zones, no direct access should be allowed on to an arterial road; and
- Only one driveway should be permitted for single family zones located at corner lots, this driveway shall be located on the lesser classified roadway and provide maximum corner clearance from the intersection where practical.

4.5.4.2 Commercial Access

Recommendations for policy and access location control are as follows:

- High degree of access control should be considered for arterial roads;
- Mutually-shared access arrangements with adjacent property owners should be considered;
- At the intersection of two major arterial roads on which the vehicular traffic volumes are about the same, a private approach should be permitted only on the arterial which allows the maximum distance from the existing intersection (corner clearance);
- Two driveway accesses may be permitted for corner lots where it has been shown through a traffic impact study that such ingress and egress are necessary to prevent the creation of traffic problems on the adjacent roadways;
- Distance from curves - desirable distance from the end of curves is 150 metres, otherwise vertical and horizontal sight distance should be checked, using the Geometric Design Guide for Canadian Roads, (TAC);
- Distance from bridges - the sight distance at the access should be checked using the Geometric Design Guide for Canadian Roads, (TAC);
- Distance from railways - should be determined through site specific assessments, considering turning movements, storage and sight distance requirements using Geometric Design Guide for Canadian Roads, (TAC);
- Crossing sight distance – should be checked using the Geometric Design Guide for Canadian Roads, (TAC);

- Gradients - vertical curves and gradients should preserve minimum stopping sight distance requirements, using the Geometric Design Guide for Canadian Roads (TAC), for gradients on main and intersecting alignments; and
- Skew angles - A right angle is recommended in terms of safety and economy. Acceptable skew angles range from 70 degrees to 90 degrees.

4.5.4.3 Industrial Access

Recommendations for policy and access location control are as follows:

- High degree of access control should be considered for arterial roads;
- Mutually-shared access arrangements with adjacent property owners should be considered;
- At the intersection of two major arterial roads in which the vehicular traffic volumes are about the same, a private approach should be permitted only on the arterial which allows the maximum distance from the existing intersection (corner clearance);
- Two driveway accesses may be permitted for corner lots where it has been shown through a traffic impact study that such ingress and egress are necessary to prevent the creation of traffic problems on the adjacent roadways;
- Distance from curves - desirable distance from the end of curves is 150 m, otherwise vertical and horizontal sight distance should be checked, using the Geometric Design Guide for Canadian Roads, (TAC);
- Distance from bridges - sight distance at the access should be checked using the Geometric Design Guide for Canadian Roads, (TAC);
- Distance from railways - should be determined through site specific assessments, considering turning movements, storage and sight distance requirements using the Geometric Design Guide for Canadian Roads, (TAC);
- Crossing sight distance – should be checked using the Geometric Design Guide for Canadian Roads, (TAC);
- Gradients - vertical curves and gradients should preserve minimum stopping sight distance requirements, using the Geometric Design Guide for Canadian Roads (TAC), for gradients on main and intersecting alignments; and
- Skew angles - A right angle is recommended in terms of safety and economy. Acceptable skew angles range from 70 degrees to 90 degrees.

4.5.4.4 Key Driveway/Access Design Elements

There are many design elements that warrant consideration as a part of a good access design practice; they are as follows:

1. Corner clearance from adjacent intersections;
2. Shared Access;
3. Maximum number of driveways based on property frontage;
4. Driveway alignment on the opposite side of an undivided road;
5. Driveway dimensions;
6. Clear throat length, or set back distance;
7. Angle of intersection;

8. Driveway grades – minimum and maximum, and allowable maximum grade changes;
9. Sight distance requirements;
10. Spacing between adjacent driveways on the same side of the road; and
11. Minimum clearance from all obstructions, like street hardware and furniture.

1. Corner Clearance

Corner clearance is the distance between an existing intersection and a proposed driveway or a public road. It is measured from the future street line to the near curb of the proposed driveway. Corner clearance should be sufficient to allow a driver to enter an arterial road without interfering with the through traffic movement. **Table 4.4** below provides (TAC) corner clearance requirement guidelines for transportation corridors.

Table 4.4: Minimum Corner Clearance Distances to Accesses or Intersections

Suggested Minimum Corner Clearance Distances to Accesses, or Intersections				
Intersection Type	Location	Minimum Clearance (m)		
		Arterial	Collector [c]	Local [c]
Signalized	Downstream	70 [a]	55	15
	Upstream	# [b]	25	15
Stop Controlled	Downstream	35	20	15
	Upstream	# [b]	25	15
a. Values based on operating speed of 50 km/h with higher values desirable for higher speeds and/or higher traffic.				
b. Access/Driveway should be positioned in advance of left turn storage length plus bay taper.				
Values that are lower reflect lower volume roads and reduces level of service on collectors and locals.				
Adapted from TAC Geometric Design Guide for Canadian Roads				

Site specific analysis should be performed when a left or right turn storage lane or taper exists at the intersection.

2. Shared Access

The introduction of a new driveway on a roadway should be located and designed in consideration of existing access points along the roadway.

Joint accesses should be encouraged whenever possible, if land uses are compatible, especially along arterial roads. Direct access to abutting properties along an arterial roadway should not be permitted where

other alternatives exist. Where direct property access is required, the use of shared driveways and inter-connected on-site circulation systems with adjacent properties should be encouraged to limit the number and spacing of driveways.

If joint access with adjacent properties cannot be realized immediately because the properties are at different stages of development or if the adjacent land owner is not co-operative than the in-stream development proposal should be required to provide either an access easement or right-of-way across a portion of the property to facilitate joint access in future, or a restrictive covenant should be registered on the land title stipulating that "in future when the adjacent property(s) redevelop that they will enter into a reciprocal access agreement and will remove/relocate their existing driveway(s)". A bond or cash-in-lieu would be secured at the time of approval for the future removal/relocation of the driveway.

3. Maximum Number of Driveways

An effective means of ensuring reasonable spacing between adjacent driveways is to limit the number of driveways permitted per individual property. For residential applications only one driveway is permitted regardless of property frontage. Access will be limited to one per property unless it can be demonstrated that additional driveways are warranted for traffic capacity and safety reasons on the adjoining roadways. Additional driveways will not be permitted solely to avoid the installation of a traffic signal.

4. Driveway Alignment

For low volume roadways, such as locals and collectors, or low volume driveways, the spatial relationship between driveways on opposite sides of the road is not a necessary design consideration. However, when the roadway volume is moderate to high, such as an undivided arterial or a high volume collector, the intersection of a new driveway will impact directly on the existing traffic operations to/from the road. Careful integration of a new driveway into the existing operating character of the arterial road is required to minimize turning conflicts and distribution to through traffic.

As a preferred arrangement, the centreline of a new driveway is recommended to align with the centreline of any existing opposing driveway or road, unless cross traffic is high and signals are not warranted or feasible. Offset arrangement should be considered in a way that avoids overlapping left turns and provides easy weaving manoeuvres. For this reason, they should be positioned in a way that allows left-turning movements to happen first and ahead of the right-turning manoeuvres as noted below:

- A minimum offset of 100 metres is required when left turns are permitted at both driveways at split "T" arrangements;
- A minimum offset of 50 metres is required when left turns are permitted only at one driveway at split "T" arrangements; and
- Site specific analysis is required when there is a left turn storage lane or taper along the road.

5. Driveway Dimensions

For low volume driveways (< 25 veh/day), like those serving single family residential land uses, the two way movements may consist of a single lane, drive-in and back-out manoeuvre. For high volume two-way

driveways (> 750 veh/day or 100 peak hour volume), it should consist of a two-way driveway separated by a centreline or median. A two-lane exit in combination with a single-lane entrance is recommended to increase capacity for moderate or high volume driveways. Typical driveway dimensions are provided in **Table 4.5**. Greater driveway widths may be considered where there is more than one traffic lane.

Table 4.5: Driveway Dimensions

Range (m)	Driveway Dimensions		
	Residential	Commercial	Industrial *
1-way	3.0 - 6.0	4.5 - 7.5	5.0 - 9.0
2-way	3.0 - 7.3	7.2 - 12.0	9.0 - 15.0
Radius	3.0 - 4.5	4.5 - 12.0	9.0-15.0
Within Oxford County the primary access cannot operate as a one-way access.			
Adapted from TAC Geometric Design Guide for Canadian Roads			

** This category also includes farms which also utilizes large vehicles.*

TAC turning templates should be used for heavy vehicles. The TST (Transport Truck) vehicle turning template is typically used for heavy truck accommodation. The SU-9 (Single Unit Truck) is typically used for a garbage truck or fire truck accommodation.

6. Clear Throat Length

Clear throat distance is the area provided on a driveway to store vehicles waiting to circulate into the site and is measured from the ends of the ultimate street line and the turning point on site, usually to a parking area. In order for major driveways to operate efficiently, both from the road side and internally, it is desirable to provide a no conflict and storage zone within the driveway. Failure to provide adequate clear throat distance results in frequent blocking of on-site circulation which can create queues of entering vehicles which impede the through movement of vehicles on the street, as well as present safety concerns for pedestrians crossing the driveway.

The amount of storage space required is directly related to the peak hour traffic demands of the parking lot, and should be assessed on a site-to-site basis.

The provision of appropriate clear throat length or storage space is particularly important for developments that propose a drive-through service where customers remain in their vehicles while waiting to be served, like some restaurants, banks, automatic car washes, and parking facilities with entry control.

A sample range of minimum and desirable clear throat distances based on development size is outlined in **Table 4.6.**

Table 4.6: Driveway Minimum Clear Throat Length

Land Use	Development Size	Minimum Clear Throat Length	
		Collector (m)	Arterial (m)
Light Industrial	10,000 - 45,000 m^2	15	30
Supermarket	> 2,000 m^2	25	40
Restaurant	> 200 m^2	15	30
Plaza	25,000 - 45,000 m^2	15	25
Office	10,001 - 20,000 m^2	15	30
This sample has been adapted from the TAC Geometric Design Guide for Canadian Roads.			

For large developments, the appropriate throat length should be determined by a detailed traffic analysis and queuing study.

7. Angle of Intersection

The angle of intersection is the degree at which a driveway intersects with a road, and should be designed in a way that ensures safe visibility when manoeuvring to/from the site.

It is desirable that two-way driveways intersect the roadway at or near right angles. A minimum acute angle of 70 degrees as measured from the roadway curb line is acceptable. One-way driveways ranging from 45 degrees to 60 degrees are acceptable in industrial areas where pedestrians are infrequent. For commercial and residential land uses, where pedestrian volumes are normally moderate to high, minimum one-way driveway angles in the range of 60 degrees to 70 degrees are preferred. A summary of acceptable intersection angles are presented in **Table 4.7** below.

Table 4.7: Angle of Intersections

Angles of Intersections			
Driveway	Land Use	Pedestrian Interference	Desirable
Two-way	All	-	70°-90°
One-way	Industrial	few	45°-60°
One-way	Commercial/Residential	high	60°-70°
This sample has been adapted from the TAC Geometric Design Guide for Canadian Roads.			

8. Driveway Grades

For selecting an appropriate driveway grade, a number of considerations should be addressed:

- Road classification;
- Driveway volume;
- Maximum driveway grade on-site;
- Maximum rate of grade change;
- Pedestrian crossing slope;

- Roadway, driveway, roadside and property drainage; and
- Cyclist accommodation.

Driveways in areas with an urban road cross-section are constructed at an incline from the roadway in order to prevent surface drainage along the roadway from discharging down a driveway and onto private property. Where it is impractical, curb drainage across the driveway can be effectively controlled by using a slightly deeper gutter and adjacent catch basins. In some cases, on-site drainage is required in order to prevent property drainage onto the roadway via the driveway. **Table 4.8** below provides a design standard for recommended driveway grades. It is acknowledged that constrained local conditions may not allow the establishment of driveway grades within these standards.

Table 4.8: Standards for Driveway Grade

Driveway Volume	Grade Between Edge of Road and Property Line		Grade Change From Property Line Into the Site	
	Min2	Max3	Min	Max
High	1.00%	1.00%	-2.00%	4%
Low-Moderate	1.00%	3.00%	-4.00%	10%
This sample has been adapted from the O.P.S.D.				

1. Downgrades are avoided to control street drainage;
2. 0.5% acceptable as absolute minimum; and
3. Assumes the street has a normal cross slope of 2.0%.

Driveways in areas with rural road cross-section are constructed with grading corresponding the shoulder grading to facilitate shoulder maintenance and to enhance safety. They are constructed in accordance with the applicable OPSD.

9. Sight Distance

Sight Distance Requirements

The provision of adequate sight distance for the exit manoeuvre from the driveway is one of the most critical elements. The sight distance required is determined in consideration of the design speed of the intersecting roadway and the sight triangle requirements.

Adequate sight distance is particularly important for commercial driveways. For minimum use driveways along local roads, reduced sight distances are generally tolerable due to the lower operating speeds and volumes resulting in a larger number of safe gaps in the traffic stream. Accesses adjacent to bridges or other structures which may interfere with a motorist's line of sight must be located as follows:

1. A commercial entrance in an area where the posted speed limit is 80 km/h or more must be located at a minimum distance of 145 metres (475 feet) from the end of the deck of the bridge or from the nearest part of the structure which actually interferes with the sight vision of motorists; and

2. A residential farm's field entrance in an area where the posted speed limit is 80 km/h or more must be located at least 30 metres (100 feet) from the end of the deck of the bridge or from the nearest part of the structure which actually interferes with the clear vision of the traffic using that entrance.

Table 4.9 provides a guideline for required sight distances for different road classifications, County wide. This is only a guideline as distance may vary due to existing characteristics such as width of roadway to cross, vehicle type, surface type and surface conditions.

Table 4.9: Sight Distance Guidelines

Road Classification	Posted Speed	Stopping Sight Distance	Crossing Sight Distance	Turning Sight Distance
Local	40km	45m	67m	80m
Collector	50km	65m	85m	140m
Arterial	60km	85m	100m	160m
This sample has been adapted from the TAC Geometric Design Guide for Canadian Roads				

Stopping Sight Distance: Is the distance required for a passenger vehicle to safely stop and avoid a conflict with another vehicle entering the stream of traffic from the side street or driveway. The distance is the sum of the distance travelled during the perception and reaction time and the braking distance.

Crossing Sight Distance: The sight distance for a crossing manoeuvre is based on the time it takes for the stopped vehicle to clear the intersection and the distance that a vehicle would travel along the major roadway at its design speed in that amount of time.

Turning Sight Distance: The sight distance for a turning manoeuvre is based on the turning vehicle being able to accelerate to a speed which does not significantly interfere with the vehicles approaching on the major roadway. It is assumed that the main line vehicle will slow down to a speed 85% of the design speed and there should always be a gap of 2.0 s between the turning vehicle and the main line vehicle.

10. Spacing between Adjacent Driveways

The spacing of driveways is related to the number and location of existing adjacent driveways, opposing driveways and the number of new driveways proposed. The minimum spacing between driveways is measured between the end and start of the curb returns on the adjacent driveways.

The following objectives should be considered:

- To clearly identify to the user which property each driveway serves;
- To ensure that sufficient space is available between driveways for the positioning of traffic signs, lighting poles and other surface utility fixtures and road hardware;
- To separate conflict areas for each driveway;
- To provide appropriate space between driveways for on-street parallel parking, where permitted and in consideration of sight line requirements;

- To increase length of potentially collision free pedestrian areas by minimizing the number and width of driveways;
- To avoid on-street overlapping left turns; and
- The amount of left turn storage required.

There are numerous factors to consider when attempting tabulating appropriate driveways spacing. An effective means of ensuring reasonable spacing between driveways is to limit the number of driveways permitted per individual property. Suggested guidelines can be found in the Geometric Design Guide for Canadian Roads (TAC).

11. Minimum Clearance from Obstructions
All driveways shall be clear of any obstructions like street hardware (utility cabinet power, mail boxes, poles, and hydro kiosks), street furniture (traffic lights/signs), trees, etc., by a minimum of 1.0 metre to the edge of pavement. Driveways shall not be built around obstructions and must be on one side of the obstruction.

4.5.5 Parking

Off-street parking will be required for all developments. The parking standards to be employed are those which are contained in the planning documents and zoning requirements for individual uses.

The provision of on-street parking for commercial uses is generally not supported on the basis that most development is to be self-supporting with respect to parking and should not have to rely on adjacent land uses or public roads to provide a sufficient amount of parking. The primary functions of a road are for the mobility of pedestrians, cyclist, and vehicles, and the provision of access. Parking is a secondary function. On-street parking in commercial or settlement areas is discouraged because it reduces the capacity of the road and increases the potential for collisions.

The loss of capacity is a result of the following:

- The reduction in through lanes; and
- Increased “friction” caused along the roadway by manoeuvring in and out of a parking space.

An increase in the potential for accidents is caused by the following:

- The angle at which vehicles are permitted to park;
- Reduced sight lines; and
- Opening doors into traffic lanes.

In situations where on-street parking exists (typically in urban areas) and there is pressure to widen the roadway for capacity reasons, removal of the on-street parking may be a reasonable alternative to widening.

Considerations and Methodology for Allowing On-Street Parking

The provision of on-street parking may be necessary in the vicinity of existing built-up commercial areas, high density residential, or labour intensive industrial areas. The following considerations should be made when determining the feasibility of on-street parking.

The effect of allowing parking along a street varies with respect to the number of lanes, the location of the parking, the orientation of the parking, the presence of curbing, and the time at which parking is permitted. Capacity studies have indicated a one third reduction in street capacity, where parking along a street is permitted, even with time of day restrictions and other regulations in place. This effect varies depending on the number of lanes and the location of the parking relative to intersections. The greater the number of lanes, and the further removed the parking is from an intersection, the higher the capacity. Based on these studies, criteria have been established that provide a threshold in determining when allowing on-street parking is acceptable without significantly impacting the functionality of the corridor. **Table 4.10** provides the threshold for allowing on-street parking without significantly affecting capacity, based on the peak hour volume per lane. These thresholds apply to arterial and collector roadways only.

Table 4.10: On-Street Parking Guidelines

Location of On-Street Parking	Peak Hour Volume Per Lane in Same Direction of Flow	
	1 Lane	Multiple Lanes
Midblock	<400 vph	<600 vph
Intersection within 50m	<300 vph	<500 vph
This sample has been adapted from the Town of LaSalle Corridor Management Policy		

For example, parking would be considered along a four lane street in a mid-block location if there is at least one through lane remaining in each direction after implementing the proposed on-street parking, and the volume of vehicles along the street flowing in the same direction does not exceed 600 vehicles per hour. Parking along a two lane street would also be permitted if the peak hour volume thresholds are not exceeded, assuming that all of the other location criteria are met.

Problems of capacity can be remedied through the effective regulation of on-street parking. Peak hour parking restrictions are a widespread regulatory measure. In most cases, capacity along a corridor is critical during peak periods; outside of those peaks on-street parking could be allowed. The peak hour could consist of commuter peak periods, shopping activities, or special events. During peak hours, stopping or loading activities should not be allowed.

The design of the parking should also be a consideration. Studies have found that there is a significant increase in collisions that result from parking oriented at an angle to the traffic stream. It is strongly recommended that if on-street parking is required that it be designed parallel to the flow of traffic.

Where on-street parking does not pose a capacity problem or an accident hazard and meets the warrant criteria, these on-street parking areas should be formalized through the installation of regulatory measures, pavement markings, parking meters or some combination of these devices.

General Areas Where on-street Parking is to be Prohibited

There are several situations where on-street parking should be prohibited at all times. These include locations adjacent to or within intersections, high density residential, commercial and industrial driveways (which are technically an intersections) or designated auxiliary lanes and at fire halls or fire hydrants.

At signalized intersections on-street parking should not be provided within the area of the average queue reach lengths at each approach where parking is being considered. The average queue reach can be determined by using the peak hour volume of each approach.

At intersections under stop sign control, vehicles should not be parked within nine (9) metres of the intersection to allow for one vehicle to pull ahead of a parked vehicle and to be seen by others at the intersection, including pedestrians.

Parking should be prohibited from the beginning of the approach taper for right turn lanes to ensure that movements out of the traffic stream are not impeded.

Parking should not be allowed within five (5) metres of a high density residential, commercial or industrial driveway. This distance is to be measured from the near edge of the driveway. This distance should provide a sufficient sight line without having to pull out into the traffic stream to see, and the distance is short enough to discourage most motorists from parking in this space.

Specific Areas Where On-Street Parking is to be Prohibited

The methodology for determining where parking is to be prohibited is to be used as the basis for determining the applicability of on-street parking along all arterial roads identified on **Schedule C-4** and subsequent **Schedules I-4, T-4 and W-5** of the Official Plan.

Considerations that should be made include the provision of adequate sight distance at intersections and at commercial driveways. The on-street parking would be located away from intersections to provide a sight triangle that would provide the minimum crossing sight distance for vehicles on the side street. The minimum crossing sight distance is the distance required to safely cross ahead of opposing traffic. The typical sight triangle is nine (9) metres by nine (9) metres. At commercial driveways, on-street parking should be located a minimum of five (5) metres from the near edge of the driveway.

4.6 Warrants

4.6.1 Traffic Study Warrants

Applications for approvals of zoning and site plans must demonstrate that matters related to corridor management and control policy are in conformity with the County of Oxford's policies. Similarly, application for changes in official plan and zoning must recognize the intent of the current designation and demonstrate how the change in designation can be accommodated on the public street system. It is therefore desirable that applications which involve development levels or changes in development levels which are above the

traffic volume guidelines in the following table will be required to undertake a traffic impact study. The threshold, **Table 4.11,** for each land use is based on the proposed application generating approximately 100 trips in the peak hour of the adjacent street.

Table 4.11: Traffic Impact Study Guidelines

Traffic Impact Thresholds		
Land Use	**Variable**	**Variable Amount**
Retail Commercial	Gross Leasable Area	13,000 Square Feet
Residential	Dwelling Units	50 Units
Office Buildings	Gross Floor Area	32,000 Square Feet
Industrial	Gross Floor Area	51,000 Square Feet
Educational	Students	120
Other	Greater than 100 two-way trips in Peak hour of adjacent street traffic	

Exceptions to these guidelines may be granted at the discretion of the County. Development applications that generate fewer trips may still be required to undertake a traffic impact study at the discretion of the County Engineer due to the cumulative impacts from smaller developments, and depending on the specific site and situational characteristics of the application.

4.6.2 Signal Warrants

We recommend that the County adopts the traffic signal warrants used by the MTO. The warrants take into account the following different roadway conditions:

- Roadways with operating speeds below 70 km/h (restricted flow condition); and
- Roadways with an operating speed greater than or equal to 70 km/h (free flow condition).

4.6.3 Intersection Traffic Signal Control

Vehicular Volume Criteria (Justification 1)

Free Flow

1. Vehicular volume of all approaches for each of the heaviest eight hours of an average day is a minimum of 480*, and
2. Vehicular volume along minor streets for the same eight hours is a minimum of 120***.

Restricted Flow

1. Vehicular volume of all approaches for each of the heaviest eight hours of an average day is a minimum of 720*, and
2. Vehicular volume along minor streets for the same eight hours is a minimum of 170***.

Cross Traffic Delay Criteria (Justification 2)

Free Flow

1. Vehicular volume along major street for each of the heaviest eight hours of an average day is a minimum of 480*, and
2. Combined vehicle and pedestrian volume crossing the major street for the same eight hours is a minimum of 50**.

Restricted Flow

1. Vehicular volume along major street for each of the heaviest eight hours of an average day is a minimum of 720*, and
2. Combined vehicle and pedestrian volume crossing the major street for the same eight hours is a minimum of 75**.

Accident Criteria (Justification 3)

Free Flow and Restricted Flow

1. Total reported accidents (likely to be corrected by a traffic signal) per twelve month period averaged over 36 month period is a minimum of 5, and
2. An adequate trial of a less restrictive remedy has failed to reduce the number of accidents, and an 80% or greater fulfilment of Justification 1 or 2.

Combined Criteria (Justification 4)

Free Flow and Restricted Flow
An 80% or greater satisfaction of a minimum of two of justifications 1, 2 or 3.

4.6.4 Mid-block Traffic Signal Control (Pedestrian Crossing)

Minimum Pedestrian Volume (Justification 5)

Free Flow

1. Pedestrian volume crossing the major street per hour averaged for the heaviest eight hours of an average day is a minimum of 120, and
2. Vehicular volume along the major street for the same eight hours is a minimum of 290*.

Restricted Flow

1. Pedestrian volume crossing the major street per hour averaged for the heaviest eight hours of an average day is a minimum of 240, and
2. Vehicular volume along the major street for the same eight hours is a minimum of 575*.

The above mentioned justifications for traffic control signals are applicable to two-lane roadways. In circumstances where this is not the case, the following notes should be applied.

*Vehicle volume warrants should be increased by 25% where two or more moving lanes exist in one direction.

**Crossing volume is defined as: the left turns from both of the minor street approaches, the heaviest through volume from the minor street, 50% of the heavier left turn movement from the major street when the left turn volume is grater than 120 vph and the left turn volume plus the opposing volume is greater than 720 vph, and the pedestrians crossing the major street.

The lowest sectional percentage governs the warrant.

***For "T" intersections values should be increased by 50%.

4.6.5 Considerations for All-Way Stop Warrants

The Ontario Traffic Manual (OTM) Book 5, notes a number of conditions under which all-way stop control should not be used. These include the recommendation not to use them: as a speed control device; on roads within urban areas having a posted speed in excess of 60 km/h; as a means of deterring the movement of through traffic in a residential area; and others (see page 20 of the OTM, Book 5).

The policy within Oxford County is to maintain a free flow operation on County roads and to install stop signs on all minor approaches to County roads. When considering an all-way stop, the following conditions will apply:

Vehicular Volume Criteria (Justification 1)

Collector Road

- The average vehicle volume on all approaches per hour is a minimum of 600 (eight hour average);
- The minimum combined vehicle and pedestrian volume from the minor street is 250 per hour for the same 8 hour period; and
- The minimum volume split does not exceed 70/30.

Local Road

- The vehicle volume on all approaches exceeds 400 during the peak hour;
- The minimum combined vehicle and pedestrian volume from the minor street is 150 per hour for the same 8 hour period; and
- The minimum volume splits do not exceed 75/25 for a 3-way stop, and 65/35 for a 4-way stop.

Accident Criteria (Justification 2)

Collector Road

- The number of accidents within a period of 12 months, of types susceptible to correction by all way stops, equals or exceeds 4. An adequate trial of a less restrictive remedy has failed to reduce the number of collisions.

Local Road

- The number of accidents within a period of 12 months, of types susceptible to correction by all way stops, equals or exceeds 3. An adequate trial of a less restrictive remedy has failed to reduce the number of collisions.

Sight Criteria (Justification 3)

Collector Road

- Sight distance of a motorist stopped on a minor street viewing the major street is a minimum of 90 metres.

Local Road

- Sight distance of a motorist stopped on a minor street viewing the major street is a minimum of 65 metres.

An All-Way Stop (3 or 4) will be considered when either justifications 1, 2 or 3 are satisfied 100% or more. Stop signs may also be installed at intersections where there is safety concerns regarding the assignment of right-of-way as determined by the County Engineer.

Roundabout Criteria

Roundabouts have been implemented in many parts of North America. Because the only movement allowed upon entry or exit from a roundabout is a right turn, the occurrence of crashes that result in injury is substantially reduced. Small-angle collisions, the type of collisions that can occur as a result of a right-hand turn, are typically less severe than other types of collisions. At a stop-controlled or signalized intersection, there are 32 potential conflict points whereas at a roundabout there are 8. Research has found that installing a roundabout can result in the following benefits:

Improved Safety

- Up to a 90% reduction in fatalities;
- Up to a 76% reduction in injury crashes;
- Up to a 30% to 40% reduction in pedestrian crashes;
- Reduces the severity of accidents; and

- Keeps pedestrians safer.

Slower vehicle speeds (under 50 Km/h)

- Drivers have more time to judge and react to the actions of other cars or pedestrians; and
- Advantageous to older and novice drivers.

Efficient traffic flow

- Reduction in pollution and fuel use due to fewer stops and starts;
- Improved traffic flow for intersections that handle a high number of left-turns; and
- Reduces the need for storage lanes.

Money saved:

- No signal equipment to install and maintain;
- Savings estimated at an average of $5,000 per year in electricity and maintenance costs; and
- Service life of a roundabout is 25 years (vs. the 10-year service life of signal equipment).

Community benefits

- Traffic calming; and
- Aesthetic landscaping.

A number of parameters need to be considered prior to pursuing the installation of a roundabout:

Intersection Compatibility

Roundabouts have a traffic calming effect in that they tend to reduce approach speeds compared with other intersection types. The County should consider whether this is sought after and/or appropriate for a particular location.

Traffic Volume

Roundabouts treat all legs equally, therefore, while overall delay may decrease, unbalanced intersecting road volumes may result in delays to the lower volume approaches. Operational analysis using software such as RODEL or SIDRA will provide an insight into this issue.

Pedestrians

Motorists are supposed to yield to cyclists and pedestrians at the entrance/exit to a roundabout. Vision impaired pedestrians may have difficulty determining if the traffic sounds they hear are of approaching vehicles wishing to use the exit they intend to cross. Pedestrian crossing signals could only be installed some distance away from a roundabout in order to avoid to intersection blocking.

Vertical and Horizontal Characteristics and Design Element Impediments

Roundabouts tend to require more land at the daylight triangles when compared with other intersection types. Steep slopes are not compatible within roundabouts or within the operational approaches of a roundabout. As with other intersection operations, poor sightlines and dangerous grades are just a couple of possible outcomes.

Signal Coordination, Progression

If the existing roadway operates as a network with signals coordinated for traffic progression, roundabouts will tend to break up platoons of vehicles potentially impacting the signal coordination.

Cost

When considering construction costs and ongoing maintenance, the life cycle cost of a roundabout tends to be less than a signalized intersection.

Safety

Roundabout design provides speed control. The typical slower negotiating speeds of a roundabout should provide benefits including a reduction in crash severity, allowing for a greater perception/reaction period due to slower speeds and increased efficiency due to more acceptable gaps in traffic as a result of the lower negotiating speeds. Due to the geometric features within a good roundabout design, the provision of speed reduction occurs during all periods of the day regardless of traffic volume.

Emergency and Special Event Accommodation

Through proper design, roundabouts can easily accommodate emergency and large sized vehicles. Drivers should behave in the same manner as they would on any other road if an emergency vehicle approaches by moving their vehicle as far right as possible and, if necessary, stopping until the emergency vehicle passes. Additionally, negotiating roundabouts may be safer for emergency vehicles due to the lower operating speeds as well as providing less risk of collision with vehicles running the intersection at high speeds.

Planning Guideline

Roundabout design should follow current North American design guidelines and possibly, should be supplemented by appropriate official UK and Australian materials as required. A useful planning guide is the FHWA publication*, Roundabouts: An informational guide, FHWA Publication No. FHWA-RD-00-067'*

5. Cycling Policies

Cycling is generally recognized as a viable mode of transportation that is environmentally sound and supportive of healthy lifestyles. In 2001, cycling accounted for 1.0% of all trips in Ontario and 1.2% nationally[1] but is expected to grow with increased awareness of health and environmental issues, and need to reduce green house gases.

Recreational / Utilitarian Cycling

Cycling is used for both utilitarian and recreational purposes. Recreational cycling is typically associated with the personal enjoyment of the cycling experience including health and wellness benefits. As a result, recreational cyclists are often less concerned with the directness of the route as they are with the safety, amenities and enjoyment provided by the route. In contrast, utilitarian cycling has transportation as the primary objective with a focus of traveling from one point to the other for specific purposes. The trip purposes for utilitarian cycling typically include traveling from home to work or to school. Generally these cyclists will take the most direct route to their destination, which may include travel on major (arterial) roadways.

From a travel demand management perspective, the utilitarian cyclist is of greatest interest as these cyclists have the potential to reduce the number of vehicles on the roadway system during peak periods of travel. However, the County recognizes the overall benefits of cycling and would like to promote and enhance cycling as a means of transportation for both recreational and utilitarian purposes.

Why Cycling?

Although most jurisdictions have in the past focused on construction of facilities for motor vehicles, scarcity of available resources has led to the realization that building a multi-modal transportation network better satisfies the overall mobility requirements and thereby provides a greater return on investment. Multi-modal networks that can be used by not only motor vehicles but also non-motorized modes like cyclists and pedestrians contribute to greater transportation choices, less traffic congestion, cleaner air, healthier citizens, stronger communities, a more sustainable economic climate and a higher quality of life for its residents.

Cycling usage has grown in the last decade and is expected to continue to grow. The growth in cycling demand is attributed to increased awareness of the health and environmental advantages of cycling. Moreover, people have become aware that cycling is a more efficient means of travel for short distance trips than any other mode. For example, recent studies have shown that for distances up to 10 km in downtown/urban cores, cycling is the fastest of all modes from door to door.

These findings are supported by recent studies that show cycling is predominantly used for trip lengths of up to 10 km. The National Bicycle and Walking Study[2] reported that in U.S. cities 25% of all trips are 1.5 km or less, and over two-thirds are 8 km long or less. In the U.S., 20% of all cycling trips involve travel to and from work, demonstrating the potential for increasing the number of trips by bicycle. A recent study in Kingston,

[1] *Cycling Trends and Policies in Canadian Cities, Victoria Transport Policy Institute Publication, 2005*
[2] *National Bicycle and Walking Study: Final Report 1994*

Ontario also shows that distances of up to 10 km account for close to 85% of all cycling trips made, as shown in **Table 5.1.**

Table 5.1: Distribution of Cycling Trip Lengths[3]

Distance	% Use
Less than 5 km	58.50%
5 to10 km	25.60%
10 to15 km	6.40%
15 to 20 km	2.50%
20 to 25 km	1.00%
25 to 30 km	0.90%
Greater than 30	5.10%

Residents of Oxford County also recognize the importance of cycling and would support initiatives to promote it. From Public Information Centre #1 held in 2005, participants generally agreed that transportation planning and future roadway designs should provide for on street cycling requirements such as bike lanes, etc. Moreover, residents would like some funding to be included in all transportation projects for cycling/pedestrian facilities. In particular, the majority felt that that more money should be spent on cycling facilities, but also note that cycling is unlikely to grow significantly in popularity. However, less than 50% think that there is a need to provide inter-connected cycling facilities that connect the constituent municipalities throughout the County.

Goals and Objectives of Policy

The goal of this document is to provide policy direction to guide the County in moving forward with its cycling agenda. Specifically, the document provides policy directions on cycling network development and ways to encourage and promote cycling in the County.

To achieve these goals and objectives the report will address the following:

- Review the existing policies of the County and other nearby municipalities to understand existing conditions surrounding cycling;
- Identify existing opportunities and constraints associated with the provision of cycling facilities and programs and explore ways of harnessing or addressing them;
- Synthesize the available information to develop an initial spine cycling network in the County that could be built upon in the future years; and
- Recommend suitable strategies for encouraging and promoting cycling activities in the County.

[3] *Source: Kingston Whig Standard, February 2003*

5.1 Existing Policies and By-laws – County of Oxford

The County of Oxford Official Plan sets out the objective of the County's transportation policy as the provision of a safe and efficient multi-modal transportation system capable of moving people and goods into and through the County both at the present and in the future.

In keeping with this objective, the County recognizes the viability of cycling as a mode of transportation and the environmental and social benefits of cycling. As such, the County commits to encouraging its usage as an alternative mode of transportation. Specifically, the County has been considering preparation of a Bicycling Plan to establish cycling networks and to determine priorities for cycling facilities and networks that would be implemented as part of its continuous program of transportation network improvement. The Cycling Policy document forms an initial step in the preparation of the Plan.

5.1.1 Existing Policies and By-laws – Constituent Municipalities

The transportation requirements of the constituent municipalities of Woodstock, Ingersoll and Tillsonburg are included in the County of Oxford Official Plan. The Official Plan policies echo the County's objectives outlined above and recommend preparation of a comprehensive Bicycling Plan in collaboration with the area municipalities. Moreover, the policy recommends provision of adequate parking facilities for bicycles as a condition of development approval in the respective municipalities. The respective municipalities are expected to lead by example by providing accessible and sufficient bicycle parking at all municipal owned and operated facilities in order to promote the use of bicycles.

The municipalities also have a number of trails around parks and popular recreational facilities that would provide starting points in the development of comprehensive cycling networks within each of the municipalities. These trails are discussed in **Section 5.3.1– Opportunities and Constraints**.

5.1.2 Provincial and National Guidelines

The federal government in Ottawa has no involvement at all in cycling policies or funding. That derives from its likewise very limited role in urban transport in general, including public transport. With the exception of Transport Canada's modest funding of occasional research and education programs, urban transport is left to the provinces and cities.

The province of Ontario provides guidelines on bicycle safety including bicycle handling and cycling skills. The safety guidelines cover helmet usage and regulations as to which highways cycling is permitted on in accordance with the Highway Traffic Act. Ontario provides virtually no funding, planning or program coordination for cycling.

5.2 Types of Cycling Facilities

Bicycle facilities can be provided either on-road where cyclists share the road space with motor vehicles, or off-road on separate paths or trails. The off-road paths and trails may be available for the exclusive use of cyclists or as shared multi-use pathways and trails that are usually shared with pedestrians. The alternative cycling facilities are illustrated in **Figure 5.1** and **Figure 5.2**. The choice of what facility to provide at any given location depends on a number of factors including the location of the road, the posted speed limit, road width, available right-of-way and possibilities of retrofitting. The various types of cycling facilities and where they may be used are discussed further below.

On-Road Cycling Facilities

Bike Lanes: Bike lanes are provided for the exclusive use of bicycles within a roadway that is being used by vehicular traffic. A bicycle lane can be provided when the available pavement width is sufficient to accommodate separate lanes for vehicular traffic and bicycles separately. They are separated from travel lanes for motor vehicles with paint lines or other delineators.

Shoulder Bikeway: These are paved shoulders on a roadway that provide a suitable area for cycling away from motor vehicles. They are particularly suited for rural roads with relatively high vehicular speeds. Bicycle traffic on a shoulder is always one way in the same travel direction as the adjacent outside travel lane.

Bicycle Routes: Bicycle routes are usually marked on a roadway on which bicycles share the travel lane with motor vehicles. The shared lane could be a typical lane with a standard width or a wider lane. Signs are required to mark the street as a bicycle route and to act as a constant reminder to motorists that the roadway is shared. Bicycle routes are suitable for low volume roads or local residential streets.

Off- Road Cycling Facilities

Cycling Path: Cycling paths are one or two-way facilities that are provided for the exclusive use of cyclists. They can be located within a road's right-of-way or in corridors not served by roadways. Within a road's right-of-way, they generally run parallel to the roadway with geometry that is strongly influenced by the road characteristics and are physically separated from the travel lanes used by motor vehicles, by a boulevard or barrier.

Multi-Use Pathways: Multi-use pathways are facilities that are intended for use by both cyclists and pedestrians. For that reason, they are usually wide enough to provide sufficient space for cycling and walking without any conflicts. Like the cycling paths, they can be provided within a road's right-of-way or in other corridors to serve any two origin and destination points.

Trails (Cycling or Multi-Use): Trails are similar to cycling paths or multi-use pathways, but are usually provided in wooded nature parks and other recreational facilities where they serve primarily recreational purposes.

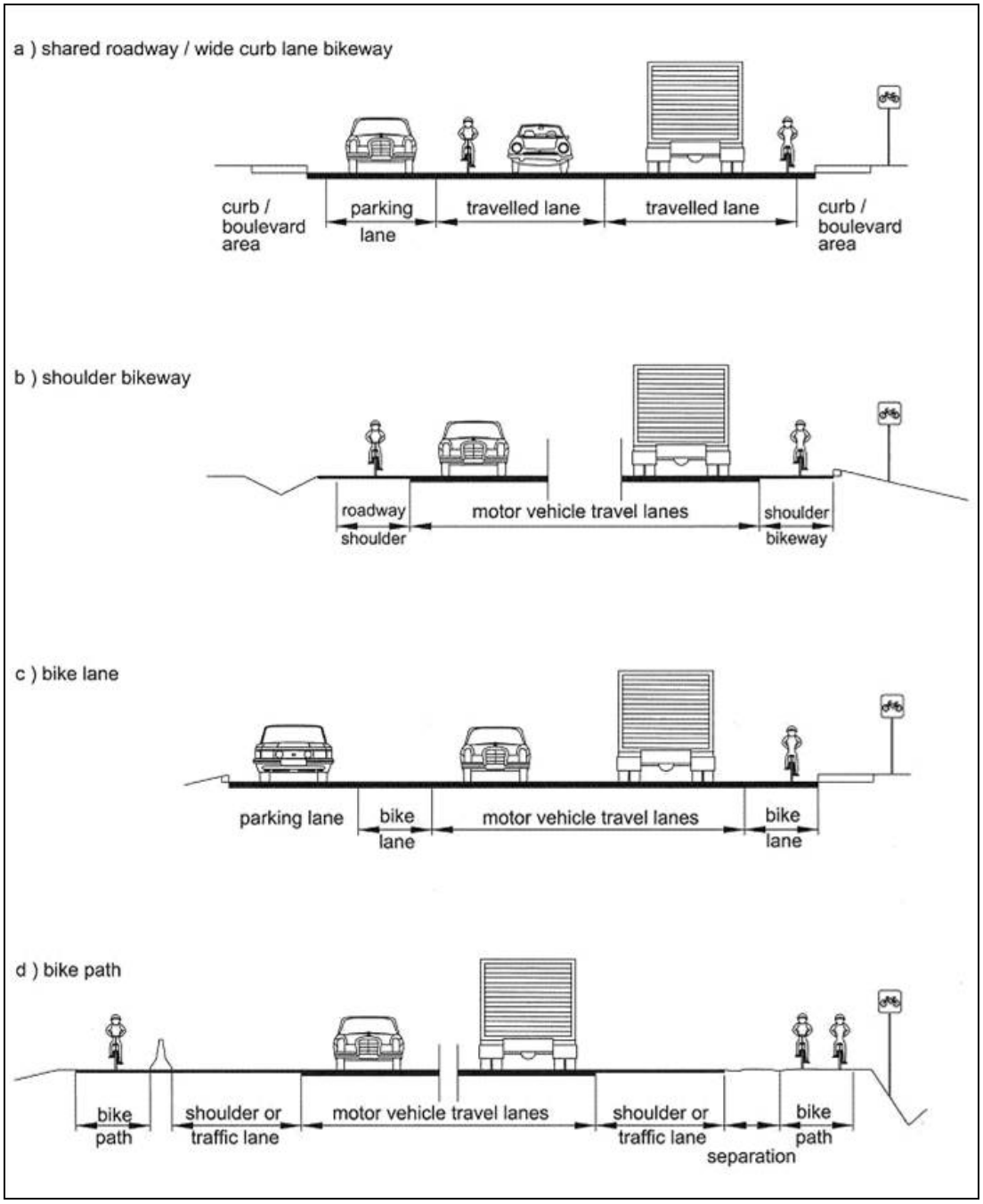


Figure 5.1: Typical Cycling Facilities[4]

[4] *Source: TAC Geometric Design Manual*

5.3 Design Considerations

Cycling facilities should be designed to be consistent with the prevailing roadway design guidelines such as the MTO Geometric Design Guidelines or Geometric Design Guide for Canadian Roads (TAC). The practical requirements for an effective bikeway includes space to ride including the width of the bike lane or path and lateral clearances, nature of the riding surface, the capacity to maintain a certain travel speed and connectivity to the desired travel destination.

Generally, the width of bike lanes or paths should be a minimum of 1.5 metres or 3.0 metres for one-way or two-way facilities. Likewise, multi-use pathways should be 2.0 metres to 4.0 metres in width depending on whether they are one or two-way facilities and the expected intensity of usage. In addition, a minimum vertical clearance of 2.5 metres should be provided for trails and other cycling facilities for underpasses or low bridges.

Furthermore, suitable pavement markings and road signs are necessary to delineate bike lanes and show bicycle routes. Signed bicycle routes should typically have a route identifying sign placed at regular intervals on roads with low traffic volumes and in residential areas. Where traffic volumes are higher, it is common practice to augment the route identifier signs with “share the road signs”. Pavement marking should typically follow TAC guidelines or Ontario Traffic Manual, Book 11 guidelines and include the diamond reserve symbol. Further information regarding design guidelines is included in subsequent sections.

5.3.1 Opportunities and Constraints

The following opportunities and constraints related to the provision of cycling facilities in the County have been identified:

- **Thames River** runs through Woodstock and Ingersoll as well as a number of smaller communities including Beachville, Thamesford and Plattsvile. The scenery provides an excellent opportunity for recreation cycling and is well suited for a cycling trail. On the other hand, it also provides a constraint on potential north-south routes;
- **Existing Trails**: A number of recreational trails exist in the County within the various constituent municipalities. The trails with provisions for cycling include Centennial Park/Victoria Park/Smith Pond and John Lawson Park and Trail in Ingersoll; and Millennium Trail System and Roth Park in the Town of Woodstock. In addition, there are camping grounds off Highway 59 in Northwest Woodstock;
- The rural nature of the County with spread out communities and low population will make it difficult to provide adequate cycling infrastructure for all communities. As such, consideration for cycling facilities must begin within the larger urban areas of Woodstock, Ingersoll and Tillsonburg. As the communities grow, there may be a need to consider an integrated bicycle network that links all the communities in the County together. Once a municipality develops a cycling route near to a County road, then the opportunity to extend the route should be considered;
- Public perception of the automobile and cycling hinders promotion of cycling for commuter purposes. The existing transportation network is based primarily on facilitating the movement of motor vehicles. Cycling is commonly portrayed as an unsafe means of transportation that should be used only for recreational purposes. Gaining public acceptance of cycling as a viable mode of transportation requires a

concerted effort to change the long-held perception. For that reason, it will be necessary to undertake public education initiatives to inform the public of the benefits of cycling and to promote safe cycling practices;

- Lack of adequate funding from other levels of government is also a factor that constrains the provision of cycling facilities and programs. The County will need to show leadership by dedicating funds for cycling activities on an annual basis. The County also should seek external funding opportunities from the higher levels of government and partners; and
- There are opportunities to retrofit existing roadways, pathways and trails with appropriate cycling facilities. In addition, there may be opportunities to utilize utility corridors, rail lines and watercourses to develop new cycling routes.

5.3.2 Policies and Programs

Policies and design standards in many municipalities are derived from the Canadian Institute for Planners Report entitled Community Cycling Manual. The manual recommends a set of basic principles that should be followed when initiating a cycling project. These include:

- Assume that every street is a cycling street;
- Bicycle facilities are part of the whole picture and should be considered as an integral component of any planning decision; thus, the basis and ideas formerly included in separate "Bicycle Plans" should be incorporated into existing policy documents;
- Overcome existing barriers to bicycle travel;
- Allow for options, both in the planning and design phases, and afterwards, when monitoring the success of the project;
- Plan ahead for changes to the transportation system;
- Ensure that cycling implications in upcoming projects are considered as part of the planning and design process; and
- Encourage cycling linkages between established routes in order to create a cycling "network" that encourages greater cycling activities.

It is recognized that a comprehensive bicycle network is best undertaken at the local municipal level; nevertheless, the County does have an important role in providing bicycle facilities on its roads to integrate with those of the local municipalities. Based on a review of polices and practices in other jurisdictions as well as the above principles and the existing opportunities and constraints within the County, the following lists some of the policies, programs and action plans that the County could consider in accommodating cycling.

A Cycling Advisory Committee:

- Coordinating a Cycling Advisory Committee could assist the County in the development and implementation of future cycling initiatives. The committee would coordinate and represent the interests of cyclists, focus on their needs and priorities and ensure that those interests are taken into consideration in any future cycling initiatives. The committee should be composed of residents and representatives of the cycling community within the County as well as area municipal representatives.

Educational and Promotional Material/Programs:

- Publications, pamphlets, newsletters, maps and other communication materials that provide information and promote cycling tourism, and encourage more cyclists to ride to work and school can be a useful tool in the promotion of safe cycling. The information should also be posted on the internet for ease of access;
- Provide and coordinate educational programs such as CAN-BIKE courses for children and adults to reinforce safe cycling practices including wearing helmets, and protective and reflective clothing;
- As demand arises, provide facilities (bicycle locking stands) in front of all County-owned buildings and make available shower and change facilities for employees; and
- Work with the local police detachments to enforce proper usage of cycling facilities, and with local school boards to nurture responsible bicycle usage for school children.

Funding for Cycling Activities and Programs:

- Provide a line item in the County's annual budget for cycling initiatives and programs; and
- Explore funding from other levels of government under special projects recognizing the role cycling plays in Transportation Demand Management, sustainable transportation and environment friendly initiatives. Exploration of potential funding opportunities from the Provincial Government include the Active 2010/ Communities in Action Fund through the Ontario Trails Council.

Supporting Cycling Initiatives:

- Encourage employers in the County to promote and support bicycle commuting by providing information to employees; and
- Continue to work with the local municipalities and support initiatives and programs aimed at encouraging cycling in those jurisdictions.

5.4 Design Guidelines

5.4.1 Cycling Facility Design Guidelines

Design of cycling facilities must take into consideration various factors including information on cyclists, their abilities and needs as well as the surrounding environment where the facility is to be located. As previously noted, practical requirements for an effective system include space to ride including the width of the bike lane or path and vertical clearances, nature of the riding surface, the capacity to maintain a certain travel speed and connectivity to the desired travel destination.

Because of physical, environmental and financial constraints, there is a need to retrofit existing roadways to accommodate cycling facilities. The cycling facilities can be accommodated in existing roadway systems within the road right-of-way either as separate pathways or on the available or expanded platform width. In such retrofit conditions, the design criteria is governed by a number of factors including roadway section characteristics (rural or urban), right-of-way width, roadway width and number of lanes, traffic volume, and posted speed. The presence of heavy commercial vehicles affects safety and also must be considered in the facility design**. Table 5.2** provides proposed design guidelines that take those factors into consideration.

Table 5.2: Design Guidelines for Cycling Facilities under Retrofit Conditions

Facility Type and Characteristics	ROW	Posted Speed	Potential Cycling Facility	Design Volume	Cycling Facility width [m]
Provincial Highway	Established by province	N/A	Cycling not recommended		
Rural County Road	Varies	Up to 60	Signed Route	< 1200	Bike Route
		Up to 80	Paved Shoulder	<5000 >5000	2.0(1.5) [1] 2.0(2.0)
		> 80	Cycling not recommended		
Urban Arterial Road – 2/ 4 Lane roadway	Unconstrained ROW	N/A[3]	Off-Road Path	N/A	1-Way - 1.5(1.5) 2-Way - 3.0(3.0)
		N/A	Off-Road Multi-Use Path	N/A	1-Way - 2.0(1.5) 2-Way - 4.0(3.0)
Urban Arterial Road – 2/ 4 Lane roadway	Constrained ROW, adequate pavement width	< 50	On road curb[2] lane	<5000 >5000	4.3(4.0) 5.0 (4.5)
		50-80	On road curb lane	<5000 >5000	4.3(4.2) 5.0(4.5)
		> 80	Cycling not recommended		
Urban Collector – 2/ 4 Lane roadway	20-26 m	< 50	On road curb lane	<5000 >5000	4.3(4.0) 5.0(4.5)
		50-80	On road curb lane	<5000 >5000	4.3(4.0) 5.0(4.5)
Local Road – 2 Lane roadways	18-20 m	Up to 50	Signed bike Route	< 1000	Cycling route

Notes: [1] 4.3 (4.0) – desirable (minimum).
Width should be increased by 0.5 m where traffic is composed of 10% or more commercial vehicles
[2] A travel lane width of at least 3.5 m must be maintained where cycling lane is provided on shoulder or curb lane. Curb lane width includes driving lane and widened portion to accommodate bicycles
[3] N/A – Not applicable.
Table assumes adequate pavement conditions

5.5 Next Steps

The success of the policies and recommendations outlined in this document will only be realized if they are implemented. It is therefore recommended that the County should consider:

- Consider extending any area municipal urban cycling routes onto adjacent County roads;
- Facilitating the formation of a County wide Cycling Advisory Committee; and
- Considering a Bicycle Master Plan Study, in coordination with appropriate County departments and area municipalities, to guide the implementation of bicycle policies, programs and networks.

6. Pedestrian Policies

Within the typical road right-of-way conflict exists between the needs of motorists and pedestrians. Such divergence can be the result of what motorists and pedestrians expect from the roadways and walkways they utilize. More and more, governments are adapting policies that will promote and sustain a positive influence towards alternative modes of travel in an attempt to get motorists out of their personal vehicles in order to utilize available travel alternatives. Consequently, to promote this concept, the general public must be provided safe, effective and sustained access to such travel alternatives.

Sidewalks are designated in the Municipal Act as a lower tier sphere of responsibility, including those that are in an Upper Tier road allowance. Notwithstanding this jurisdictional situation, the County supports the provision of sidewalks in the County road allowance.

6.1 Why Walking?

The incorporation of pedestrian activity into the County's Transportation Master Plan will be an essential component in promoting a walking environment. The pedestrian policy outlines how to integrate, sustain and encourage a walking environment. It identifies goals, objectives, and evaluation criteria for pedestrian planning, design, education, enforcement, and encouragement. It should identify actions for municipal agencies to implement these objectives. Finally, it provides a list of pedestrian design criteria.

Surveys indicate that the use of non-motorized travel could increase significantly if given appropriate community support. Walking is a key form of transportation through neighbourhoods, around schools, and in business districts. Walking/hiking is also a popular form of recreation, and Walking/hiking in particular is expected to gain in importance in this regard.

6.2 Goals & Objectives

6.2.1 County Pedestrian and Accessibility Goals

County Council has acknowledged that within their long term plans and when budgets allow, there is a necessity to support the provision of pedestrian facilities within the County Road system and to make them safer and more user friendly by:

- Generally supporting the provision of sidewalks on both sides of County Roads within designated Villages, Serviced Villages or Large Urban Centres except where the road is within an Employment Area are an exception where sidewalks may be provided only on one side of a street;
- Replacing sidewalks disturbed during road construction/reconstruction projects and sharing the cost of installation with the lower tier when sidewalks are installed during road construction/reconstruction projects;

- Ensuring that sidewalks associated with the County Road system are, where possible, sufficiently set back from adjacent roadways to allow for snow storage, adequate draining drainage and safety for pedestrians; and
- Ensuring that new or replacement pedestrian facilities forming part of the County Road system provide barrier-free access from the road network for the disabled and elderly and persons pushing a stroller or cart.

6.3 Background

The Ontario Government passed legislation known as the Ontarians with Disabilities Act, 2001 (ODA). On June 13, 2005 The Ontario government passed the new legislation known as the Accessibility For Ontarians with Disabilities Act, 2005 (AODA). The purpose of this new legislation is to make Ontario a better place by creating a society that is open to all, including persons with disabilities.

In light of this provincial legislation, the County of Oxford wishes to promote a sustainable walking infrastructure where walking is increasingly recognized as a viable means of transportation. Non-motorized transport provides many benefits to users and non-users alike, including travel choice and mobility, affordability, reduced road congestion, infrastructure savings, improved health, recreation and enjoyment, environmental protection, and economic development. Walking improvements are critical for creating more liveable communities.

Actions that support walking include:

- Language and policy in the Transportation Master Plan that supports increased walking;
- Language in the Official Plan supporting increased walking; and
- Policies specific to the location and design of sidewalks/pathways within County road allowances.

6.3.1 Defining Pedestrian Accessibility

Pedestrian facilities include paths, sidewalks, crosswalks, and walkways within County road allowances/right-of-ways or on public lands owned by the County. High quality pedestrian facilities should be considered in all urban or settlement areas.

Pedestrian Accessibility is defined as the provision of sidewalks and pathways to promote and sustain a walking environment to/from all areas within a community and between communities where vehicular transport is not the only viable transportation alternative. This includes incorporating safety into the walkway designs and accommodating persons of all abilities.

6.4 Design Guidelines

The geometry for pedestrian facilities must take into account the width, grades, and the separation from the traveled roadway via the inclusion of a boulevard, where feasible. Boulevards not only provide a barrier

between vehicles and pedestrians, but in northern climates, boulevards provide storage for snow removal. In keeping with this subject, it bears repeating that access to pedestrian facilities, including transit stops, must be designed to safely accommodate persons of all abilities. Therefore, facilities such as transit stops must be approachable by pedestrians from directions safely removed from the travelled portion of the right-of-way. Designs for new pedestrian facilities must reflect at minimum, current industry accepted standards. The pedestrian facility/sidewalk/walkway designs should accommodate persons of all abilities. As an example, sidewalks should be built to a width that will accommodate two wheelchairs to allow passing and/or overtaking manoeuvres and provide safe grades where grade separations exist from one pedestrian facility to the next. The pedestrian planning guidelines can be found within the Ontario Provincial Standards Documents (OPSD), the Geometric Design Guide for Canadian Roads (TAC), the Municipal Engineers Association Municipal Works Design Manual, and the Ontario Traffic Manual (OTM). Overleaf, **Table 6.1** provides an array of topics that require attention before pedestrian facilities are constructed/rebuilt/refurbished.

Table 6.1: Pedestrian Planning Guidelines

Topic	Required or Recommended	Reference[5]
Access for People with Disabilities	In general, accessible design requires the elimination of obstacles within the route of travel, a minimum 1.5 m width of travel route widening to 3.0 m to accommodate passing wheelchairs and crowded bus ramps. Slopes ranging between 2% and 4%.	TAC 2.2.6.5, figure 2.2.6.3 OPSD 310.010 Facility Accessibility Design Standards
Crosswalks	A marked crosswalk includes the use of pavement markings and signs. The County should install painted crosswalks and crosswalk warning signs at locations where required for school pedestrians if the local municipality places and retains an adult crossing guard during the time required for school pedestrians. Pedestrian heads on County traffic signals are installed in urban areas only and each design is to be evaluated on a site by site basis by Public Works staff and/or an appointed consultant. Pedestrian signals are installed only as warrants demand (e.g., mid-block signal for pedestrian crossing). Crosswalks can be better defined with uniform texturing to aid in their identification by persons with disabilities and provides non-slip surfaces for wheelchairs.	OTM Book 11 TAC 2.2.6.5 OPSD 561.030

[5] *This policy is not to be taken as absolute. A review of current provincial standard should be carried out before construction or rehabilitation of pedestrian facilities.*

Topic	Required or Recommended	Reference[5]
Curbs	Curbs are useful to provide a physical separation between pedestrians and traffic. They stop vehicles from mounting the boulevard when parking and the gutter acts as a path for storm water drainage. In rural areas where a curb is not typically found a ditch or swales provide separation.	TAC 2.2.7
Catch Basins	Catch Basins are best if located outside the route of pedestrian travel and should be mounted flush with the surrounding sidewalk surface.	OPSD 610.010 OPSD 610.020
Hand Rails	Handrails placed at heights ranging between 0.7 m and 1.0 m are recommended when installed.	MEA 5.3.3
Cross-Slope	An acceptable range of cross-slope is 0.01 m/m to 0.05 m/m. A normal cross-slope on a sidewalk is 0.02 m/m to prevent water ponding and icing. It is ideal not to exceed 0.02 m/m for safety in consideration of persons with disabilities and wheelchairs.	TAC 2.2.6.5
Sidewalks	The minimum acceptable width for sidewalks is 1.5 m widening to 3.0 m at bus stops to accommodate higher pedestrian volumes.	TAC 2.2.6.5 TAC figures 2.2.6.1, 2.2.6.2 & 2.2.6.3
Sidewalk Ramps (Curb Cuts)	Ramps are useful for all people, baby strollers, luggage wheels, in-line skaters, bicyclists, and people in wheelchairs. They provide accessibility at intersections, building entrances, and other areas where elevated walkways are edged with curbing. It is recommended that curb ramps have a detectable warning surface for people who are visually impaired.	OPSD 310.030 TAC figure 2.2.6.4
Street Furniture	Street furniture signs, trash cans, and utility boxes may pose hazards to the visually impaired person. In general, it is suggested that street furniture be grouped together to be more noticeable than they would individually and take up less room. Add contrast with a brighter color, maintain a clear height of pedestrian walkways, and place grouped objects in an area with a different surface, and/or mark with a tactile strip.	
Surface	Smooth surfaces such as cement concrete or asphalt are firm and stable enough to support wheelchair wheels, crutch tips, and other mobility aids. Smoothed gravel screenings may be acceptable in recreational settings, however loose gravel and wood chips generally do not provide for an accessible surface.	TAC 2.2.6.5

6.5 Location and Design Parameters

In addition to the County pedestrian and accessibility goals, the location and design for the installation of sidewalks and crosswalks must be prioritized to aid with budget limitations. Criteria must be established and prioritized within a ranking system to effectively apply to sidewalk requisitions. The criteria can include the following:

- The necessity to connect with existing sidewalks/pathways;
- The proximity to schools, parks, senior's complexes, residential areas, retail and business districts;
- Road width to be crossed by pedestrians;
- Traffic volumes and truck percentages;
- Street topography and the safety therein (namely relating to hills and curves to overcome);
- Street classification (arterials and collector roads ranking higher than local roads and laneways);
- Public petitions;
- In preference to other travel modes such as buses and/or taxis; and
- Installation cost.

Cost for installation is included to establish when and where sidewalk installation becomes unreasonable. A base installation cost per linear metre should be ascertained. Where costs become overbearing, the compromise of installing a sidewalk on only one side of the street could be recommended.

The County currently has a cost sharing practice which stipulates that, despite sidewalks being a lower tier sphere of responsibility, the county will pay a 50% share the cost of sidewalk installation in urban or settlement areas during County reconstruction projects. In the event that an existing sidewalk is disturbed during a County reconstruction project, 100% of the affected sidewalk replacement costs will be covered by the County.

6.6 Recommended Policies

The Public Works Department will:

- Liaise with the area municipalities prior to the start of County road reconstruction projects to ensure sidewalks are considered;
- Coordinate efforts with the Community and Strategic Planning Department to ensure that connections between on-street and off-street facilities are well designed;
- Use established standards to ensure access and safety to pedestrians during construction projects;
- Ensure that all pedestrian projects on County road right of ways comply with recognized design standards, such as:
  - Facility Accessibility Design Standards (recently adopted by County Council);
  - Ontario Provincial Standards Documents (OPSD);
  - Transportation Association of Canada (TAC) Guidelines;
  - Municipal Engineers Association (MEA); and
  - Ontario Traffic Manuals (OTM).

- Ensure that if railway right-of-ways acquired by the County are considered for public pedestrian/cyclist activity, that all of the implications on other possible uses such as utility corridors are considered, and
- Ensure sidewalks are wide enough to allow two persons to move in a side by side fashion. This includes persons with disabilities and persons in wheelchairs.

7. Goods Movement

Maintaining the efficient and effective movement of goods is significant to the economic health of municipalities. Trucks traveling on municipal roads are required, for the majority of their route, to follow existing truck routes as well as Federal, Provincial and Municipal Government regulations.

Not all roads are equal. Regions and Counties designate routes that were built to withstand atypical loads. This paved road network is often designated as a truck route. Such roads are typically under the jurisdiction of higher levels of government and out of the municipal controlling arm. These routes should be easily identifiable and understood by its users. The County's mandate is to maintain all County roads as eligible for truck traffic unless otherwise posted due to operational, structural, or seasonal issue constraints.

In accordance with such a network, Regions and Counties typically create by-laws that will stipulate the load factors, axle weight, vehicle length, vehicle height, hazardous goods restrictions and other criteria to be conformed to by users. The County has and will continue to liaise with the province, area municipalities and adjacent municipalities to promote the coordination of improvements or the establishment of new local, regional or provincial road networks to assist in accommodating goods movement.

Goods Movement Data

Recent data regarding the movement of trade goods is essential in order to maintain accurate tracking and funding toward the transportation infrastructure. Forging partnerships with key stakeholders is a major step toward establishing and maintaining all transportation corridors. Stakeholders include all levels of government as well as major private sector groups.

Small steps to goods movement tracking includes regularly scheduled turning movement counts and cordon counts. The identification of key congestion areas on a regular basis will aid Public Works as they attempt to prioritize infrastructure works projects and the budgeting associated with such endeavours.

Modal Aspect

The County of Oxford can be considered a conduit for trade and tourism between the Greater Toronto Area, and Southwestern Ontario and the United States. International trade and goods movement through this area into and out of Canada's economic heartland are important to the Local, Regional and Provincial economies. The efficiency of the goods movement system, in and through the study area is therefore essential to economic prosperity.

An effective transportation network will be essential in supporting the County of Oxford and its continued economic prosperity. Where the historical prosperity was due in part to the existing provincial, County and municipal transportation systems, and the network of other modes, namely railways and to a lesser extent airports, future prosperity will be influenced primarily by the maintenance of an effective road transportation network.

Trucking is a principal means of goods transport in Southern Ontario with highways linking to all major manufacturing centres and international border crossings. The demand for truck transport remains a competitive mode of goods distribution. Trucking provides inter-modal goods transport connectivity between rail, air and marine transport facilities and market destination.

7.1 Goods Movement Network

The following subsections provide a profile of the existing transportation services in the analysis area, focusing on facilities that accommodate longer distance inter-city/inter-County/Regional trips. The profile of each mode describes current service levels and the role and function within the context of the transportation system.

7.1.1 Roads

The provincial road network through Oxford County includes:

- Highway 401;
- Highway 403;
- Highway 19;
- Highway 7; and
- Highway 3.

Sections of Highway 401 are experiencing up to 45% of its daily travel as truck traffic. The urban centres of Woodstock and Ingersoll are serviced via Highway 401 with Highway 403 connecting to Highway 401 at the eastern limits of the City of Woodstock. The Town of Tillsonburg is serviced by Highway 19 and Highway 3. Highway 19 provides the Town of Tillsonburg with an important link to Highway 401.

7.1.2 Rail

The County will actively pursue the maintenance and improvement of rail service sufficient to meet the needs of County residents and area municipalities. Rail transport within the County of Oxford is serviced by the Goderich Exeter, Canadian National and Canadian Pacific Railway lines as follows:

- Canadian Pacific Railway;
- Toronto-Windsor/Detroit main line;
- Canadian National Railway
- Toronto/Hamilton-Sarnia/Port Huron main line;
- VIA Rail passenger service Toronto-London-Windsor; 5 trains/day each way (4 on weekends);
- Goderich Exeter Railway; and
- Short line running through Tavistock owned by Rail America Inc.

GO Transit offers no service in this area of the province. Their most westerly stations are located in Georgetown, Milton and Hamilton. **VIA Rail** operates on both CN and CP rail networks throughout Ontario. Passenger service is provided out of two stations:

- Woodstock (100 Victoria Street South); and
- Ingersoll (1 Thames Street North).

7.1.3 Air

There are no major airports located within the County of Oxford. The closest major international airports would be located in the cities of London and Hamilton. The Town of Tillsonburg does have a municipal airport with a 4,000 ft asphalt runway operational 12 months of the year with night time operations and customs. Of note, customs are only available on an on-call basis.

7.1.4 Marine

The County of Oxford is land locked therefore providing no opportunities for marine facilities although major water corridors such as the Thames and Nith Rivers could be defined as navigable waterways. The nearest marine passenger/cargo operations are handled out of Hamilton to the east. Ferry service or other marine passenger transportation/cargo shipping is not presently provided within the greater analysis area. Many rivers are used for recreational purposes but do not serve a passenger transport or goods movement role.

7.2 Regulations

Few municipalities have designated truck routes. Some cities, such as Hamilton and Guelph are examples of municipalities that have designated truck routes. Most local authorities have a passive attitude towards designating truck routes. Among the upper-tier municipalities, County arterial roads are generally assumed to be suitable for truck routes although are not always formally designated as such. This approach does not recognize the importance of the ability for operators of large trucks to distinguish between more free-flow facilities with a higher design speed and those with frequent intersections and traffic signals. In the municipalities that have designated truck routes or use regional/County roads/major arterials, connectivity issues are minimal as they usually correspond to a network of major roads that meet the needs of goods movement traffic in connecting to the highway system.

On the other hand, virtually all municipal Official Plans and by-laws have policies pertaining to truck restrictions. These restrictions are temporal, spatial and/or functional. Particularly in residential areas, heavy truck movements are often restricted during overnight hours and weekends. In rural jurisdictions there are also seasonal restrictions (during the spring run-off). Heavy trucks are generally not permitted on local or collector roads with residential or institutional (i.e. schools) zoning and downtown areas. Height, weight and time restrictions are commonly grouped together in truck restriction by-laws or Official Plan policies. On the functional side, restrictions are weight or axle-based so as to reduce the degradation of the road facility. This restriction type is less common. Appropriately and effectively implementing and enforcing truck restrictions is problematic as the lists of restricted roads are often long and confusing. When coupled with separate temporal restrictions, it is sometimes difficult to be certain of where trucks are permitted to travel at what

times. Furthermore, it is not clearly evident as to whether there is consistent and comprehensive signage of roads with truck restrictions in all municipalities. The enforcement of the truck restrictions is typically dependent on resident complaints where the municipalities would resolve each complaint on a case-by-case basis.

In some municipalities, truck restrictions do not permit adequate connectivity. Truck restrictions may also be implemented as a result of political motivations over safety and comfort (of local residents) without necessarily considering the effects on and the overall goods movement system. Between abutting municipalities truck restrictions may be inconsistent; change the moment one crosses a municipal boundary, which would be confusing to truck drivers. For example, when a neighbouring municipality institutes truck restrictions that are more severe than their neighbouring municipality this can force trucks to abandon their current route for another once a boundary has been crossed. Furthermore, when time of day restrictions are not consistent this can add to driver frustration and confusion.

7.3 Detours

The Ministry of Transportation, Ontario Good Roads Association, Ontario Provincial Police, local police and representatives from various municipalities in Ontario formed a task force to develop guidelines and best practices that will allow safe and orderly control of traffic on Emergency Detour Routes (EDR's). These EDR's were created to provide drivers with a pre-determined route when a provincial highway is closed. The EDR's through the County of Oxford shall be built to standards that will accommodate provincial highway users. The existing EDR's within Oxford County are presented in **Table 7.1** below.

Table 7.1: Emergency Detour Routes in Oxford County

Road	Between	
	From	To
Athlone Ave.	Mill St.	Juliana Dr.
CR 10	Ex 216, Hwy 401	CR 27
CR 12	Hwy 19	Exit 230, Hwy 401
CR 2 (Dundas St.)	Springbank Ave.	CR 3
CR 27	CR 10	Hwy 19
CR 29	Exit 250, Hwy 401	CR 4
CR 3	CR 2	CR 8
CR 4	CR 2	CR 29
CR 55	CR 2	Brant County Rd 53
Cr 59 (Norwich Ave.)	Exit 232, Hwy 401	Juliana Dr.
CR 6	Exit 222, Hwy 401	Cr 12
CR 8	CR 3	Exit 268, Hwy 401
Ingersoll St, Ingersoll	King St., Ingersoll	Exit 216, Hwy 401
Juliana Dr.	Springbank Ave.	Athlone Ave.
King St., Ingersoll	Middlesex County	Whiting St., Ingersoll
Mill St.	Athlone Ave.	Exit 230, Hwy 401
Springbank Ave.	Dundas St (CR 2)	Juliana Dr.
Whiting St, Ingersoll	Exit 216, Hwy 401	King St., Ingersoll

7.4 Goods Loading/Unloading

Loading and unloading of goods on the existing road network often takes place due to a lack of off-street facilities for older buildings. Additionally, vehicle manoeuvring on streets rather than within off-road facilities also has the potential to disrupt traffic flow and increase the risk of accidents. The reduction in roadway capacity in turn causes increased congestion. A 1993 found that most curb side stoppages in Toronto (70%) were not made by goods movement vehicles. Instead, they were made by personal vehicles for personal reasons. In fact, there was also significant use (21%) of off-street goods loading spaces made by personal and service vehicles as well.

7.5 Hazardous Goods

Another area of goods movement is the transportation of dangerous goods. With approximately 3,500 products listed as "dangerous goods", these are divided into nine major categories: explosives, gases, flammable liquids, flammable solids, oxidizing substances, poisonous and infectious substances, radioactive materials, corrosive substances, and miscellaneous products. Common examples of dangerous goods are paint, petroleum and chlorine.

Under the Emergency Management Act, R.S.O., 1990, Chapter E9, municipalities are required to identify and undertake risk assessment and analysis of all potential hazards within their municipality. Such an audit would require the input of shippers, carriers and other risk-sensitive stakeholders. Information on dangerous goods movement would be useful in assisting in the development of municipal emergency response measures.

Dangerous goods form a small part of the total movement of all goods within cities and towns – typically less than 2%. They also often constitute but a small portion of an overall truck's cargo shipment. On the order of two-thirds of all dangerous goods are hauled by truck; this category has been experiencing double digit increases in tonnage moved. In 1988, it was estimated that 1 million truckloads a year involved the carriage of dangerous goods on the province's intercity highway network. In 2000, it is estimated that approximately 5% of all intercity trucks (7% of trucks that were carrying a load) were carrying dangerous goods.

The MTO, through the Canadian Vehicle Survey (CVS) data, can provide municipalities with information relating to hazardous goods movement through their areas of jurisdiction, covering a diverse cross-section of carriers and shippers while identifying the highways used, time of day and quantities in each truck. As mentioned elsewhere in this report, there needs to be enhancement of goods movement monitoring and data analysis. With respect to dangerous goods, this could deal with improved risk identification and minimization.

7.6 Role of the County

In conducting its business, the County should consider the Goods Movement Industry as a stakeholder in understanding accessibility issues and determining appropriate responses. This is typically done through

Environmental Assessment Studies for new improved roads, but can also be done during regular reconstruction projects.

7.6.1 Planning

Corridor planning and funding with the cooperation of the lower tier municipalities and stakeholders is the next stage of goods movement policy development. The existing County road network should accommodate trucks. Truck route construction and maintenance standards, particularly for those routes designated as EDR's, should be proportionate to the use expected. A map of truck volumes on County roads is provided in **Appendix B (Exhibit 3**).

Goods movement issues may include:

- Road widening needs;
- Intersection upgrades;
- Establishment and maintenance of Emergency Detour Routes;
- Off-Road loading/unloading;
- Road base and pavement upgrades; and
- Improved pavement standards to accommodate truck weight and volumes.

Future priorities may include:

- Allocating sufficient right-of-way for road and rail;
- Incident/collision response and detours;
- By-law enforcement;
- Grade separated railways; and
- Adequate connections for industry to provincial highway interchanges.

A key constraint to goods movement is the lack of sufficient right-of-ways. Area municipalities may have insufficient right-of-ways for improving road and intersection capacity to accommodate the movement of heavy goods vehicles.

7.6.2 Operations

Finally, annual facility improvement and maintenance efforts should be coordinated with the Province and local municipalities in order to target current and/or forecasted congestion while balancing the needs of private automobile users with the needs of industry and goods movement.