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EXECUTIVE SUMMARY

Introduction

The Kingston Transportation Plan (KTMP) outlines the City’s strategic direction for the development of its transportation networks, programs and priorities. The KTMP is a critical policy document that will influence every trip taken by residents and visitors to Kingston over the next 25 years. Within the City’s boundaries, the KTMP policies will determine the convenience and attractiveness of the different travel modes as manifested by municipal investment priorities, system performance targets, and supporting programs and infrastructure.

Strategic Direction

The KTMP developed a strategic direction for the transportation system to guide the development of networks, policies and programs. The strategic direction built on the work undertaken through the Community Strategic Plan process, had regard for the Transportation Association of Canada (TAC) urban transportation principles and adhered to the stated preferences of the community. The strategic direction focuses on satisfying travel demand by making efficient use of the existing infrastructure and by providing the facilities and services to encourage walking, cycling and transit as priority modes, before providing road based solutions.

Existing and Future Conditions

Kingston has an extensive system of multi-modal transportation networks serving commuter, recreational and commercial goods movement travel demands. The network within the City is primarily centred on road rights-of-way (sidewalks, on-road cycling facilities, transit routes, and general travel lanes), supplemented by an expanding network of off-road, multi-use recreational trails and parking facilities. The intra-city network is supplemented by Provincial highways, a system of local ferries serving Howe and Wolfe Islands, intercity rail and bus stations and a regional airport.

In January 2002, during the afternoon commuter peak hour, 82% of trips were made by car, 11% by walking, 6% by transit (3% school bus and 3% public transit) and just over 1% by cycling. Over the next 25 years, Kingston is expected to grow by between 30% and 45%, based on population figures for the City of Kingston, and travel demands will increase concurrently.

The increase in travel demand will be accommodated through a focussed effort on the promotion of non-automobile modes, including walking, cycling and transit, by managing travel demand, by making the most efficient use of existing infrastructure and by expanding the road infrastructure. Public transit use is forecast to increase from the current 3% of PM commuter peak hour trips to 11%. Despite this substantial shift in the role of transit and other modes, there will still be increases in the number of trips taken by the automobile during the PM commuter peak hour and these too need to be accommodated (Figures 3 and 4).

The KTMP describes the network and program requirements to achieve the modal share targets assumed in the demand forecasting exercise and presents a number of policy statements to translate the City’s transportation goals into actions.
Managing Transportation Demand

Managing both the demand and existing supply of transportation infrastructure represents all of the actions that the City may take to complement major new infrastructure investments to achieve its transportation vision. The goal of Transportation Demand Management/Transportation System Management (TDM/TSM) strategies is to delay and possibly even eliminate the need for significant capital investments in new transportation infrastructure.

To assist with these objectives the City will create the position of TDM Coordinator, with the mandate to coordinate public and private sector TDM initiatives in the City of Kingston and prepare a Community TDM Action Plan. The City will also adopt a range of strategies to optimize the performance of the transportation system. The goals of Kingston’s TSM strategies will be to maximize the people-moving capabilities of network elements, reduce the costs of operation, and improve safety for all users.

Walking

The strategic direction for the KTMP emphasizes walking as an active, environmentally friendly preferred mode of travel in Kingston. As part of the TDM strategy there is a desire to increase the amount of walking overall and specifically to increase the share for walking trips in the PM commuter peak hour. The plan includes support for programs that promote walking, significant increases in the kilometres of on- and off-road pedestrian facilities (Figure 5) across the City and designing, operating and maintaining barrier-free facilities to make walking more attractive.

Cycling

Cycling, like walking, is an active mode of travel that makes positive contributions to the traveler’s health and avoids negative impacts on the environment. The strategic direction for the KTMP emphasized cycling as part of City’s TDM strategy and there was an expressed desire to increase the modal share for cycling trips in the City overall and in the PM commuter peak hour. The plan includes programs that promote cycling (both recreational and utilitarian), significant increases in the kilometres of on and off-road cycling facilities (Figure 6 and 7) across the City and design, operating and maintenance practices that make cycling more attractive.

Public Transit

One of the main objectives of the KTMP is to increase the percentage of PM commuter peak hour trips by transit to 11% (from the current 3%). This represents an aggressive but achievable target when supported by the full range of policies, programs and infrastructure recommended in this plan.

The transit strategy being adopted by the KTMP study aims to:

- Proactively increase existing transit use by providing full-service, accessible transit, comprising high-frequency peak period service and extended off-peak service, weekdays and weekends.
- Tailor service levels and route structures to reflect the different needs of urban and rural communities within the City by providing a mix of flexible and fixed routes, community bus routes, commuter and tourist shuttles, and local charters.
• Fully coordinate services with inter-city bus terminal, train station, ferry and airport passenger services.
• Provide a mix of fully accessible, attractive modern vehicles to meet market demands.

It is envisioned that over 20-25 years this strategy will lead to increased transit ridership as a result of growth and increased use of transit in the City. A substantial increase in ridership of this magnitude requires local transit that is convenient and attractive to potential riders, takes them where they want to go, when they want to go, and provides a total trip travel time that is competitive with the private automobile. In summary, it requires services that are tailored to the needs of the various local transit markets in Kingston.

An innovative transit system responsive to the needs of Kingston communities was developed in this study (Figure 8) and includes:

• The introduction of new services over time on strategic corridors, and taking the initial steps to support future higher frequency transit service in higher density areas of the city.
• Responding to transit opportunities in planned centres of employment and residential development throughout the city where emerging travel patterns represent new opportunities for transit to meet the needs (i.e., fixed route).
• The introduction of additional services (i.e., flexible routes) and possible infrastructure solutions, such as transit priority lanes and intersection treatments (where warranted), to give higher priority to transit, make transit more attractive, and build ridership to the levels projected in 20 to 25 years.
• The development of a range of marketing/educational initiatives targeted at increasing transit usage.
• Supporting land use patterns that promote transit use and giving high priority to the needs for transit services when reviewing and processing development applications under the Planning Act (a “transit first” approach).
• The introduction of inter-modal transfer locations, supporting both inter-city and tourist markets.

Roads

Roads and road rights-of-way are the most important element of the transportation system. They contain elements of the networks for all modes of travel and balancing these needs within the right-of-way is one of the critical factors in achieving the strategic direction of the KTMP. Ensuring consistent decisions regarding the design, operation and maintenance of the various elements within the right-of-way will determine the future success of the plan. In addition, it is essential to protect adequate right-of-way width to accommodate the required elements.

The strategic direction for the KTMP emphasizes the need to reduce the demand for automobile travel and to optimize the existing roadway network while meeting the infrastructure needs of all modes. The KTMP supports:

• Programs that promote all alternatives to automobile use, measures that pro-actively optimize the road network and the allocation of roadway rights-of-way, and minimize the impact of increased congestion on Kingston residents;
Kingston Transportation Master Plan
Final Report, July 2004

- Strategic expansion of the road network to ensure minimum Level of Service standards are met, and allocation of some roadway space to priority elements for non-auto modes; and
- Design, operating and maintenance practices that strategically manage roadway rehabilitation and reconstruction to extend the useful life of roadway investments as much as possible.

The recommended network expansions identified through this KTMP are illustrated on Figure 9. These additions to the network have been planned on the basis of utilizing 90% of the available capacity during the PM commuter peak hour. This service target must, however, be balanced against the performance measures of competing modes and traffic safety.

The KTMP has looked at the need for and location of additional capacity across the Cataraqui River. There is a need for one additional lane of capacity in each direction to satisfy the 2026 PM commuter peak hour traffic demand. This important facility is required as early as practical to support the preferred Urban Growth Strategy. The recommended location, which is subject to review and comment by stakeholders and the general public, is generally along a Gore/Elliott alignment. Prior to construction of any facility, a Municipal Class EA will be required that completes and documents Phases 1 to 4 of the Municipal Class EA process. In addition, the study requirements under the Canadian Environmental Assessment Act will need to be met.

Proper design, operation and maintenance of the City’s road infrastructure will ensure a safe and efficient driving environment and supportive environments for other modes of travel. It also ensures that the huge investment in infrastructure is maintained in a cost-effective manner. The following are some additional recommendations of the KTMP.

- Prepare Area Traffic Management (ATM) Guidelines to provide direction to staff and the community regarding the determination of need for ATM measures (including traffic calming measures, enforcement, TDM), conditions under which various ATM measures will be considered, and the process by which implementation priority will be determined.

- Develop, maintain and apply Right-of-Way Design Guidelines for all classes of urban and rural roads under the City’s jurisdiction. Secure rights-of-way for all roads in accordance with the Rights-of-Way Design Guidelines and the Official Plan, consistent with the roadway classification.

- Consider the needs of and impacts on travelers by all modes when modifying the design or operation of the roadway system. Consider pedestrian and cyclist safety in all intersection design and operational decisions. Consider transit priority measures and passenger amenities in design and operational decisions.

- Identify and develop a goods movement network that maintains adequate access to industrial and commercial areas while minimizing the impact on residential neighbourhoods. The network will respect the hierarchy of roads, focusing routes on freeways and arterial roads such as Montreal Street, Division Street, Sir John A. Macdonald Boulevard, Gardiners Road, Princess Street, Bath Road, Highway 2 and other key linkages to serve the City.

- Implement a Safety Improvement Program to identify and mitigate locations on the road network with unacceptably high collision rates and to promote education and enforcement.

- Develop and implement an Asset Management strategy to manage the City’s infrastructure assets in order to preserve the integrity of the infrastructure by optimizing the investment in maintenance and rehabilitation, and to establish targets to measure its success.

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Parking

Kingston’s parking system is a critical component of the City’s transportation network. Parking supply and day-to-day parking controls determine parking availability. Strategic management of parking availability will assist the City to achieve some of the KTMP objectives.

Among other initiatives, the City will develop and maintain parking plans for parking precincts in the Central Business District. This will balance supply, demand and price in a way that supports the objectives of the KTMP, including the goal of fiscal self-sufficiency, and the need for a vibrant and prosperous downtown. This will include the continued use of centralized parking lots within a reasonable walking distance of multiple destinations.

The City should promote short-term parking over long-term employee parking, which simultaneously helps the needs of the tourism industry by providing for visitor parking and encourages non-auto modes of travel. These initiatives can be further supported by:

- providing a system of Park n’ Ride lots at strategic locations in and around the City connected by high frequency shuttle express services;
- providing an increased supply of bicycle parking and secure bicycle parking; and
- preparing a tour bus parking and tourist shuttle strategy for the waterfront area.

In terms of assisting with implementation this parking strategy should:

- be coordinated with the Parking Advisory Committee; and
- give consideration to having the Parking Services Department manage City bicycle parking, particularly as supply of secure bicycle facilities increases.

Intercity Transportation

Intercity transportation connects Kingston to the rest of the province, country and beyond and it has important economic linkages. The integration of the intercity and intra-city transportation is an important component of the overall KTMP. This is highlighted by the provision of high quality transit to serve bus and rail stations, as well as the airport and ferry docks. These contribute to form the essential connections to and from the City of Kingston.

In addition to the above, the City will:

- Support the federal government high-speed rail initiative in the Windsor to Quebec City corridor that provides this service to and through the City of Kingston via the Counter Street train station.

- Support the continued viability of the Norman Rogers Airport by revising and updating the 1997 Draft Airport Master Plan and by allowing new specialized business uses, which need the locational advantages of the airport facility. The objective is to support the continued expansion of regional air service, as supported by market demand, and to make the airport financially self-sufficient.

- Support the ongoing dialogue with the Ministry of Transportation, the County of Frontenac and Frontenac Islands Township as it relates to the Wolfe Island Ferry and the Howe Island Ferry and the desire for additional capacity.
• Support the continued viability of the City’s waterways and related marinas with policies and programs that enhance their integration into the intra-city transportation network for walking, cycling, transit and roads.

Financial Capability and Implementation Plan

All of the City of Kingston’s infrastructure assets are continuously deteriorating and eventually will require major rehabilitation and/or replacement. The challenge for Kingston is to minimize the life-cycle costs of the assets while maintaining the expected quality and level of service. Financial assessment of current spending on existing infrastructure highlights a significant funding gap and an unfunded backlog of capital projects that are required today. When the network improvements associated with the KTMP (to accommodate the expected growth) are added, the related lifecycle costing of this new infrastructure and the additional improvements resulting from policy initiatives (e.g. improved walking and cycling facilities) the capital-funding gap is even bigger.

Existing expenditures of $12.1 million/year (average over the last three years) are far short of what is required for replacing the existing infrastructure, which is $23.3 million/year. When the full recommendations of the KTMP are factored in as well as the related lifecycle costs, the annual amount increases to $31.9 million/year. This is an $19.9 million per year shortfall.

Current sources of capital funding for road, transit and related services include: current year taxes; reserve funds; debentures; development charges; grants where obtainable; and miscellaneous sources. At current rates these revenue sources will be inadequate to fund the required transportation costs.

In order to reduce the reliance on property taxes, new and innovative funding sources must be pursued. Those sources with the greatest potential require federal support (e.g. infrastructure funds) and/or provincial support or legislative changes (e.g. fuel tax, tolls, vehicle registration fees). Strategies for innovative funding for transportation improvements focus around two central approaches: user-pay and public-private partnerships.

The KTMP has identified a number of infrastructure improvements, polices and programs that require implementation over the life of the plan. The key variables are the location, timing and extent of development. Since these have a way of evolving over time, the need to continuously monitor and update the plan is essential.

The KTMP has been developed based on the preferred growth alternative from the Urban Growth Strategy (a parallel study). Growth Alternative 2 (sometimes referred to as Alternative 1 plus 2) was selected as the best overall option to guide future land use based on a comprehensive approach of considering the costs and impacts of all services, not just roads.

Monitoring

To ensure the success of the plan, the City of Kingston must remain aware of its progress toward key objectives, so that it can add, modify, or delete priorities as needed. The KTMP must retain some measure of flexibility and be adaptable to changes in travel behaviour and other conditions. This can be best accomplished through ongoing monitoring of relevant conditions and periodic updates to the Travel Demand Model and master plan.
Ongoing monitoring would also be necessary in determining the effectiveness of the initiatives identified in the plan in meeting the adopted strategic direction. Ideally the performance measures can be tied to broader municipal management measures such as, the Municipal Performance Measurement Program (MPMP).

Monitoring needs to focus on all aspects of transportation including:

- transit demand and performance (including individual route performance, system performance and periodic (i.e., 5-year) comprehensive transit service reviews);
- traffic flow or volume data;
- the travel demand model and related Kingston Household Travel Survey; and
- continued implementation of other related city initiatives, such as the Cycling and Pathways Study, and the Accessibility Plan.

The need to update the KTMP in the future should be undertaken in conjunction with future updates to the City’s Official Plan, typically at five-year intervals. Future transportation system improvements would be based on need, and the timing of their implementation would be determined through the monitoring of the transportation system performance, land development, modelling results, and fiscal constraints.
1.0 INTRODUCTION

1.1 Purpose

The City of Kingston Transportation Master Plan (KTMP) is the first transportation strategy document produced by the City since its amalgamation in 1998. As the guidebook to the City’s transportation strategy for the future, the KTMP outlines the City’s vision for the development of its transportation networks, programs, and priorities. The KTMP is a critical policy document that will influence every trip taken by residents and visitors to Kingston over the next 25 years. Within the City’s boundaries, the KTMP policies will determine the convenience and attractiveness of the different travel modes through such measures as municipal investment priorities, system performance targets, and supporting programs and infrastructure.

1.2 Background to the KTMP

The City of Kingston

The new City of Kingston came into being on January 1, 1998. Composed of the former Townships of Kingston and Pittsburgh and the former City of Kingston (see Figure 1), the new municipality now has a geographic land base of 450 square kilometres and a population of 114,195 (2001 Census, Statistics Canada).

Figure 1
The City of Kingston is located halfway between two of Canada’s largest cities – Toronto and Montreal – and only a two hour drive from Ottawa, the nation’s capital. Major transportation routes, such as Highway 401, railway lines and the St. Lawrence Seaway, have significantly affected the community’s growth.

Other important facts that influence the transportation system are:

- Population is projected to grow to 164,092 persons by 2026 (High Growth Scenario);
- 78% of land base is rural accommodating 12% of the population;
- Highway 401 has been the northern limit of urban development for some time with the greatest portion of greenfield growth occurring in the west end of the City; and
- Open water covers 15% of the municipal jurisdiction. Wetlands, valley lands and other natural features are substantial and play a key role in determining development patterns.

**Community Strategic Plan**

The City of Kingston completed an overall Community Strategic Plan in October 2000, which confirmed the community’s belief that a good quality transportation system is necessary to support economic growth and to protect the desired quality of community life. Based on this, the Community Strategic Plan established the KTMP as a key initiative for the City. The Community Strategic Plan further established that the KTMP must produce several key deliverables, considering accessibility for people with disabilities, safety issues, and needs of rural and urban users, businesses and visitors:

- A prioritized road network that maximizes efficiency of existing investments;
- A transit strategy that stabilizes the service, markets the service to current and potential clients, and builds the service as demand grows; and
- A citywide network of paths and trails that serves walkers, joggers, cyclists and links neighbourhoods.

The development of the KTMP supports the fulfillment of the Focus Kingston 2000 - 2010 created by the community. Along with the new Official Plan, the KTMP is part of the Planning Initiative, which is one of the twelve priority areas of the Community Strategic Plan.

**Transportation Principles**

The terms of reference for the KTMP were developed to satisfy thirteen principles that direct future changes in transportation. These principles were included in the City’s Action Plan, which followed preparation of the Strategic Plan (see Table 1).
Table 1

City of Kingston Action Plan Transportation Principles

1. Plan for increased densities and more mixed land use.
2. Promote walking as the preferred mode of person trips.
3. Increase opportunities for cycling as an optional mode of travel.
4. Provide higher quality transit service to increase its attractiveness relative to the private auto.
5. Create an environment in which automobiles can play a more balanced role.
6. Plan parking supply and price to be in balance with walking, cycling, transit and auto priorities.
7. Improve the efficiency of the urban goods distribution system.
8. Promote inter-modal and inter-line connections.
9. Promote new technologies, which improve urban mobility and help protect the environment.
10. Optimize the use of existing transportation systems to move people and goods.
11. Design and operate transportation systems, which can be used by people with disabilities.
12. Ensure the urban transportation decisions protect and enhance the environment.
13. Create better ways to pay for future urban transportation systems.

Concurrent Strategic Planning Initiatives

In addition to the KMTP being a key Initiative, this study supports the related effort for the development of the new Official Plan for the City. Related to this, the City initiated the Urban Growth Strategy to help determine the optimal direction for growth. The KTMP was developed and integrated with the Urban Growth Strategy and will directly support the development of the Official Plan. Directly or indirectly, this study will also support other City of Kingston policy planning studies including:

- the Waterfront Strategy;
- the Downtown Action Plan;
- the Cycling and Pathways Study;
- the Development Charges By-Law; and
- the North Block Central Business District Study.

1.3 Master Plans and the Municipal Class Environmental Assessment Process

The KTMP was designed to integrate municipal transportation planning and environmental assessment objectives and requirements into a comprehensive planning process. The KTMP was carried out in accordance with the Master Plan planning requirements of the Municipal Class Environmental Assessment Planning and Design Process (Class EA) and addresses the requirements of Phases 1 and 2 of the five-phase Municipal Class EA planning process for its recommended infrastructure projects:

**Phase 1** – Problem Identification

**Phase 2** – Consideration of alternative ways to solve the identified problems, giving recognition to environmental, social, economic, cost and transportation service considerations.

Many of the initiatives identified in the KTMP may not require Class EA approval (e.g. TSM strategies). However, Class EA approval will be required for most of the proposed road improvements. The type and scope of project dictates how much of the process needs to be followed. Three different levels of transportation projects are identified, each of which requires a different degree of EA investigation:
Schedule A Projects – Projects that involve minor modifications to existing facilities. Environmental effects of these projects are minimal and the projects are, therefore, considered pre-approved.

Schedule B Projects – Projects that involve minor expansions to existing facilities. As there is some potential for adverse environmental effects, these projects are required to proceed through a screening process including public consultation.

Schedule C Projects – Projects that involve the construction of new facilities and/or major expansions to existing facilities. These projects must pass through the entire EA planning process outlined in the Class EA.

For more information on the Municipal Class EA process see internet link http://www.municipalengineers.on.ca/specialproj/classea/index.asp or http://www.ene.gov.on.ca.

The road improvement recommendations identified in this KTMP include a mixture of the above three project types. The KTMP addresses Phases 1 & 2 of the Class EA for most projects, but the full Class EA requirements, following the appropriate schedule, needs to be fulfilled prior to project implementation. The Schedule C projects will require the assessment and evaluation of alternative design, additional public consultation and completion of an Environmental Study Report.

The Class EA process also includes a provision for a Part II order formerly known as a ‘bump-up’, whereby an individual can provide a written request to the Minister of Environment to elevate the project to a higher level of EA investigation.

1.4 Consultation

The KTMP has included a significant amount of public consultation in its development. Key events have included:

- Several visioning Focus Groups dealing with cycling, newly developing areas, transit, special user needs, getting around downtown and economic development;
- Four newsletters;
- A transportation origin-destination survey of households;
- A Backgrounder Report;
- Public Information Session;
- Community Workshops;
- Information releases on Kingston’s website; and
- Public release of the Draft KTMP and related public information session.

These events and consultation sessions have yielded valuable information, specifically with respect to direction on the City’s transportation vision that has, in turn, been the foundation for the KTMP. Detailed summaries and records of the consultation events are documented in the accompanying Technical Foundation Report.
1.5 Report Format

This report summarizes the work undertaken to develop the KTMP. The following outlines the content of this Transportation Master Plan:

- **Chapter 1.0 – Introduction** puts the Master Plan in context with other studies and initiatives that have been or are being carried out by the City of Kingston;

- **Chapter 2.0 – Vision and Strategic Direction** provides an overview of the vision and strategic direction developed to guide the development of the KTMP;

- **Chapter 3.0 – Existing and Future Conditions** presents the transportation facilities and services, the existing and future population and employment, as well as, the magnitude of the network deficiencies;

- **Chapter 4.0 – Managing Transportation** presents strategies and actions to manage transportation demand and make the best use of existing and planned transportation infrastructure (supply);

- **Chapter 5.0 – Walking** includes the policies, programs and infrastructure affecting pedestrians;

- **Chapter 6.0 – Cycling** includes the policies, programs and infrastructure affecting cycling facilities;

- **Chapter 7.0 – Public Transit** sets out the transit strategy, projections, services and other attributes of the proposed system;

- **Chapter 8.0 – Roads** highlights the policies, programs and infrastructure, including the main roadway recommendations;

- **Chapter 9.0 – Parking** includes the policies and role parking can play in achieving the objectives of the plan;

- **Chapter 10.0 – Intercity Transportation** presents the key modes of transportation providing linkages to and from the City of Kingston and the role they play;

- **Chapter 11.0 – Financial Capability and Implementation Plan** outlines the cost of implementing the various recommendations and identifies priorities for implementation; and

- **Chapter 12.0 – Monitoring** includes guidelines for ongoing review of traffic, transit and parking demands as well as periodic updating of the Master Plan.
2.0 STRATEGIC DIRECTION

2.1 Developing the Strategic Direction

The first major task in the development of the KTMP was the refinement of the Community Strategic Plan Transportation Principles into a more detailed strategic direction for the transportation system. The strategic direction was an important guide for the development of the KTMP networks, policies and programs. The strategic direction built on the work undertaken through the Community Strategic Plan process, had regard for the Transportation Association of Canada (TAC) urban transportation principles and adhered to the stated preferences of the community.

The Transportation Principles were refined through a two-stage approach:

1. Several outreach sessions were held between September and November 2001 to collect various stakeholders’ visions for the Kingston transportation system, including specific issues to be addressed in the KTMP; and

2. The Transportation Principles, visions and issues were compiled and combined to create three potential strategic directions for the KTMP, each of which had different network and program emphases. The strategic direction scenarios were brought back to the public and community stakeholders for review and comment, and a preferred strategic direction was selected.

The results from this exercise are presented in the Technical Foundation Report. The balance of this section is focused on the selection of the preferred strategic direction.

2.2 Identification of the Strategic Direction Scenarios

The KTMP study team initially developed strategic direction alternatives for the future of transportation in the City of Kingston – Staying on Track, Switching Gears and A New Direction. The KTMP strategic direction was a tool to guide the development of the networks and programs in a manner that was consistent with the Transportation Principles and the community transportation vision. The three alternative scenarios ranged from a future that prioritized service for the automobile, to a future that maximized the use of all other methods of transportation and provided the facilities and services to encourage transit, cycling and walking, as priority modes before providing road solutions. While the emphasis on (and consequently, the investment in) non-auto mode shifts from one scenario to the next, it is acknowledged that the majority of the travel demand will be accommodated with road-based solutions under each scenario.

The three scenarios for the strategic direction are described briefly below. They are described in greater detail in the Technical Foundation Report.

Scenario 1 - Staying on Track

This scenario will provide the road network and programs necessary to meet the future demands, as projected directly from today’s trends and priorities. Emphasis will be placed on movement of the automobile. Existing pedestrian pathways, cycling routes and links to public transit facilities will be maintained, with expansion at approximately today’s rate.
**Scenario 2 - Switching Gears**

This scenario identifies facilities and programs necessary to reduce automobile use and increase the use of other methods of transportation. Emphasis will be placed on making walking, cycling, and transit more convenient and attractive. More links to support other methods of transportation will be created (e.g. park-and-ride lots, cycling and pedestrian routes connected with major public transit stops).

**Scenario 3 - A New Direction**

This scenario emphasizes non-automobile modes (walking, cycling, and public transit) as the preferred methods of transportation. It identifies the facilities, programs and policies necessary to encourage the shift away from the automobile. It will coordinate all forms or modes of transportation, and increase funding to add new and expanded facilities. Municipal policies will place emphasis on development that encourages non-automobile transportation.

### 2.3 Selection of the Preferred Strategic Direction

The strategic direction was a tool to ensure consistency with the Transportation Principles and vision; therefore, the evaluation process consisted of an assessment of the degree to which the three scenarios for the strategic direction were able:

- to represent the broad transportation goals that flow from the Transportation principles;
- to fulfill the vision expressed by the public; and
- to address the specific issues identified by stakeholders.

The evaluation process confirmed that Scenario 3 - *A New Direction* best represented the philosophy expressed by the residents of Kingston. This strategic direction was identified as preferred and was presented to the public for comment. Following extensive consultation, which included publishing the selection in Newsletter 3, it was confirmed that Scenario 3 was broadly supported. Based on public input there were some minor refinements and clarifications. The slightly modified strategic direction was endorsed by the Planning Committee and ultimately Council.

Table 2 describes the main elements of the New Direction.

The strategic direction was used throughout the development of the KTMP to establish:

- modal share objectives for non-auto modes that would represent aggressive, yet achievable targets;
- program requirements for the City of Kingston and private-sector partners to deliver the modal share targets;
- foundation principles for the development of networks for all modes; and
- guiding program and network policies to assist staff and Council in making decisions in a manner consistent with the Transportation Principles and vision.
### Table 2
Description of Preferred Strategic Alternative

#### A New Direction

<table>
<thead>
<tr>
<th>Factor/Element</th>
<th>Philosophy of the Strategic Direction</th>
</tr>
</thead>
</table>
| **TDM/TSM**<sup>1</sup> Policies | ➢ Policies mandate measures to promote the increased use of non-auto modes of travel and the provision of transit service to individuals across the City with emphasis on providing service to urban areas  
➢ Municipal policies and practices for TDM/TSM are established and implemented; where appropriate, the city and other employers implement a wide range of programs, incentives and disincentives to promote transit as a viable alternative to auto traffic, and also to promote environmentally friendly modes such as walking and cycling |
| Transit Supportive | ➢ TDM/TSM is a key component in planning new urban areas and major developments |
| Parking | ➢ Parking strategy that supports and promotes non-auto modes |
| **Pedestrian Facilities** Design Standards & Guidelines | ➢ Revise to support and promote pedestrian activity throughout City  
➢ Establish policy base that provides a range of modal choice for all users, based on the hierarchy of walking, cycling, transit and automobile use |
| Pedestrian Network | ➢ Ensure widespread pedestrian linkages to transit to encourage modal shift  
➢ As part of new developments include design elements that promote walking |
| Recreational Paths/Routes | ➢ Protect, acquire and aggressively implement recreational trails/pathways |
| Maintenance | ➢ Enhance maintenance during winter, and along all pathways, and trails |
| Spending | ➢ Increase spending to add/improve facilities and consider them as part of any road construction project |
| **Cycling** Design Standards & Guidelines | ➢ Revise to support and pro-actively promote increased city-wide cycling activity |
| Cycling Network | ➢ Ensure a complete network and facilities to encourage modal shift and recreational use  
➢ As part of new developments include design elements that promote cycling linkages |
| Links to Transit | ➢ Promote linkages with transit and promotion for tourism, and health benefits |
| Maintenance | ➢ Enhance maintenance during winter, and along all on and off-road facilities |
### Table 2 (Continued)
**Description of Preferred Strategic Alternative**

**A New Direction**

<table>
<thead>
<tr>
<th>Factor/Element</th>
<th>Philosophy of the Strategic Direction</th>
</tr>
</thead>
</table>
| **Spending**   | ➢ Increase spending to add/improve facilities including adding them to new/reconstructed facilities to develop a complete network  
➢ Increase to improve facilities, including end-of-trip amenities |
| **Bicycle-Vehicle Compatibility** | ➢ Improved network with signage and/or pavement markings and public education efforts that will maximize bicycle-vehicle compatibility |
| **Transit**    | ➢ Pro-actively shift transit mode split by providing full-service, accessible transit, comprising high-frequency peak period service and extended off-peak service, weekdays and weekends |
| **General Service & Ridership Levels** | ➢ Tailor service levels and route structures to reflect the different needs of urban and rural communities within the City by providing a mix of flexible fixed routes, community bus routes, commuter and tourist shuttles and local charters, as warranted |
| **Routes**     | ➢ Fully coordinated with inter-city bus, train, ferry and airport passenger services  
➢ Fully accessible transit service is provided to the inter-city bus terminal, rail station, ferry docks and airport |
| **Areas Serviced** | ➢ Fully integrated with conventional service to ensure coordination with all services |
| **School, specialized and tourist transit** | ➢ Provide a mix of fully accessible, attractive modern transit vehicles to meet market demands  
➢ Improve infrastructure, including terminals, park & ride facilities, and related amenities, to make transit more convenient and attractive |
| **Capital and Infrastructure** | ➢ Allocate spending to better coordinate the transit system, and promote transit as an attractive, viable system serving the City |
| **Roadways**   | ➢ Maximize the use of existing capacity and help induce a non-auto mode split increase  
➢ New roads or road widenings required to alleviate moderate amounts of congestion will be delayed, including some local intersection improvements  
➢ Where congestion is severe, solutions will be implemented  
➢ Marked reduction in auto demand will occur due to modal shift |
### Description of Preferred Strategic Alternative

#### A New Direction

<table>
<thead>
<tr>
<th>Factor/Element</th>
<th>Philosophy of the Strategic Direction</th>
</tr>
</thead>
</table>
| Major Roads             | ➢ Identify the role and function of the road network, with consideration for the differences between urban and rural roads  
                          | ➢ Establish policy basis for non-auto modes within the right-of-way                                       |
| R.O.W. Standards        | ➢ Revise standards to accommodate and support active (non-auto) modes                                     |
| Maintenance             | ➢ Ensure adequacy in urban and rural areas, with increased emphasis on pavement condition and street sweeping/plowing in curb |
| Infrastructure          | ➢ Provide convenient and comfortable stops, priority lanes, intersection treatments and advanced signal technologies within road rights-of-way, as warranted, to reflect priority for multiple-occupant vehicles |
| Spending                | ➢ Recognize and place increased emphasis on non-auto modes by assigning priority to accommodating multiple-occupant vehicles |
| Parking                 |                                                                                                         |
| On-Street Parking       | ➢ May require removing some downtown to facilitate/encourage active modes                                 |
| Off-Street Parking      | ➢ Will need to be at levels that promote non-auto modes                                                    |
| Parking Policies/Programs | ➢ Can be pro-actively used as a tool to promote modal shift to non-auto modes                             
                          | ➢ Businesses can be required to undertake programs to encourage a shift away from single occupant vehicles |
| Spending                | ➢ The costs and revenues associated with parking will vary depending on pricing policy that reflects the relationship between parking supply and demand, modal shift objectives and the availability of alternatives to single-occupant vehicles |

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1 Transportation Demand Management/Transportation System Management
3.0 EXISTING AND FUTURE CONDITIONS

3.1 Establishing the Magnitude of the Network Deficiencies

One of the primary objectives of the KTMP is the definition of the new network and program elements that will be required to meet the forecasted 2026 transportation demands. To achieve this, the projected 2026 transportation demands are compared to the existing transportation networks and programs and determine where the system capacity does not meet the forecasted volumes. Section 3 is focused on determining these system needs.

Kingston is expected to grow by between 30% and 45% over the next 25 years, based on population figures for the City of Kingston, and transportation demands will increase concurrently. The key question will be how does the demand grow and what should the City do to meet the demands?

The community has expressed a strong desire to shift the emphasis on travel away from the private auto to more environmentally friendly and sustainable transportation modes. The demand forecasts that were developed accounted for the desired shift — that is, they assumed that this shift could be encouraged to take place, and the system deficiencies were identified based on the preferred travel demand patterns. Should this shift fail to take place, the identified road needs will be more than those identified in this plan and/or congestion levels on the road network may grow to unacceptable levels. Monitoring the progress of change is therefore important to assist in achieving the plan.

3.2 Existing Transportation System

There is an extensive existing system of multi-modal transportation networks in Kingston serving commuter and recreational demands for person movement and for goods movement. The intra-city network (i.e., within Kingston) consists of dense networks in the downtown, radiating out to significantly less dense networks in the suburban and rural areas. The intra-city network is primarily centred on road rights-of-way (sidewalks, bike lanes, paved shoulders, transit routes and general travel lanes), supplemented by a burgeoning network of off-road, multi-use paths, and by a system of local ferries serving Howe and Wolfe Islands.

Given Kingston’s strategic location (halfway between Toronto and Montreal; a two hour drive from Ottawa; and virtually on the Canada-U.S. border), the inter-city network is a well-developed and diverse network of road, rail, marine, and air links.

Table 3 provides a brief description of the key elements of the existing transportation system. The existing transportation system is important to the development of the KTMP only so far as it affects the preferred strategies for the future.
<table>
<thead>
<tr>
<th>Networks/Services</th>
<th>Existing Conditions</th>
</tr>
</thead>
</table>
| Sidewalks, Bikeways, and Pathways     | • There are concentrated areas of pedestrian and cycling demand where these modes provide the primary commuter mode of travel, including the Downtown core and waterfront, Queen’s University, St. Lawrence College;  
• Majority of streets in the old City of Kingston have sidewalks; but there are many areas where there are no sidewalks in the former Townships;  
• There are limited/no on-road cycling facilities and limited/no pathway facilities aimed at serving utilitarian desire lines in the west and/or to downtown; and  
• There is a linked recreational system (with gaps), focused on the Waterfront and the rivers.                                                                                                                                                                                                                                                                                                                                 |
| Public Transit                        | • Operated by Kingston Transit (the City is responsible for 100% of the costs);  
• Fleet of approximately 34 buses, including 8 low-floor, accessible vehicles;  
• Service is provided Monday to Saturday, on 15 fixed routes, with limited Sunday service and no service on statutory holidays;  
• Annual ridership approximately 2,500,000 passengers a year;  
• Kingston Access Bus serves mobility challenged residents in Central Kingston and the urban areas of the former Kingston Township on a demand-responsive basis; and  
• Elementary student transportation is the responsibility of the Tri-Board Transportation Authority.                                                                                                                                                                                                                                                                 |
| Road System                           | • City owns 803 km of arterial, collector and local roads;  
• The Province of Ontario (through MTO) owns several major facilities, including Highway 401 (east boundary to west boundary), Highway 15 (Highway 401 to north boundary) and Highway 33 (Collins Bay to west boundary);  
• Highway 401 is the primary inter-city roadway facility, with local interchanges at Joyceville Road, Highway 15, Montreal Street, Division Street, Sir John A. Macdonald Boulevard, Sydenham Road, Highway 38/Gardiners Road;  
• Primary demand patterns are east-west; and  
• The key issue to be addressed is the need for an additional crossing of the Great Cataraqui River.                                                                                                                                                                                                                                                                 |
| Parking System                        | • Ownership divided between the City and private operators; City owns bulk of supply;  
• City manages:  
  ➢ 20 parking lots, (capacity 2,335 spaces) - almost 2,000 are in the Downtown  
  ➢ 1,360 parking meters - over 860 are in the Downtown  
• The recent (June 2003) Parking Utilization Study identified some high use parking facilities, as well as, underutilized spaces in some areas of the downtown; and  
• Bicycle racks provided at numerous locations in the Downtown - 28 bicycle racks, half of these are seasonal (removed from December until April), one at City Hall and 27 bike racks along Princess Street.                                                                                                                                                                             |
Table 3 (Continued)
Existing Transportation System

<table>
<thead>
<tr>
<th>Networks/Services</th>
<th>Existing Conditions</th>
</tr>
</thead>
</table>
| **Ferry Service** | • Two cable ferries serve Howe Island – the westerly ferry is the primary service and operates 24 hours/day;  
• The westerly Howe Island Ferry has a capacity for twelve cars and accommodates 186,000 trips/year;  
• The easterly Howe Island Ferry has a capacity for three cars and accommodates 45,200 trips (March 96 to March 97);  
• Wolfe Island Ferry operates year round and is part of the provincial highway system  
  ➢ Capacity of 55 vehicles and 330 passengers  
  ➢ 350,000 vehicles and an additional 200,000 pedestrians per year  
• A Second private Wolfe Island Ferry service connects to Cape Vincent, New York. |
| **Rail Services** | • Rail line is the main corridor from Windsor to Quebec - train station at Counter Street;  
• Approximately 56 passenger and freight trains use the line daily;  
• Freight sidings to the former Township of Kingston’s Industrial Park, the Norcom/CDT site, and the Dupont site; and  
• Passenger service provided by VIA with connections to Montreal, Toronto and Ottawa  
  ➢ Current estimate of passenger demand - 295,000 people. |
| **Inter-City Bus** | • Bus terminal at Counter Street;  
• Multiple daily connections to Toronto, Montreal, Ottawa, Peterborough, and Cornwall; and  
• Significant demand from Chartered Buses – primary destination is downtown. |
| **Waterways** | • Greater Kingston Public Port includes LaSalle Wharf and Crawford Wharf;  
• No commodity traffic but significant commercial cruise and tour boat traffic;  
• Recreational boating is significant:  
  ➢ Two municipal marinas (Confederation Basin and Portsmouth Olympic Harbour)  
  ➢ A number of privately owned marinas  
• Rideau Canal Waterway – 202 kilometres extending from Kingston to Ottawa. It is a National Historic Site, a Canadian Heritage River and the oldest continuously operating canal in North America. |
Kingston Transportation Master Plan
Final Report, July 2004

Table 3 (Continued)
Existing Transportation System

<table>
<thead>
<tr>
<th>Networks/Services</th>
<th>Existing Conditions</th>
</tr>
</thead>
</table>
| Airport           | • Kingston (Norman Rogers) Airport is owned and operated by the City of Kingston;  
|                   | • New $1.8 million terminal opened in 1995;  
|                   | • 302 hectare airport located in the southeast quadrant on a small peninsula surrounded by Collins Bay and Lake Ontario - location constrains its ability to expand;  
|                   | • Two main runways (principal runway is 1,524 m long), accommodating:  
|                   |   ➢ Five daily commercial flights to and from Toronto and delivery of freight  
|                   |   ➢ Two flight training schools  
|                   |   ➢ Charter Medivac to transfer patients from/to James Bay  
|                   |   ➢ A centre for commercial flights:  
|                   |     ■ 75,054 passengers in 2002 (48,141 aircraft movements)  
|                   |     ■ 71,608 passengers in 2003 (39,548 aircraft movements)  
|                   |   ➢ A Medivac aircraft, transferring patients to and from local health care facilities.  
|                   | • In 2003 the economic impact amounted to $33.8 million and 251 jobs. |

3.3 Existing Transportation Demands

Existing transportation demands for the various travel modes were established through household surveys (undertaken in winter 2002) to provide a baseline for future projections. Table 4 presents the number of person trips reported for each travel mode during a typical afternoon commuter peak hour (the PM commuter peak hour), and the corresponding percentage of travel market that the each mode accommodates (i.e., modal share). The commuter peak hour is used throughout the analysis as the critical design hour because it is the hour with the most traffic. The analysis of the peak hour is done for existing conditions and forecast for future conditions. The data in Table 4 represents average, citywide travel conditions.

<table>
<thead>
<tr>
<th>Mode of Travel</th>
<th>Afternoon Commuter Peak Hour (3:45 to 4:45 PM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Modal Share</td>
</tr>
<tr>
<td>Walk</td>
<td>11%</td>
</tr>
<tr>
<td>Cycle</td>
<td>1%</td>
</tr>
<tr>
<td>Public Transit</td>
<td>3%</td>
</tr>
<tr>
<td>School Bus</td>
<td>3%</td>
</tr>
<tr>
<td>Automobile</td>
<td>82%</td>
</tr>
<tr>
<td>Total, all modes</td>
<td>100%</td>
</tr>
</tbody>
</table>
Forecasting of future network deficiencies requires that travel demand and system performance be understood at strategic locations around the City. One way to do this is through the use of screenlines – imaginary lines drawn across major transportation facilities in a corridor. Screenlines typically follow a natural barrier to travel, such as a river or freeway, that has limited crossing opportunities. Many screenlines are significant barriers to walking and cycling, and are not very useful tools for examining travel by these modes.

Figure 2 illustrates the screenlines developed for the KTMP. Table 5 shows existing travel demand data across selected KTMP screenlines.

<table>
<thead>
<tr>
<th>Screenline</th>
<th>Transit</th>
<th>Auto</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Person</td>
<td>Modal Share</td>
</tr>
<tr>
<td>East-West</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Cataraqui Creek</td>
<td>143</td>
<td>3%</td>
</tr>
<tr>
<td>Victoria Street/Beverly Street</td>
<td>130</td>
<td>2%</td>
</tr>
<tr>
<td>Division Street</td>
<td>38</td>
<td>2%</td>
</tr>
<tr>
<td>Cataraqui River</td>
<td>67</td>
<td>5%</td>
</tr>
<tr>
<td>North-South</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front Road West</td>
<td>10</td>
<td>1%</td>
</tr>
<tr>
<td>Joseph Street</td>
<td>88</td>
<td>3%</td>
</tr>
<tr>
<td>Raglan Road</td>
<td>88</td>
<td>4%</td>
</tr>
<tr>
<td>Bath Road/Concession Street</td>
<td>149</td>
<td>3%</td>
</tr>
<tr>
<td>Highway 33 (Bath Road)</td>
<td>18</td>
<td>1%</td>
</tr>
<tr>
<td>Princess Street/Counter Street</td>
<td>86</td>
<td>2%</td>
</tr>
<tr>
<td>Highway 401 South-West</td>
<td>143</td>
<td>3%</td>
</tr>
</tbody>
</table>

* Modal share based on person trips, and was calculated based on automobile and transit trips only. Estimate of trips across screenlines by other modes do not exist.

3.4 Population and Employment Forecasts

The KTMP growth projections were based on information developed by Stevens Associates, demographic consultants for the City of Kingston using the 2001 Census data and the Greater Kingston Area (GKA) 2041 population model. The same growth projections were applied in the Urban Growth Strategy.

Table 6 summarizes the population growth projections prepared by Stevens Associates for the 25-year study period using the low, medium and high employment growth assumptions (revised March 20, 2003). Growth assumptions are based on potential job creation rates of 200, 600 and 1,000 jobs a year, respectively, for the Kingston Census Metropolitan Area (CMA). Growth forecasts prepared during the 1990s had been based on 1,000, 1,300 and 1,600 jobs per year for the low, medium and high projections respectively.
Figure 2
City of Kingston Screenlines
Table 6
Population Forecasts

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
<th>Build Out 2026</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kingston CMA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Low (200 jobs/year)</td>
<td>146,838</td>
<td>149,062</td>
<td>151,823</td>
<td>156,767</td>
<td>163,676</td>
<td>169,759</td>
</tr>
<tr>
<td>Population Med (600 jobs/year)</td>
<td>146,838</td>
<td>153,943</td>
<td>161,082</td>
<td>170,297</td>
<td>181,535</td>
<td>192,454</td>
</tr>
<tr>
<td>Population High (1,000 jobs/year)</td>
<td>146,838</td>
<td>158,876</td>
<td>170,462</td>
<td>184,109</td>
<td>199,904</td>
<td>215,959</td>
</tr>
<tr>
<td><strong>City of Kingston</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Low (200 jobs/year)</td>
<td>114,195</td>
<td>115,491</td>
<td>117,238</td>
<td>120,699</td>
<td>125,672</td>
<td>129,903</td>
</tr>
<tr>
<td>Population Med (600 jobs/year)</td>
<td>114,195</td>
<td>119,153</td>
<td>124,158</td>
<td>130,758</td>
<td>138,916</td>
<td>146,712</td>
</tr>
<tr>
<td>Population High (1,000 jobs/year)</td>
<td>114,195</td>
<td>122,852</td>
<td>131,162</td>
<td>141,016</td>
<td>152,520</td>
<td>164,092</td>
</tr>
</tbody>
</table>


Notes:
- Kingston CMA includes Loyalist Township, the Township of South Frontenac and the Township of Frontenac Islands.
- Population figures are for the entire City, including the rural area.
- Population forecasts include students not captured by Census Canada as Kingston residents and therefore are slightly higher than the reported population forecasts. Figures also provided by Stevens Associates.
- The “Build Out” horizon year was assumed to be 2026 to be consistent with the Urban Growth Strategy. The growth forecasts provided by Stevens Associates for Alternative 1 plus 2 (High) actually shows build out in 2023.

Stevens Associates cautions that, given the history of Kingston’s sporadic growth, future growth projections are uncertain and therefore, retaining the flexibility to react to different conditions is an important consideration in the KTMP. The appropriate projection to use in further analysis should not be less than the medium projection, but does not need to be more than the high projection. The medium and high projections would result in the total increases for the 2001 – 2026 period shown in Table 7.

Table 7
Population and Job Growth

<table>
<thead>
<tr>
<th></th>
<th>2001-2026 Growth</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (non-institutional)</td>
<td>31,083</td>
<td>47,724</td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>15,000</td>
<td>25,000</td>
<td></td>
</tr>
</tbody>
</table>


Job growth for the past 20 years has averaged about 775 jobs per year, the mid range between the medium and high projections of 600 and 1,000 respectively. Some jobs are population related (schools, local commercial, home based businesses) and will be integrated with the population served. The vast majority of the projected jobs would be located in urban Kingston.

3.5 Projected Transportation Demands

Logically, growth in population and employment levels in Kingston will lead to growth in travel demands for all modes. To assist in forecasting this demand a transportation model was developed to simulate future travel demand. The model incorporates the population and employment forecasts and the travel behaviours of Kingston residents as described by the household survey. The model developed is typical of the types of models developed by other municipalities throughout North America. The household survey and the travel demand forecasting details are presented in the Technical Foundation Document.
3.6 Screenline Capacity Deficiencies

One of the key objectives of the KTMP was to identify the significant road network expansions required to meet the forecasted 2026 demands. The KTMP assumed a performance standard for screenlines (for planning purposes) of volume/capacity ratio 0.90 (i.e., the Level of Service standard for the major roadways crossing the screenline will be that, on average, the ratio of the demand to available supply is 0.90). The need for roadway solutions was triggered once the screenline volume/capacity exceeded 0.90, accounting for all of the planned improvements in non-auto mode performance.

Table 8 presents the comparison of 2026 auto demands to existing screenline capacities for those screenlines where deficiencies have been identified. As can be seen from the table, a number of improvements are required to ensure that acceptable levels of service will be maintained across the screenlines in 2026. Figures 3 and 4 show the anticipated deficiencies across each of these screenlines.

<table>
<thead>
<tr>
<th>Screenline</th>
<th>2026 Vehicular Demand</th>
<th>2026 Projected Road Capacity Deficiencies</th>
<th>Solution to Projected Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[veh/hr]</td>
<td>[veh/hr]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Existing Road Capacity</td>
<td>Existing Effective Road Capacity</td>
<td>Projected Effective Capacity Deficiency</td>
</tr>
<tr>
<td>East-West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Cataraqui Creek</td>
<td>6,855</td>
<td>6,300</td>
<td>5,670</td>
</tr>
<tr>
<td>Victoria Street/Beverly Street</td>
<td>4,870</td>
<td>4,600</td>
<td>4,140</td>
</tr>
<tr>
<td>Division Street</td>
<td>2,255</td>
<td>2,150</td>
<td>1,935</td>
</tr>
<tr>
<td>Barrie Street</td>
<td>4,215</td>
<td>4,600</td>
<td>4,140</td>
</tr>
<tr>
<td>Cataraqui River</td>
<td>1,640</td>
<td>900</td>
<td>810</td>
</tr>
<tr>
<td>Gardiners Road</td>
<td>5,415</td>
<td>5,400</td>
<td>4,860</td>
</tr>
<tr>
<td>North-South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front Road West</td>
<td>1,530</td>
<td>1,500</td>
<td>1,350</td>
</tr>
<tr>
<td>Joseph Street</td>
<td>2,310</td>
<td>2,000</td>
<td>1,800</td>
</tr>
<tr>
<td>Elliott Avenue</td>
<td>2,095</td>
<td>1,650</td>
<td>1,485</td>
</tr>
<tr>
<td>Raglan Road</td>
<td>2,265</td>
<td>2,300</td>
<td>2,070</td>
</tr>
<tr>
<td>Bath Road/Concession Street</td>
<td>5,390</td>
<td>4,250</td>
<td>3,825</td>
</tr>
<tr>
<td>Hwy 33/Bath Road</td>
<td>3,620</td>
<td>3,050</td>
<td>2,745</td>
</tr>
<tr>
<td>Princess Street/Counter Street</td>
<td>5,065</td>
<td>5,100</td>
<td>4,590</td>
</tr>
<tr>
<td>Hwy 401 South-West</td>
<td>6,545</td>
<td>6,150</td>
<td>5,535</td>
</tr>
<tr>
<td>Hwy 401 North-West</td>
<td>2,610</td>
<td>2,750</td>
<td>2,475</td>
</tr>
</tbody>
</table>

1. Effective Road Capacity is the Road Capacity times 0.9 to reflect the Level of Service standard.
2. An additional arterial lane was assumed to have a capacity of 900 vehicles/hour and an effective capacity of 810 vehicles/hour.
3. Traffic operational improvements and transit are expected to resolve the deficiency across this screenline.
4. Traffic operational improvements are expected to resolve the deficiency across this screenline. No additional lanes required.
5. One lane is required based on adding an arterial lane of capacity. Having completed the plan that includes completing Cataraqui Woods, a collector road, it would take the equivalent of two collector roads to solve the problem. One collector road and transit is expected to be sufficient to solve the deficiency.
6. Although transit can theoretically solve the capacity deficiency, there is an over-reliance on Patrick Street, a local road to accomplish this. An additional lane is needed.
7. Transit potential and interchange capacity improvements will resolve any capacity deficiency.
Insert Figure 3
East-West Screenline Analysis
[This page intentionally left blank as reverse of Figure 3.]
Insert Figure 4
North-South Screenline Analysis
Despite the identification of capacity deficiencies in terms of roadway lane capacities, the considered solutions were not limited to roadway expansion or extensions. Rather, other strategic level alternatives that focused on the promotion on non-automobile transportation were considered, including:

- pedestrian facilities;
- promotion of other modes – construction of cycling lanes, etc.;
- transit considerations – route expansion;
- Travel Demand Management (TDM) techniques – High Occupancy Lanes, staggered or flexible working hours, car pooling; and
- Transportation System Management (TSM) – includes various measures to maximize existing system efficiency such as, intersection improvements and traffic signal optimization.

In fact, for the identified capacity deficiencies, non-automobile oriented solutions were given first priority as long as they could resolve the identified problem to an appropriate level of service and in a cost effective manner. Roadway expansion alternatives were only then considered to address the remaining deficiencies.

The following sections describe the network and program requirements to achieve the modal share targets assumed in the demand forecasting exercise and present a number of policy statements to translate the City’s transportation goals into actions.
4.0 MANAGING TRANSPORTATION

Transportation Demand Management/Transportation System Management (TDM/TSM) strategies represent all of the actions that the City may take to complement major infrastructure investments to achieve its transportation vision. Fundamentally, the goal of TDM/TSM strategies is to delay and possibly even eliminate the need for significant capital investments in new transportation infrastructure.

4.1 Transportation Demand Management (TDM)

TDM is essentially a series of co-ordinated actions aimed at reducing auto demand during the PM peak commuter hour. Travel demands during the PM peak commuter hour are used to size the road network; therefore, reduction in auto demand during the commuter peak hour minimizes the overall size of the road network. TDM strategies reduce peak hour auto demands by encouraging individuals to make fewer trips, to travel less in a single occupant automobile, to travel outside the peak hour, and/or to reduce the length of their trips, thereby reducing overall travel.

TDM strategies are the primary means to achieve the desired change in travel behaviours that are consistent with the strategic direction. These strategies attempt to influence and change habits of travel. TDM strategies are a system-based process to not only reduce travel time and costs, but to reshape underlying attitudes and develop mechanisms to implement and execute these changes. Table 9 highlights some high-potential TDM strategies for Kingston.

The experience in other municipalities has shown that a sustained commitment and diligent work is needed to first, define and implement a program and then, to see the effects on system wide travel demands in the next five to ten years. Managing transportation demand offers a low cost alternative to building additional roadway infrastructure and could play a significant role in dealing with the travel demand forecasts for the period beyond 2011. A successful TDM program will be a long-term commitment involving both City staff and community stakeholders, over an extended period of time. The establishment of a permanent position/role of TDM Coordinator will go a long way towards ensuring the goals and objectives of the plan are achieved.

Below are some of the steps that will initiate and sustain a TDM program.

1. **Assemble Relevant TDM Background Information:** This task would include assembling as much current documentation on existing programs both in Canada and the United States. As part of this task, linkages should be established with other agencies, such as those in Ottawa, Montreal, the Greater Toronto Area (GTA) and other midsized cities involved in the TDM process. Internet linkages to existing web sites to establish these additional information linkages should further support this. Further actions associated with this task could include establishing ties to current community energy conservation and waste management programs.

2. **Identify Current TDM Programs in the Kingston Community:** The City of Kingston has already initiated some public sector-based TDM activities. These include policies in support of parking management, cycling and pathways, land use, and transit enhancement. There are also a number of community-based initiatives in the area of ridesharing and flex hour programs. These programs should be identified and assembled into an overall inventory of community TDM programs.
### Table 9
Strategies for Managing Transportation Demand in Kingston

<table>
<thead>
<tr>
<th>TDM Measure</th>
<th>Currently Used in Kingston</th>
<th>Potential for Public Acceptance</th>
<th>Potential to Incrementally Affect Travel Demand</th>
<th>Recommended for Immediate Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategies to Reduce Peak Hour Travel Demands</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work-based Strategies (e.g., Flexible work hours, telecommuting, home-based business)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>School-based Strategies (e.g., Shift classroom hours, distribution of transit passes)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Strategies to Shift Modal Choices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking/Cycling Strategies (e.g., Improved marketing/information distribution, increased Can-Bike training, development of improved streetscaping standards)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Public Transit Strategies (e.g., Improved marketing/information distribution, increased venues for transit pass/ticket distribution)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Parking Strategies (e.g., Strategic management of parking fees and supply)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Auto Disincentive Strategies (e.g., road pricing, tolls)</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>Strategies to Increase Auto Occupancies/Efficiencies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategies to Increase Ridesharing (Car/Vanpooling) (e.g., preferential parking fees and locations, ridematching assistance)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

3. **Identify and Establish TMA Groups for Kingston**: The key to a successful TDM program will be a sense of community ownership. Transportation Management Associations (TMA) is one way to achieve the grass roots organization that can implement the TDM mechanisms. A TMA is typically a private, non-profit membership organization that works to promote non-auto modes and transportation demand management within an area. They are supported by public and private organizations and work with individual member organizations to put in place transportation management solutions for their direct benefit.

TMA activities should be coordinated through a Steering Committee and can be formed on a geographic basis throughout the community. This allows for a specific tailoring of TDM activities to meet the diverse needs of the different areas of the community from the institutional uses at Queen’s University/Kingston General Hospital area to groups of major employers such as in the Downtown or along Counter Street. Potential TMA’s should be identified and encouraged through the support of a TDM coordinator.
4. **Draft an Initial Framework for a Kingston TDM Action Plan:** The TDM coordinator should collate all the information developed in the first three activities. Based on this information a draft framework should be developed in concert with the current transportation, road and transit plans for the City. This framework can then be vetted with the community stakeholders. Based on a general agreement of the framework, the TDM program can be finalized and subsequently used as a guide for the community TMA’s to develop detailed TDM programs for their respective areas.

The TDM community program goals should be expressed in terms of performance objectives. This approach will allow individual agencies and institutions the latitude to develop their own mechanisms and organizational structures to achieve these performance standards. By using such performance standards agencies will be able to measure change in travel patterns so that individual problem areas can be identified and appropriate action plans developed. Also, performance objectives can be used to monitor the success of the mechanisms developed by the KTMP.

Any community TDM program should be a partnership of public sector agencies, private sector businesses and community interest groups. Because of their basic role in developing community transportation infrastructure, public sector agencies must take a proactive role in initiating and supporting TDM activities. Combined with the recognition that TDM is a broad spectrum of mechanisms aimed at reducing peak hour auto travel demands, these mechanisms must be applied as tailored package to fit the needs of a specific community.

The City will:

1. Create the position of TDM Coordinator, with the mandate to coordinate public and private sector TDM initiatives in the City of Kingston.

2. Prepare a Community TDM Action Plan, identifying a short-term work plan, potential private and public-sector partners, resource requirements, performance targets, and monitoring tools. The Action Plan will consider the modal share objectives set for all modes that are alternatives to auto travel.

### 4.2 Transportation System Management (TSM)

As a complement to managing transportation demand, the City will adopt a range of strategies to optimize the performance of the transportation system. The goals of Kingston’s TSM strategies will be to maximize the people-moving capabilities of network elements, reduce the costs of their operations, and improve their safety for all users. Successful TSM strategies:

- maintain or improve system safety;
- defer the need for major infrastructure investments;
- provide the best possible level of service for all users; and
- minimize the impacts of transportation activities on community liveability.

Kingston will face many challenges over the next 25 years in moving towards its transportation objectives. Desired changes in travel behaviour will take years to come to fruition, but as these gradual changes take effect the benefits will be seen through fewer major investments needed to meet the interim demands. As road demands approach capacities, actions must be taken to prevent unacceptable trends in congestion and safety. Relatively minor actions that remove localized barriers and bottlenecks can have large benefits to overall system performance.
The following general policies confirm the City’s commitment to transportation system management. Readers are referred to Section 7.0 for more information on roadway policies.

The City will:

1. Enhance its road safety programs and services to ensure the highest level of safety that is practically achievable.

2. Optimize the performance of its arterial and major road network through periodic review of roadway elements and traffic controls (e.g., optimize traffic signal timings).

3. Apply comprehensive and consistent area traffic management tools and processes (such as traffic calming measures) to improve neighbourhood liveability.
5.0 WALKING

Preamble

Walking is the most basic form of transportation. Walking is not only a mode of travel on its own; it forms a portion of every trip that is made, linking the trip origin to the vehicle of travel, and the parking space or transit stop to the ultimate trip destination. Pedestrians are the most vulnerable traveler in the system, and the choice to rely on walking as a mode of travel for all or part of a trip depends on several key factors:

- A range of destination choices that are within a reasonable walking distance from the trip origin;
- The presence of a complete network without significant barriers to travel that provides users with an adequate level of safety and personal security;
- The use of design and operations practices that promote pedestrian travel and minimize conflicts between pedestrians and other travel modes; and
- Adequate seasonal maintenance practices for network facilities.

Walking is also one of the two active modes of travel that contribute not only to the completion of the trip, but also to the personal health of the traveler. As such, there are not only significant numbers of pedestrians completing utilitarian trips (e.g., commuting), but there are also significant recreational demands for walking. Walking is also one of the two most environmentally friendly modes, making no contribution to noise or air pollution levels in the completion of the trip.

The City of Kingston Cycling and Pathways Study was completed concurrently with the KTMP. The two studies were completely integrated and the recommendations are common where they overlap.

The strategic direction for the KTMP emphasized walking as a preferred mode of travel in Kingston. There was an expressed desire to increase the amount of walking overall and specifically to increase the share for walking trips in the PM commuter peak hour. Support was expressed for:

- Programs that promote walking as an alternative to auto travel and as a recreational activity;
- Significant increases in the kilometres of on and off-road pedestrian facilities (i.e., sidewalks and pathways) across the City, as a means to promote walking and transit (walking as a connection to transit trips); and
- Design, operating and maintenance practices that make walking more attractive.

Programs

Programs that promote walking as an alternative to auto travel (e.g. The “Walking Bus” concept for students) are one part of the City’s comprehensive TDM strategy. Readers are referred to Section 4.1 of this report. Tools (e.g. policies, education) should, at a minimum, promote the environmental, health, and economic benefits of walking.

Infrastructure

Figure 5, taken from the Cycling and Pathways Study, illustrates the Pedestrian Focus Master Plan (i.e., the network of pedestrian-focused recreational pathways).
Insert Figure 5
Pedestrian Focus Master Plan
[This page intentionally left blank as reverse of Figure 5.]
The City will:

1. On new roads, and on reconstructed roads where feasible, require the provision of:
   
a) Sidewalks on both sides of urban arterial roads and collector roads adjacent to developed lands;
   
b) Sidewalks on at least one side of all local roads;
   
c) Direct high quality pedestrian connections to transit;
   
d) Pedestrian connections between neighbourhoods; and
   
e) Pedestrian linkages to major attractors/generators of walking trips.

2. Require the development of a pedestrian network that maintains a maximum walking distance of 400 metres to all transit stops, for areas served by fixed route transit.

3. Coordinate with neighbouring municipalities and/or counties, other agencies and interest groups to establish alignments and priorities for extensions to the pathway network beyond the City.

4. Ensure that multi-use pathway development in a corridor being protected for other future uses, for example utilities, will not compromise the long-term potential for these other future uses.

5. Require, as a condition of Site Plan Approval, owners of land to provide direct, safe, secure and well-delineated access routes for pedestrians between the main building entrances and adjacent public sidewalks and transit facilities/bus stops. Owners may also be required to provide pedestrian walkways across their property to the satisfaction of, and at no cost to, the City of Kingston. All facilities will be fully accessible to the public at all times.

**Design, Operating and Maintenance Practices**

The Cycling and Pathways Study also reviewed and developed design standards, harmonized planning policies, prioritized and provided costing on proposed improvements and provided an implementation strategy for short and long term planning horizons.

The City will:

1. Develop a comprehensive source of sidewalk and pathway information by integrating the existing sidewalks database with the inventory of facilities from the Cycling and Pathways Study.

2. Investigate and, if appropriate, select Measures of Effectiveness for the transportation system, as it relates to serving pedestrian demands. There are currently no common Measures of Effectiveness in use in North America or Europe to measure pedestrian levels of service in a transportation system. Establishing Measures of Effectiveness is the first step in ensuring that planning and operational decisions are made to further the Plan’s pedestrian objectives.

3. Where necessary, trade-offs between targeted service levels will be made recognizing safety and mobility needs of all users and the priority placed on walking as a mode of travel.

4. Work with public and private sector partners to enhance personal security along routes which pedestrians and cyclists use for travelling to and from bus stops and transit stations.
5. Require, on an annual basis, the preparation, maintenance, and update of a five-year pedestrian network implementation plan and ten-year pedestrian network targets. Require each five-year pedestrian network implementation plan to include an annual work program establishing the basis for providing staff resources and allocating funds in the City of Kingston transportation budget, to support identification, analysis, design, implementation, and monitoring of pedestrian network performance.

6. Develop consistent procedures for evaluating the need for, and relative priority of, pedestrian network elements.

7. Investigate alternative road crossing treatments and controls.

8. Investigate opportunities to resolve conflicts between pedestrians and other travel modes on shared and/or integrated networks in an effort to pinpoint and eliminate barriers to walking.

9. Investigate alternative facilities within the road right-of-way (i.e., look at alternatives to providing sidewalks such as off-road paths).

10. Establish design guidelines for pedestrian network elements, considering things such as:

   a) personal security;
   b) way-finding;
   c) effective width, based on pedestrian flow, volume, and size of typical groups;
   d) construction materials/treatments;
   e) accessibility for all users including children, seniors and persons with disabilities;
   f) landscape/streetscape treatments;
   g) weather protection; and
   h) engineering standards (e.g., sidewalk slopes, utilities, etc., lighting).
6.0 CYCLING

Preamble

Cycling, like walking, is an active mode of travel; one that makes positive contributions to the traveler’s health and avoids negative impacts on the environment. As an active mode, cycling demands also fall into utilitarian and recreational categories, but unlike walking, utilitarian facilities and recreational facilities tend to vary noticeably (discussed further in this section of the report, under Networks).

Cyclists are also vulnerable travelers (when mixed with motorized vehicles), and safety of cyclists requires particular attention at all times. This issue is discussed further in this section of the report, under Design, Operating and Maintenance Practices.

The key factors that influence the attractiveness of cycling as a mode of travel include:

- a suitable distance between trip origin and destination;
- the presence of a complete, pleasant network without significant barriers to travel that provides users with an adequate level of safety and personal security;
- design, operating and maintenance practices that promote cycling and minimize conflicts with other modes; and
- adequate trip-end facilities (e.g. bicycle racks, lockers, showers).

The City of Kingston Cycling and Pathways Study was completed concurrently with the KTMP. The two studies were completely integrated and the recommendations are common where they overlap.

The strategic direction for the KTMP emphasized cycling as a preferred mode of travel in Kingston and expressed a desire to increase the modal share for cycling trips in the City in the PM commuter peak hour. Support was expressed for:

- Programs that promote cycling as an alternative to auto travel and as a recreational activity for residents and tourists;
- Significant increases in the kilometres of on and off-road cycling facilities (i.e., on-road bikeways and pathways) across the City, as a means to promote cycling; and
- Design, operating and maintenance practices that make cycling more attractive.

Programs

Programs that promote cycling as an alternative to auto travel are one part of the City’s comprehensive TDM strategy. Readers are referred to Section 4.1 of this report. Tools should, at a minimum, promote the environmental, health, and economic benefits of cycling.

Infrastructure

Figures 6 and 7, which are taken from the Cycling and Pathways Study, illustrate the Utilitarian and Recreational Cycling networks.
The City will:

1. Implement, where feasible, the portions of the Cycling Network as shown on Figures 6 and 7, actively promote implementation of portions of the network that are under other jurisdictions (i.e. adjoining municipalities, conservation areas, publicly owned lands) and support its harmonization with the overall transportation network.

2. Recognize the Cycling Networks in the forthcoming Official Plan. An amendment to the Official Plan for revisions to the Cycling Networks will not be required provided that the continuity and functionality of the network is maintained in the same general location.

3. Require that zoning by-laws provide for an appropriate capacity of secure bicycle parking at educational, community, retail, recreational and employment land uses, and at residential apartment buildings.

4. Implement, where feasible, affordable and appropriate, cycling requirements in the design of all new, reconstructed or rehabilitated City of Kingston roads not included in the Cycling Network.

5. Maintain a collaborative process in the on-going development of the Cycling Network, including:
   a) monitoring of cycling usage on the network;
   b) ongoing consultation with users including cycling groups; and
   c) ongoing consultation with adjoining municipalities, conservation authorities and those responsible for publicly owned lands (i.e. federal and provincial governments).

6. Encourage multi-modal transportation opportunities by implementing a program of bicycle racks on buses to enable passengers to store their bicycles on board.

**Design, Operating and Maintenance Practices**

In general, the use of design elements that are barriers to cyclists will be avoided in the design of any roadway facility. This will require an awareness of planned construction and traffic control modifications to ensure that improvement opportunities are identified early on and sufficient time is provided to develop revised designs and budget allocations. There are a number of places where the Cycling Network and other modes of transportation must share the available roadway, and appropriate provision must be made for each mode. Emphasis should also be placed on the maintenance and repair of roadway elements that affect the performance of on-road bicycle facilities.

The City will:

1. As a priority, examine and continue to implement routine maintenance practices such as road sweeping and pothole patching that promote safer cycling conditions for as much of the year as is practical.

2. Ensure that the needs of cyclists are considered in the selection and placement of vehicle detection equipment at signalized intersections.

3. At signalized intersections where it is necessary to provide a movement by bicycles, which is separated from other vehicular traffic, consider the use of special bicycle signal indications in accordance with developing provincial and federal standards and legislation.
Insert Figure 6
Utilitarian Focus Master Plan
[This page intentionally left blank as reverse of Figure 6.]
Insert Figure 7
Recreational Focus Master Plan
[This page intentionally left blank as reverse of Figure 7.]
4. Manage, locate and enforce loading zones on City roads to minimize the potential negative effects of loading activities on bicycle movement, with particular attention paid to designated Cycling Network routes or roads experiencing high cycling demand.

5. Implement bicycle compatible construction practices (i.e. bicycle friendly sewer grates with openings perpendicular or diagonal to the direction of travel as opposed to parallel sewer grates that can trap bicycle wheels).

6. As a priority, identify and modify as required any operational design practices which may impede cycling on roadways, including intersection geometry, location and type of on-street drainage, procedures to minimize and effectively reinstate road cuts, and cyclist safety measures during road construction.

7. Identify and implement opportunities to eliminate intersection design or operational characteristics that are incompatible with safer cycling.
7.0  PUBLIC TRANSIT

7.1  Transit Strategy

Preamble

Public transit is an important element of a comprehensive transportation network. It can be an attractive alternative travel mode for the people who live, work, study, play and visit in Kingston, while providing mobility, environmental, economic development and tourism related benefits for the entire community. However, existing transit use in Kingston accounts for about 3 percent of total travel during the commuter p.m. peak hour and only 1 percent of the total work trips during the same period. Considerable potential exists to improve the modal share of transit.

The transit strategy being adopted by the Kingston Transportation Master Plan study aims to:

- Proactively increase existing transit use by providing full-service, accessible transit, comprising high-frequency peak period service and extended off-peak service, weekdays and weekends.
- Tailor service levels and route structures to reflect the different needs of urban and rural communities within the City by providing a mix of flexible and fixed routes, community bus routes, commuter and tourist shuttles, and local charters.
- Fully coordinate services with inter-city bus, train, ferry and airport passenger services.
- Provide fully accessible service to the inter-city bus terminal, rail station, ferry docks and airport.
- Provide a mix of fully accessible, attractive modern vehicles to meet market demands.

It is envisioned that over 20-25 years this strategy will lead to increased transit ridership as a result of growth and increased use of transit in the new city. Current expectations are that transit use could increase from about 3 percent of travel in the afternoon peak hour in Kingston to over 11 percent.

However, a substantial increase in ridership of this magnitude requires local transit that is convenient and attractive to potential riders, takes them where they want to go, when they want to go, and provides a total trip travel time that is competitive with the private automobile. In summary, it requires services that are tailored to the needs of the various local transit markets in Kingston.

Based on these directions, an innovative transit system responsive to the needs of Kingston communities was developed in this study. The following sections present the approach to developing the transit system, the description of the transit service and the estimated cost.

7.2  Transit Projections

In developing the transit strategy, the existing travel patterns and behaviours (e.g. modal splits), projected development and resultant growth in person trips and potential congestion were reviewed, which were used to project potential future transit use in Kingston. The transit forecasts have two components:

1. The projection of existing trends into the future (i.e. the existing transit modal split applied to future population and employment levels); and
2. An estimate of the additional riders that could be “attracted” to transit with a pro-active emphasis.
Future transit ridership was estimated for each component on the basis of trip origin and destination. Thus, for example, the study aims to attract 30 percent of projected future total trips made entirely within the downtown core/KGH/Queen’s University, based on anticipated corridor and area services, anticipated frequencies and supporting elements. It is projected that future transit services between the downtown core and destinations in the Princess Street and Division Street corridors could attract approximately 15 percent of future total trips. Within other areas of the urban area, attraction rates of 5 to 10 percent are typically projected. These rates typically drop to between zero and 3 percent in outlying and rural areas of Kingston.

The study then used a screenline analysis approach to identify and assess the transit needs required to support projected transit trips in Kingston.

Following this approach, transit ridership was estimated to increase from nearly 1,200 riders during evening rush hour in 2001 to almost 5,400 riders (about 3,500 “new” transit person trips are attracted from auto trips) during the same period by 2026. It is anticipated that these future transit riders would represent over 11 percent of future total travel (up from 3 percent).

Although the percentage increase may seem ambitious, it should be noted that Kingston Transit currently provides transit trips to over 3,500 riders during some of the peak periods. On Clear Air Day recently, “3,700 additional transit rides were taken” according to Kingston Transit. With a concerted effort and improved service levels, the additional transit ridership is achievable.

The Technical Foundation Document outlines the approach to transit projections in further detail.

### 7.3 Recommended Transit Innovations

An innovative transit system was developed based on the projected transit demand and identified transit corridors. The proposed transit system shown on Figure 8 envisions enhanced fixed routes and higher levels of service in major travel corridors connecting key parts of the City. These corridors place increased emphasis on downtown Kingston as a major market of potential transit users and are supported by complementary service delivery options in the outer urban and rural areas. Expanded service is anticipated in the downtown core, Queen’s University/Kingston General Hospital precinct and the immediate surroundings. As well, enhanced services with increased service levels are anticipated in the Princess Street corridor between downtown and the Cataraqui Centre, and to a slightly lesser extent in the Bath Road and Division Street corridors.

#### Corridor Transit Service

Identified major transit corridors include Princess Street, Bath Road, Division Street, Highway 2 (LaSalle Causeway), Gardiners Road, King/Union Street and Counter Street. Service on three major transit corridors, Princess Street, Bath Road (east of Gardiners Road) and Division Street, would operate at 10-minute frequencies, based on projected transit trips and the defined minimum service level to achieve the goals of the plan.

The combined service frequency along Princess Street would be approximately 3 to 7 minutes. To further improve the transit service and diminish traffic delays at major intersections on this corridor, some transit priority measures, such as transit priority signals and queue jump lanes at intersections, could be applied along the Princess Street corridor, and integrated with the adjacent uses. The frequency and express nature of the service is expected to be very attractive to current auto users.
The combined service frequency on LaSalle Causeway corridor is projected to be in the order of 7.5 to 10 minutes, which would help to relieve the congestion in this corridor. Auto drivers could use the proposed commuter lot to access transit service to the downtown, Queen’s University and the hospital. This would give auto users an attractive choice for travel across the Causeway to downtown. Services in other corridors would operate at 15-minute frequencies.

All corridor buses operate on a circle route in the downtown area to reduce walking distance and transfers for transit users whose destinations/origins are Queen’s University, Kingston General Hospital and other business and commercial areas beyond the downtown terminal.

It is recognized that this level of service would not be immediately available and that as described further in Section 7.5 an incremental approach to achieving these levels would be pursued.

**Fixed Route Services**

Four Fixed Route Service areas with routes operating at approximately 15-minute frequencies would serve existing and emerging communities in Kingston and feed into the Corridor Transit Services at major transfer points. The advantages of these fixed route services are:

- they provide transit users access to proposed express and frequent corridor services;
- they serve communities (i.e., serve the needs of users where reducing walking distance is more important than the time spent on the bus); and
- they can serve special needs (i.e., the seniors market during off-peak hours).

The maximum walking distance to transit should be 400 metres within fixed route service areas. Road patterns and pedestrian facilities should be planned in new and emerging communities to ensure efficient, cost-effective transit routing that minimizes the average walking distance to transit. In areas of established communities where it is not cost-effective to operate fixed route service to this standard, consideration should be given to providing supplemental flexible route services.

**Flexible Route Services**

The private automobile is the predominant choice of mode for all trips in the west portion of the City, in part, because of the low density of development and lower traffic volumes. However, most auto trips with a downtown destination (and areas to the east) face increasing traffic delays. To attract auto drivers to corridor transit services, three flexible routes are proposed that connect the existing and emerging communities to a terminal at the Cataraqui Centre, a major transfer location in the vicinity of Gardiners Road and Bath Road, and a proposed park-and-ride facility in the vicinity of Front and Days Roads. The flexible routes would have fixed stops and schedules along the routes, supplemented with small deviations, when required. Features could include:

- operates based on transit demand;
- uses smaller community transit vehicles;
- reduced operating costs allow transit to be introduced in areas where fixed routes services would not be cost-effective;
- passengers can walk to a fixed stop at the scheduled time, or call for service;
- walking distance to transit service is substantially reduced for the majority of transit users; and
- there is potential for door-to-door service for passengers unable to get to a bus stop.
Insert Figure 8
Conceptual Transit Network
Kingston Accessible Services

Accessible transit service in the city would operate in a manner similar to its current service mandate and “mirror” the service area of the proposed conventional transit system.

The flexible route services described previously, with the potential to operate door-to-door, also provide some additional capacity to accommodate riders who would otherwise be dependent on accessible services or without service.

Perimeter Parking Lot Shuttles

To promote the shift to transit in the core area, the existing public parking lots located outside of the downtown core could be linked to the downtown by a dedicated “parking lot” shuttle that would serve employees working in downtown businesses, as well as visitors to the hospitals, municipal offices and other government facilities located in the downtown. Similarly, the new commuter lot proposed to the east of the LaSalle Causeway (as illustrated in Figure 8) could be linked to the downtown using a parking lot shuttle.

From the user’s perspective, the parking lot shuttle needs to provide a convenient and attractive alternative to travel by auto. This requires commuter lots and transit facilities that are located together in an integrated fashion, frequent service to key destinations in the downtown (i.e., Kingston General Hospital, downtown transit terminal, etc.) during peak periods, and transit support elements such as transit priority measures that provide transit with a travel time advantage over the automobile.

The shuttle could also serve the ferry docks providing access to the downtown core for passengers using the ferry services to and from Wolfe Island.

To access the parking lot shuttle, a patron could show a valid parking lot receipt; ferry riders could pay a nominal fee for using the shuttle. It is intended that the shuttle service would be frequent, however, parking lot patrons could use their parking receipts to board any regular transit bus that passed by their lot heading to or from the downtown core. Details related to routing, ownership, operations and maintenance, and cost are typically determined as part of a comprehensive Transit Operations Review.

Downtown Shuttle Service

A downtown shuttle would operate at approximately 10-minute headway connecting the downtown core, Queen’s University and Kingston General Hospital. The shuttle route could deliver transit service close to the origins and destinations of transit users further improving transit accessibility and attracting additional riders. The downtown shuttle service could be operated in conjunction with the parking lot shuttles. Details related to routing, ownership, operations and maintenance, and cost need to be determined as part of a comprehensive Transit Operations Review for the City of Kingston.

Downtown Tourist Shuttle

Kingston has become a significant destination for visitors during the tourist season that extends from May through October and attracts over 3 million visitors annually seeking accommodations, dining and entertainment. With numerous tourist attractions in close proximity to the Downtown, a shuttle service could be introduced to provide visitors to the city with an attractive means of transportation that will allow access to these attractions without requiring use of their cars. Designed specifically to cater to tourists and other visitors, the shuttle would provide convenient and frequent service using unique buses, similar to the Confederation Trolley equipment currently operated by Kingston Tourism for its historic tours around the city.
The shuttle service would circulate through the Downtown stopping at various attractions, accommodations and points of interest. Tourists could be encouraged to use the shuttle through an ongoing marketing program promoting the service as the best way for visitors to get around the city and see its attractions. Access to the shuttle by tourists could be through electronic fare media paid for through direct or indirect means; the details of which would be determined in the implementation phase. Equipment ownership, operation and maintenance issues would also be determined at that time. The shuttle service should be offered on a full cost recovery basis from the outset and the service developed with that objective in mind. Implementation details need to be determined as part of a comprehensive Transit Operations Review for the City of Kingston.

The use of the shuttle services would help to decrease the number of vehicle trips into the downtown, and ease the demand for parking.

**Kingston Downtown Transit Terminal**

Kingston Transit presently operates an on-street transfer point in the downtown at the intersection of Bagot and Brock Streets, with the majority of routes stopping on the north side of Brock Street. This type of operation is not uncommon in municipalities the size of Kingston, however, if transit is to assume a more significant role in accommodating future travel demands it is necessary to raise the profile of transit, particularly in the downtown core. One of the ways this can be accomplished is to improve the downtown bus facilities. Transit infrastructure improvements in the downtown should be directed at concentrating city bus operations in one identifiable location.

The facility best suited to meet Kingston’s transit needs and effectively increase transit’s profile in downtown may be an “off-street” terminal such as is found in Barrie or an “on-street” facility as in Burlington or a “special treatment” that blends into the streetscape as in the Harbourfront area in Halifax. In Kingston’s situation, there is a distinct advantage to having a high profile, focal point for transit in the downtown, particularly if transit is to be viewed as a viable alternative for access to the area for those who work, shop or access the numerous attractions in the downtown and waterfront area.

The nature and location of this downtown transit facility is best determined as part of a comprehensive Transit Operational Review. As part of a detailed review of transit service needs and routing, a location and facility could be identified that appropriately reflects: transit activity in the downtown including the volume and nature of transfers; impacts on transit routing; terminal facility requirements; availability of potential terminal sites; and other considerations related to downtown redevelopment or the provision of parking.

**Rural Connection**

Based on transit projections, there will be considerable transit demand in the area north of Highway 401. To accommodate this need, a rural route could operate at 60-minute service frequency connecting this area to Cataraqui Centre and Division Street transit corridor. This rural route would provide transit users, north of Highway 401, with access to the downtown core and Cataraqui Centre. Furthermore, auto drivers could leave their cars at the proposed park-and-ride facility at Division Street and Highway 401 (see Figure 8) or the commuter lot at Gardiners Road and Highway 401 to directly access the express corridor transit services.
Rural Service

Initially, fixed route services in the rural areas within the municipal boundaries of Greater Kingston are not justified, as population densities do not warrant this type of service delivery. A more practical and efficient system could be introduced, however, that would allow access to transit service in non-urban areas on a demand responsive basis.

This service could take the form of a “taxi script” or Dial-a-Ride operation that would only be activated by riders pre-booking trips in advance. This service delivery method would allow the transit authority to create flexible trip schedules, meeting the desire to provide rural service, but at the same time holding costs for these services in check.

Inter-modal Connections

The inter-city bus, VIA rail station and ferry terminals, as well as the airport, are served by the proposed innovative transit system. The Counter Street corridor and two other fixed routes would provide transit service to the Coach Canada terminal and the VIA rail station. A flexible route would serve the airport, while some routes could provide services to the ferry terminal. Transit schedules would be coordinated with those of inter-city bus, rail, and ferry operators.

7.4 Making Transit Attractive

For transit to be successful it must be attractive to the user and competitive with the automobile. To achieve this, transit services must provide competitive travel times, improved reliability of schedules, increased service options and enhanced station facilities at each point along the trip from home to destination and back.

With the customer in mind, new emphasis needs to be placed on considerations such as:

- transit service levels (i.e., proximity, schedule, frequency and travel time) that meet the customers needs;
- technology (i.e., smart cards, passenger information and so forth) that increases convenience and attractiveness of service to the customer; and
- education of the customer regarding the services that are available.

Attributes of an Attractive Service

Research has shown that the attributes of an attractive transit service are:

- from origin to transit service:
  - fast and easy to get to (parking, kiss and ride, well timed connecting transit);
  - comfortable (exposure to weather).

- during the transit trip:
  - fast (high average speed, including station stops);
  - comfortable and stress-free (able to read, work, or do other things they can’t do while driving);
  - timely (schedules which match times people want to travel);
  - reliable (high on-time performance);
  - convenient and easy to use;
cost competitive in relation to the value offered (cost is a secondary decision factor: people tend to determine the best way to make the trip, then look at price.

- from transit service to final destination:
  - fast and easy (walk, well connected transit); and
  - weather-protected (concentrated employment).

Alternative service delivery concepts, including flexible and dynamic routing, demand responsive service, or use of smaller vehicles or taxis, have had success in other communities in directly serving the local community transit needs. These services can be tailored to the needs of key market segments including workers, students, seniors and tourists to significantly increase the attractiveness of transit in these key market segments.

For example, the use of transit for trips to and from work is virtually non-existent at the present (i.e., approximately 1 percent of peak period work trips are by transit). The use of smaller vehicles in flexible route service areas, for connections to rural areas and as shuttles that bring frequent and convenient service near home and/or work, and connect in a timely fashion to high-frequency corridor services is a key aspect of the transit strategy for Kingston that is expected to be highly attractive to many workers.

The provision of modern, attractive and comfortable transit vehicles with the addition of features such as bike racks (where feasible) also contributes to increasing the attractiveness of transit by making the use of transit more appealing to potential customers and by accommodating the entire trip from the customer perspective.

Maintaining equipment in a state of good repair to ensure a high degree of cleanliness on and around buses and facilities is also vital.

**Network Support Elements**

The transit component of the Transportation Master Plan for the City of Kingston involves much more than the network of transit services operating in the various corridors and between areas of the City. To increase the attractiveness of transit from its current level of approximately 3% to over 11% in the next twenty years, there are various required elements in support of the network including:

- land use patterns in the City that support increased transit use for work trips;
- coordinated planning of roads, parking and transit;
- inter-modal transfer locations, supporting both inter-city and tourist markets;
- introduction and expanded use of new technologies; and
- Travel Demand Management (TDM) and Transportation Systems Management (TSM).

To serve local needs and build ridership, effective and innovative local transit service is required. To achieve strong local transit capable of accommodating future travel, political and funding commitments are needed for the existing local services, expanding services to growing areas of the City and providing feeder services and inter-modal facilities (e.g. bike racks on buses).

To attract work trips, higher densities and mixed uses should be located in conjunction with proposed transit corridors and nodes, where feasible. Opportunities to create streetscapes in areas such as the downtown core that encourage walking and other activities, and discourage auto use should be identified and implemented.
It is important that the City consider the proposed transit network when reviewing its Official Plan and that the approvals of development plans support the proposed transit strategy.

Local transit service needs to support and anticipate the demand in the emerging employment and activity centres and connects with strategic locations on the transit network to promote transit, particularly for work trips. Services should be integrated to provide connections to proposed transfer locations.

Transit nodes also need to be located with the needs of the tourist market in mind. The existing and proposed transfer locations provide excellent opportunities to establish inter-modal facilities that permit convenient transfers between local transit and area tourist shuttles.

Coordinated planning of roads and transit is required to ensure appropriate implementation of future infrastructure-related elements of the transit network, including transit priority and intersection treatments, stops and station locations, where warranted. Possible initiatives could include queue-jump lanes and signal priority for transit vehicles at major intersections along corridors such as Princess and Division Streets to facilitate higher service levels during peak periods or allowing priority access for transit vehicles at the approaches to the Causeway.

Enhanced service coordination is also required to make transit attractive to potential customers. Service coordination comprises:

- coordinating local schedules;
- reducing transfers, where possible, or establishing timed transfers to minimize inconvenience for passengers;
- identifying customer interface opportunities and working towards selection and implementation of coordinated customer interface through integrated passenger information systems and technologies; and
- increased use of vehicle location systems and on-board passenger information systems to provide daily and real time information to customers.

Services also need to reflect the integration of fare technology. Integration of fare technology involves working with stakeholders to identify opportunities to increase customer convenience and make transit more attractive for travel. Specific initiatives should include the establishment of pre-paid fare instruments (i.e. SmartCard technology) and electronic fare collection systems.

Implementation of consistent and complementary TDM/TSM policies in the City can also help encourage reduced travel by single-occupant automobile, as well as support the increased use of transit. Travel Demand Management measures that can be effective in reducing travel by single-occupant vehicles, while supporting increased transit use include parking management strategies related to the provision of park-and-ride and commuter lots, preferential parking, parking supply controls and parking pricing. Transportation Systems Management measures that can be effective in reducing traffic congestion include providing priority or High-Occupancy Vehicle (HOV) lanes, signal priority and/or optimization, and using Intelligent Transportation System (ITS) technologies for such things as incident management.

**Marketing/Education**

As highlighted previously, part of making transit more attractive is educating the customer regarding the services that are available and the personal and environmental benefits of transit. Marketing of transit in Kingston should consider initiatives such as:

- ongoing promotion and awareness campaigns;
- programs to change the public image of transit (e.g., elementary school education programs);
• advertisement campaigns and promotions that target specific groups in an effort to increase ridership (i.e., high school students, seniors);
• tourist shuttle service in the downtown core;
• park-and-ride lots and interface with tour boat and ferry services at the waterfront;
• SmartCard technologies that allow discounts and promotions in conjunction with special events or business promotions in the downtown or elsewhere; and
• Kingston’s Economic Development Program to market the transit network externally to tourists and visitors.

7.5 Incremental Growth

Presently, transit in Kingston is a long way from achieving the vision of a future innovative transit system. In particular, regularly scheduled services for workers are limited. As a consequence, transit trips account for a small fraction of the total trips in the City, and even less for work trips.

There are crucial initial steps that must be taken by the City to begin to foster additional future demand and ensure that the long-term transit strategy is realized.

The City will:

1. Undertake a transit service operational review as a priority in 2004 to provide specific direction on details relating to routing, operations, maintenance, and costing implications.
2. Introduce new services over time on strategic corridors, and take initial steps to support future higher frequency transit service in higher density areas of the city.
3. Respond to transit opportunities in planned centres of employment and residential development throughout the city where emerging travel patterns represent new opportunities for transit to meet the needs.
4. Introduce where warranted, additional services and possible infrastructure solutions, such as transit priority lanes and intersection treatments, to give higher priority to transit, make transit more attractive, and build ridership to the levels projected in twenty years.
5. Consider a range of marketing/educational initiatives, which would increase transit usage.
6. Give high priority to needs of transit services when processing development applications under the Planning Act.
7. Continue to coordinate service delivery to optimize transit service.

7.6 Cost

This section describes the vehicle requirements over the next 20 years and the estimated operating cost for the proposed innovative transit strategy described above.
The total required vehicles would be approximately 55 buses in the peak periods and 33 buses in the off-peak periods. The total fleet size would be approximately 60 buses including 5 spares. Kingston Transit is currently operating 36 transit coaches. Hence, Kingston would have to spend $16.2M for replacement and $10.8M for the new vehicles over the next 20-25 years (a total of $29.0 million).

To maintain the service, the estimated operating cost would be approximately $4.8M for the peak, $6.9M for the off-peak and $865,000 for the Sunday/holiday operation annually. The total operating cost would be approximately $12.6M per year. This is the figure in 20 years with the purchase of the fleet as outlined. Achievement of this level of transit would be incremental, with yearly acquisitions tied to annual capital purchases.

In support of the plan outlined above, the City needs to initiate and complete a comprehensive Transit Service Operational Review as a priority in 2004.
8.0 ROADS

8.1 General Policies

Preamble

Roads are the most common transportation right-of-way, and are generally classified into a hierarchy to reflect role and function. This is done to:

- Convey intended function to the public and to users;
- Ensure consistent decisions regarding the design and operation of the various elements within the right-of-way; and
- Guide long range planning of rights-of-way to protect adequate width to accommodate required elements.

Roads contain elements of the networks for all modes of travel, such as:

- Pedestrians: sidewalks, pedestrian crossings;
- Cycling: dedicated and shared lanes, bicycle crossings;
- Public transit: transit signal priority, select segments of transit lines, mixed traffic lanes, bus stops and passenger amenities at major stops;
- Private transit: parking; standing areas;
- Taxis: taxi stands, mixed traffic lanes;
- Auto: mixed traffic lanes, on-street lanes;
- Trucks: loading zones, mixed traffic lanes; and
- Other intercity: at-grade crossings, grade-separated crossings.

The strategic direction for the KTMP emphasized the need to reduce the demand for automobile travel and to optimize the existing roadway network while meeting the infrastructure needs of all modes. Support was expressed for:

- Programs that promote all alternatives to automobile use, pro-actively optimize the road network and the allocation of roadway rights-of-way, and minimize the impact of increased congestion on Kingston residents;
- Strategic expansion of the road network to ensure minimum Level of Service standards are met, and allocation of some roadway space to priority elements for non-auto modes; and
- Design, operating and maintenance practices that strategically manage roadway rehabilitation and reconstruction to extend the useful life of roadway investments as much as possible.

Programs

The City of Kingston will deliver a number of integrated programs to manage the City’s roadway network in a manner that strives to meet the intentions of the strategic direction. The basic goals of roadway operations programs will be:

- Remove barriers to non-auto travel;
- Reduce delays to transit users and improve transit system reliability;
- Maximize the capacity and efficiency of the existing road network; and
- Minimize the impacts of transportation activities on community liveability.
The City will strive to deliver minimum acceptable levels of service for the network elements of all modes, where possible. As these networks will be competing for time and space (time at signalized intersections and space within the road right-of-way), conflicts will arise. Where necessary, trade-offs between targeted service levels will be made recognizing safety and mobility needs of all users and the priority placed on walking, cycling and transit use.

One of the key ways of delivering this is through Area Traffic Management (ATM). ATM is the set of regulatory and physical measures the City can use to ensure that the road network is used appropriately. “Area” typically refers to residential communities where concerns related to the impact of traffic are most pronounced. A number of measures can be used to manage traffic, depending on the nature of the problem, including:

- Traffic movements - closures, one-way streets;
- Street Environment - streetscaping, landscaping, sidewalks;
- Traffic Operations - turning restrictions at intersections, parking;
- Enforcement - police presence, red-light cameras, radar boards;
- Transportation Demand Management - use of alternative travel modes;
- Education - safe driving campaigns; and
- Traffic Calming - speed humps, road narrowings, traffic circles.

The City will:

1. Investigate possible Level of Service indicators/Measures of Effectiveness for all modes of travel operating on roadways. If Level of Service indicators can be established that have data needs that can reasonably be collected and that provide indications of performance that are relevant to Kingston, the City will consider adopting the Levels of Service indicators and developing performance targets.

2. Establish Volume/Capacity ratios as the relevant Level of Service indicators for performance of mixed traffic lanes. Further, the City will adopt 0.90 as the relevant service target for overall signalized intersection performance and 1.00 for individual movement performance.

3. Prepare Area Traffic Management (ATM) Guidelines to provide direction to staff and the community regarding the determination of need for ATM measures (including traffic calming measures), conditions under which various ATM measures will be considered, and the process by which implementation priority will be determined.

4. Consider impacts on safety, functional role of the road, and adjacent roadways when assessing the appropriateness of ATM measures. ATM on arterial roads should not displace traffic to adjacent lower classification roads.

Infrastructure

The development of municipal roadway infrastructure requires a coordinated set of policies that are mutually reinforcing.

The City will:

5. Provide a regular network of arterial and collector roadways to ensure adequate access and mobility for all areas in the City. For an effective and efficient transit service, provide for a layout for a collector
A road system that permits the linking of several adjacent developments with direct transit routing. In addition, make provision for transit signal priorities and transit priority lanes, where appropriate and feasible.


7. In general, base road widenings on an equal widening from the centre line of the existing road, except where existing development, topographic features or other unique conditions, precludes this. In those cases an offset widening will be obtained.

8. Secure additional land for widenings to provide proper corner (or sight line) triangles at intersections and at existing at-grade railway crossing of a municipal road to protect for future grade-separations.

9. Implement the roadway network modifications/expansions identified in the Official Plan in a timely manner, considering network performance, safety, access to developing lands, and available funds.

10. Continue to require the preparation of Transportation Impact Studies in support of planning applications for significant new developments. Such Transportation Impact Studies will identify transportation system modifications needed to maintain post-development operations of the transportation system in a manner consistent with the City’s network objectives. The City will require road modifications (e.g., road widening, turning lanes, ditch work, etc.) necessary to support development applications as a condition of approval on Site Plans or subdivisions for new institutional, commercial or industrial sites.

11. Review infrastructure requirements at all at-grade rail crossings every five years, in keeping with new Transport Canada regulations, with a view towards addressing the needs within the financial capability of the municipality.

12. Continue to consult with the appropriate Conservation Authority or the Ministry of Natural Resources when constructing new roads or new structures in flood plain areas.

13. Cooperate with senior levels of government and adjacent communities in the planning of roadway infrastructure, considering the City’s strategic direction, existing and future network elements and operational policies.

14. Require the consideration of alternative treatments to noise attenuation barriers (such as berms, development patterns featuring fronting roads, etc.) where noise attenuation measures are required adjacent to public roads.

15. Ensure that noise levels (interior and exterior) do not exceed the levels prescribed by the Ministry of Environment Noise Regulations when reviewing proposals for new residential development adjacent to existing and proposed highways, arterial roads, major collectors, and railways. If the noise level is beyond the maximum levels, the development can go ahead, but: (i) noise impact study should be conducted; and (ii) the developer should provide sufficient noise attenuation measures or provide notice to all prospective purchasers.
**Design, Operating and Maintenance Practices**

Proper design, operation and maintenance of the City’s road infrastructure will ensure a safe and efficient driving environment. It also ensures that the huge investment in infrastructure is maintained in a cost-effective manner.

The City will:

16. Plan, design and operate all roadway measures respecting applicable legislative controls and requirements, professional standards, and best practices.

17. Consider the needs of and impacts on travelers by all modes when modifying the design or operation of the roadway system. Consider pedestrian and cyclist safety in all intersection design and operational decisions. Consider transit priority measures and passenger amenities in design and operational decisions.

18. Consider the identification of a Goods Movement network consisting of upper tier roadways such as Montreal Street, Division Street, Sir John A. Macdonald Boulevard, Gardiners Road, Princess Street, Bath Road, Highway 2 and other key linkages to serve the City.

19. Consider the specific needs of heavy vehicles when modifying the design of any roadway or intersection on any identified Goods Movement Network roadway.


21. Implement a comprehensive Data Collection and Management Program for roadway-related data including transit passengers per bus. Improved data collection and management is necessary to permit the measurement and monitoring of roadway performance and the progress of the City towards the goals of this Plan.

22. Implement a Safety Improvement Program to identify and mitigate locations on the road network with unacceptably high collision rates and to promote education and enforcement.

23. Develop and implement an Asset Management strategy and establish targets to measure its success.

24. Implement transit facilities at the discretion of Kingston Transit. Candidate transit facilities include Transit priority measures (e.g., queue jump lanes, priority signal timing and phasing, etc.), shelters, bus stops, and way-finding signage.

Readers are also directed to the following sections of the KTMP for related policies:

- **Section 4 – Managing Transportation**: Strategies to discourage auto use and increase auto occupancy; Strategies to optimize road network operations
- **Section 5 – Walking**: Policies on walking and pedestrian facilities
- **Section 6 – Cycling**: Policies on cycling and related facilities
- **Section 7 – Public Transit**: Policies on Transit Priority, general transit operations
- **Section 9 – Parking**: Policies on on-street parking
- **Section 10 – Inter-City Transportation**: Policies on inter-city transportation (goods movement, rail, air and bus transportation)
8.2 The Recommended Road Network

The Final KTMP is based on the preferred Urban Growth Strategy (UGS) growth alternative to ensure that the transportation system matches the expected development. The KTMP is based on Growth Alternative 2 as the preferred UGS alternative.

The development of the road network plan flowed from the evaluation of alternative roadway improvements. This evaluation was undertaken through the following steps:

Step 1: Evaluation Criteria Selection: The evaluation was guided by a set of criteria and indicators organized by the following criteria groups: Natural Environment; Social Environment; Economic; Cost; and Transportation Service. The criteria were developed recognizing the nature of the study area, the proposed road improvements and their potential for impact and from previous experience with similar studies. Table A-1 in the Annex to this report presents the evaluation criteria and indicators.

Step 2: Data Collection and Assessment: On the basis of the evaluation criteria and indicators, data were collected for each of the alternative roadway improvement solutions being evaluated.

Step 3: Comparative Evaluation of Alternatives: Based on the collected data for each indicator, an assessment of potential impact for each roadway improvement alternative was made recognizing existing environmental conditions, the physical magnitude of the improvement, and the potential to mitigate any impacts. For each evaluation the alternative with the most advantages and least disadvantages was selected as the recommended alternative. This impact assessment was documented and is presented in sets of tables contained in the Technical Foundation Report. A summary of the findings is presented in the Annex to this report.

Step 4: Network Options Development: The final step of the evaluation was to build up the individual preferred roadway improvements into an overall network in order to determine whether these improvements together in combination, make sense from a network perspective.

As described in Section 3.5, different areas within the City were identified to have transportation capacity deficiencies that are best addressed through roadway improvements. For each of these problem areas or screenlines, an assessment was undertaken to select the recommended alternative. Figure 9 illustrates the required road network modifications. The KTMP addresses the first two phases of the five-phase process of the Municipal Class Environmental Assessment Process. For each of the roadway improvement included in the roadway network plan it is necessary to identify what schedule of project they are considered under the Class EA process and whether or not they require completion of Phases 3 to 5. Table 10 identifies the status of the roadway improvements and any future EA requirements.
Insert Figure 9
Recommended Transportation Network Improvements
[This page intentionally left blank as reverse of Figure 9.]
Table 10
EA Status of Roadway Improvements

<table>
<thead>
<tr>
<th>Roadway Improvements</th>
<th>Future EA Study Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elliott Avenue (Montreal Street to Division Street)</td>
<td>Class EA Approved</td>
</tr>
<tr>
<td>Centennial Drive (Kingsdale Avenue to Taylor Kidd Boulevard)</td>
<td>Class EA Complete</td>
</tr>
<tr>
<td>Leroy Grant Drive (400 m north of Concession Street to Counter</td>
<td>Class EA, Schedule C or Plan of Subdivision</td>
</tr>
<tr>
<td>Street)</td>
<td></td>
</tr>
<tr>
<td>Counter Street (Division Street to Princess Street)</td>
<td>Class EA, Schedule C</td>
</tr>
<tr>
<td>Princess Street Improvements</td>
<td>TBD – Some may be Class EA, Schedule A</td>
</tr>
<tr>
<td>Wellington Street (Bay Street to Railway Street)</td>
<td>Class EA, Schedule C</td>
</tr>
<tr>
<td>Highway 15 Improvements</td>
<td>Class EA, Schedule B</td>
</tr>
<tr>
<td>Mid Block Arterial (Railway Street to Elliott Avenue)</td>
<td>Class EA, Schedule C</td>
</tr>
<tr>
<td>Centennial Drive (Princess Street to Gardiners Road two-lane)</td>
<td>Plan of Subdivision</td>
</tr>
<tr>
<td>Cataraqui Woods Drive (Sydenham Road to Midland Avenue)</td>
<td>Plan of Subdivision</td>
</tr>
<tr>
<td>Bayridge Drive (Princess Street to north of Cataraqui Woods Drive)</td>
<td>Plan of Subdivision</td>
</tr>
<tr>
<td>Third Crossing (Gore Road to Elliott Avenue)</td>
<td>Class EA, Schedule C and CEAA Screening</td>
</tr>
<tr>
<td>Centennial Road (Princess Street to Gardiners Road widening to four lanes)</td>
<td>Class EA, Schedule C</td>
</tr>
<tr>
<td>Gardiners Road (Creekford Road-Centennial Drive to Highway 401)</td>
<td>Class EA, Schedule C, Provincial Highways</td>
</tr>
<tr>
<td>Gardiners Road/Days Road re-alignment at Bath Road</td>
<td>Class EA, Schedule B/C (subject to review)</td>
</tr>
</tbody>
</table>

8.3 The Third Crossing

The need for, and preferred approach to, increasing the road capacity crossing the Great Cataraqui River was the most important roadway issue addressed in the KTMP. Given the potential capital cost of a new bridge structure (in the range of $32 million in $2003) and the impact that this would have on the City’s capital budget, the issues surrounding the Third Crossing were examined in great detail and were singled out from all of the other screenline assessments for presentation in this Section.

Need

Additional road capacity is required to meet the forecasted 2026 demands across the Cataraqui River screenline. Realistically, given the current levels of congestion demonstrated on the LaSalle Causeway during the PM peak commuter hour, additional capacity is actually needed to meet today’s demands.

Table 8 in Section 3.5 shows that the existing peak hour, peak direction capacity across the Cataraqui River screenline is 900 vehicles per hour (i.e., the one lane on the LaSalle Causeway). The forecast PM peak hour demand in 2026 is 1,640 vehicles/hour. Given a desired volume/capacity ratio of 0.90, the forecasted capacity deficiency is approximately 830 vehicles/hour (i.e., 1,640 – (900 x 0.90). This translates to slightly more than one arterial lane in the peak hour, peak traffic direction (i.e., 900 x 0.90).

It is important to note that Highway 401 is not considered to be on the Cataraqui River screenline, despite the fact that it crosses the Great Cataraqui River. Extensive modelling of travel demand was completed for this screenline and given the distance between Highway 401 and the LaSalle Causeway, it was concluded that most travelers attempting/need to cross the LaSalle Causeway do not consider Highway 401 to be a reasonable alternative route for their trip.
Alternative Solutions

In accordance with the Municipal Class EA process, all viable options for solving the capacity shortfall were identified and evaluated.

Do-Nothing
The Class EA process requires that all evaluations explicitly consider the “Do-nothing” option. Given the potential impacts of any of the road network expansion solutions, the “Do-nothing” is a viable option that must be carefully considered. Evaluation of this option will also provide some indication of the conditions that are anticipated should a road network expansion option be selected as the preferred approach, but get delayed due to funding or impact concerns.

Transportation Demand Management/Transportation System Management (TDM/TSM)
Kingston has clearly committed to TDM and TSM programs as tools to optimize the future transportation system (Section 4 of this report outlines the broad commitments to TDM and TSM). These programs and their contributions to solving the screenline capacity deficiencies have already been assumed in the demand forecasting numbers shown in Table 8. Therefore, TDM/TSM programs form part of the solution, but are unable to meet the entire capacity deficiency. As TDM and TSM are assumed to be part of all potential solutions, they are not discussed further in this section.

Increased Participation in Walking and Cycling
Similar to TDM/TSM Kingston has clearly committed to promoting increased walking and cycling as modes to help meet the needs of the future transportation system (Section 5 of this report outlines the broad commitments to walking and cycling). These programs and their contributions to solving the screenline capacity deficiencies have already been assumed in the demand forecasting numbers shown in Table 8. Therefore, walking and cycling programs form part of the solution, but are unable to meet the entire capacity deficiency. As walking and cycling are assumed to be part of all potential solutions, they are not discussed further in this section.

Improved Transit Service and/or Facilities
Kingston has also clearly committed to increasing public transit ridership and improving transit services as a key component of the 2026 transportation system. Figure 8 (Proposed Transit System) proposes high quality, corridor-focused transit service on both the LaSalle Causeway (accessing C.F.B. Kingston lands) and Highway 15. These “transit corridors” are the highest quality service that can be supported in Kingston’s transit markets. The impacts that these services will have on travel demands have been considered in the development of the auto demand forecasts and the resulting capacity deficiency across the Cataraqui River screenline. Therefore, improved transit service and facilities form part of the solution, but are unable to meet the entire capacity deficiency. As improved transit is assumed to be part of all potential solutions, they are not discussed further in this section.

Additional Roadway Capacity
The alternative roadways considered to solve the screenline deficiency included providing additional capacity to cross the Cataraqui River, either in the form of widening the existing LaSalle Causeway or through a new bridge to connect Elliott Avenue and Gore Road. Also considered in this evaluation was the ‘do-nothing’ alternative as previously introduced.

Trade-offs
For each criteria group a relative preference ranking was established among the three options as presented in Table 11.
Table 11
Summary of Ranking of Cataraqui River Crossing Alternatives

<table>
<thead>
<tr>
<th>Criteria Group</th>
<th>Alternative Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LaSalle Causeway Widening</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>2</td>
</tr>
<tr>
<td>Social Environment</td>
<td>3</td>
</tr>
<tr>
<td>Economic</td>
<td>2</td>
</tr>
<tr>
<td>Cost</td>
<td>2</td>
</tr>
<tr>
<td>Transportation Service</td>
<td>2</td>
</tr>
<tr>
<td>Overall Ranking</td>
<td>2</td>
</tr>
</tbody>
</table>

The do-nothing alternative is disadvantaged in that it does not solve the problem nor does it support urban growth and development in east Kingston. Despite its low impacts on the Natural and Social environment and low cost, it was not considered further. The LaSalle Causeway is considered to be less expensive than a new crossing and should result in less natural environment impacts, but is expected to result in slightly higher social impacts and is less preferred from a transportation service perspective (it directs cars into the downtown core and does not support a mid-town city wide corridor).

A new crossing at Gore/Elliott is clearly preferred from a transportation service perspective and supports economic considerations (new development) and provides an additional crossing location in emergency situations. It is least preferred from a natural environment perspective (passes through an undisturbed area near the Great Cataraqui Marsh) although it is expected that most of the impacts can largely be mitigated. Its greatest disadvantage is with respect to cost at an estimate of approximately $32 million. After discussion of the tradeoffs with the Steering Committee, it was decided the advantages of the Gore/Elliott Third Crossing with respect to being better integrated with the overall envisioned transportation network for the City and its ability to support growth in east Kingston were significant advantages. As well, given that negative natural environment effects associated with this option can be mitigated; the new Third Crossing option was considered as preferred.

The KTMP has looked at the recommended location for additional capacity across the Cataraqui screenline. The completion of this study will have identified the preferred general location. Prior to construction of any facility, a Class EA will be required that completes and documents Phases 1 to 4 of the Class EA process. This will include a detailed examination of the alternative design concepts. In addition, the study requirements under the *Canadian Environmental Assessment Act* will need to be met.
9.0 PARKING

9.1 Parking Strategy

Kingston’s parking system is a critical component of the City’s transportation network. Parking supply and day-to-day parking controls determine parking availability. Strategic management of parking availability will assist the City to achieve three important objectives:

- Parking availability affects transportation choices (time of trip, mode of travel), making parking availability a key lever in the realm of Transportation Demand Management;
- Parking availability affects the City’s ability to encourage its preferred development patterns, particularly within the core area of the City of Kingston; and
- Parking availability is a key determinant of the acceptable market price for parking and the parking system has the potential to generate a significant amount of revenue for the City.

The achievement of this parking strategy should be coordinated with the Parking Advisory Committee.

9.2 Goals and Objectives

Given the potential role of the parking system that was described above, and based on the strategic direction that was adopted for the City of Kingston Transportation Master Plan, it was determined that the City’s parking system would be planned and managed in a manner that:

- supports the City’s Transportation Demand Management and non-auto mode objectives;
- encourages the City’s preferred land use and development patterns;
- supports the continued growth of the tourism industry and economic development; and
- pursues the goal of fiscal self-sufficiency.

These goals are to be pursued in a manner that minimizes the impacts of parking on the City’s residents and businesses (impacts such as spill over parking on residential neighbourhoods) and makes the best use of the existing supply. Consideration should be given to having the Parking Services Department manage City bicycle parking, particularly as supply of secure bicycle facilities increases.

9.3 Network Planning

1. Develop and maintain parking plans for parking precincts in the Central Business District that:

   - Continue the current strategy of establishing centralized parking lots within a reasonable walking distance of multiple destinations;
   - Establishes the parking supply at levels that promote increased use of non-auto modes for all trips, while minimizing the impacts of parking on residents and businesses. Do this by using precinct specific parking supply ratios that help achieve the desired behaviours consistent with the plan;
   - Account for potential changes to the current supply through development of existing parking lots. Over time replace existing lots lost through development at similar levels of supply to exert upward
pressure on price. This should coincide with improved transit service in the downtown, including the development of a transit terminal to help manage demand and increase mode split;

- Promote short-term parking over long-term employee parking;
- Provide increased supply of bicycle parking and secure bicycle parking; and
- Recognizes the needs of the tourism industry by providing for visitor parking.

2. Review and update the City’s Parking By-law to establish parking requirements for new developments that are consistent with the philosophy of the KTMP and the goals and objectives for the parking system.

3. Investigate opportunities to make increased use of street space for short term and long-term residential parking, while protecting the capacity of the transportation system to meet commuter travel demands.

4. Support and provide, with Kingston Transit, a system of Park and Ride lots at strategic locations in and around the City connected by high frequency shuttle express services.

5. Prepare, with Kingston Transit, a tour bus parking and tourist shuttle strategy for the waterfront area.

9.4 Network Design

Prepare design guidelines for parking facilities that address such matters as:

- building location relative to the street (e.g., “buildings-in-front/parking-in back”);
- definition and delineation of clear pedestrian routes through parking lots;
- lighting;
- pedestrian security;
- drainage; and
- landscaping/aesthetics.

9.5 Network Operations

Develop and maintain operating strategies for City-owned parking facilities and on-street parking areas that:

- include parking pricing and time-limit controls;
- pursue the goal of fiscal self-sufficiency for the parking system;
- include an asset management plan that maintains all facilities in a safe and cost effective manner; and
- support the Transportation Demand Management and non-auto mode goals of the Transportation Master Plan.
10.0 INTERCITY TRANSPORTATION

Preamble

Intercity transportation links Kingston to the rest of the province, country and beyond. It is an essential element of the transportation system and its integration with the intra-city transportation is an important component of the overall KTMP. Rail services, the airport, ferry services, waterways, intercity bus and goods movement all contribute to form the essential connections to and from the City of Kingston. While the City does not control some of these services and infrastructure, the policies, programs and infrastructure that the City can influence will help ensure the entire system is coordinated, integrated and mutually reinforcing.

The City will:

1. Support the federal government high-speed rail initiative in the Windsor to Quebec City corridor that provides this service to and through the City of Kingston via the Counter Street train station.

2. Support better integration of transportation services between the rail station, the intercity bus station and Kingston Transit routes serving these facilities and the Downtown.

3. Support the continued viability of the Norman Rogers Airport by revising and updating the 1997 Draft Airport Master Plan and by supporting new specialized business uses, which need the locational advantages of the airport facility. The objective is to support the continued expansion of regional air service, as supported by market demand, and to make the airport self-sufficient.

4. Support the ongoing dialogue with the Ministry of Transportation, the County of Frontenac and Frontenac Islands Township as it relates to the Wolfe Island Ferry and the Howe Island Ferry and the desire for additional capacity.

5. Support the continued viability of the City’s waterways and related marinas with policies and programs that enhance their integration into the intra-city transportation network for walking, cycling, transit and roads.

6. Identify and develop a comprehensive truck route system that maintains adequate access to industrial and commercial areas while minimizing the impact on residential neighbourhoods. The network will respect the hierarchy of roads, focusing routes on freeways and arterial roads. An assessment of the quantity and routes used for goods movement should be conducted on a regular basis to ensure that the network reflects changes in land use patterns.

7. New methods/technologies for goods movement, such as multi-modal terminals to encourage shifting goods from roads to rail, should be promoted to minimize community impacts of truck traffic.
11.0 FINANCIAL CAPABILITY AND IMPLEMENTATION PLAN

All of the City of Kingston’s infrastructure assets are continuously deteriorating and eventually will require major rehabilitation and/or replacement. With pressure on the municipal budget and with the prospect of ever-increasing demands, the challenge for Kingston is to minimize the life-cycle costs of the assets while maintaining the expected quality and level of service.

This Chapter of the report looks at the financial capability of the City of Kingston. This is considered both in terms of capital costs and operating/maintenance costs. It compares existing levels of expenditures to those required under an asset management or life cycle approach. It also looks at the future capital and operating requirements resulting from growth (population and employment growth) and from improvement to the quality of life resulting from policy based initiatives (e.g. more off-road recreation bike paths or multi-use pathways).

The implementation plan for the main elements of the plan is also discussed, including an estimate of the relative timing.

11.1 Capital Costs

Capital expenditures by the municipality involve the purchase or major repair of assets, which are permanent in nature, and which provide longer-term benefits. Major capital projects are identified through the Official Plan(s), augmented by various special studies and master plans.

The City of Kingston prepares an annual capital budget and a nine-year expenditure plan as the financial framework for infrastructure planning:

- The capital budget for the current year, which contains detailed information on sources of funding, is approved by Council and provides the authority for works to be undertaken in that year.

- The City uses an “envelope” approach to preparing the Capital Budget, in that each “activity” within a service division is allocated an amount of tax funding for that year. Staff then identifies a list of priority projects within that total amount. For instance, the engineering category contains five general roads-related “activities”:
  - reconstruction/overlay;
  - sidewalks/para ramps;
  - traffic signals general;
  - street lighting; and
  - bridges and culverts.

- Sources of capital funding for road, transit and related services include: current year taxes, reserve funds, debentures, development charges (discussed below), grants where obtainable, and miscellaneous sources.

The 2003 10-year Capital Budget identifies nearly $407 million in capital expenditures (including growth-related projects and excluding Water, Sewer, and Hydro). Table 12 identifies approximately $12.1 million in average annual existing capital expenditures. This amount is based on average budgeted transportation capital expenditures over the last three years. To put this amount in context of overall municipal capital expenditures, Table 13 provides for the total municipal capital budget and transportation capital spending for each year from 2001 to 2003:
Table 12
Identified Annual Transportation Capital Expenditures

<table>
<thead>
<tr>
<th>Description</th>
<th>Existing Level of Expenditures</th>
<th>Lifecycle Costs of Existing</th>
<th>Backlog</th>
<th>New KTMP Policy Improvements</th>
<th>New KTMP Network Improvements</th>
<th>Lifecycle Costing of New Capital Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian</td>
<td>527,000</td>
<td>667,000</td>
<td>281,000</td>
<td>675,000</td>
<td>N/A</td>
<td>Incl. in Roadway</td>
</tr>
<tr>
<td>Cycling/Pathway</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>615,000</td>
<td>N/A</td>
<td>10,000</td>
</tr>
<tr>
<td>TDM/TSM</td>
<td>30,000</td>
<td>N/A</td>
<td>N/A</td>
<td>25,000</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Transit</td>
<td>1,225,000</td>
<td>900,000^10</td>
<td>N/A</td>
<td>N/A</td>
<td>540,000^10</td>
<td>540,000</td>
</tr>
<tr>
<td>Roadway</td>
<td>7,165,000</td>
<td>20,469,000</td>
<td>934,000</td>
<td>11^1</td>
<td>5,899,000^9</td>
<td>369,000</td>
</tr>
<tr>
<td>Parking</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Growth-Related Projects</td>
<td>3,104,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Incl. in Roadway</td>
<td>Incl. in Roadway</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$12,051,000</strong></td>
<td><strong>$22,036,000</strong></td>
<td><strong>$1,215,000</strong></td>
<td><strong>$1,315,000</strong></td>
<td><strong>$6,439,000</strong></td>
<td><strong>$928,000</strong></td>
</tr>
</tbody>
</table>

Existing Expenditures: $12,051,000
Total Annual Costs: $31,933,000
Annual Shortfall: $19,882,000

Notes:
1. Existing capital expenditures are based on the average of 2001, 2002, and 2003 expenditures identified in the City’s capital budget for those years and adjusted to reduce the effect of much larger than average projects occurring during those years. There has only been negligible spending on Cycling projects. All growth-related projects are shown on a separate line.
2. Annual lifecycle costing estimates are only shown where the City provided data. These lifecycle costs are only in respect of existing sidewalks and roads.
3. Includes costs identified as immediate backlog by City Engineering staff and is spread over 10 years. It is assumed that longer-term backlog (out to 10 years) will overlap with future capital works.
4. Pedestrian and Roadways costs each include a portion of Downtown Revitalization costs equal to 25% and 75%, respectively.
5. Annual provision for Transit Scheduling or Asset Management Software upgrades or traffic safety/management studies.
7. Based on average construction of 5 km of sidewalk and 33.8 lane-km of roadway per year at the same average cost per km / lane-km applied to existing infrastructure.
8. The Pedestrian amount is an allowance that covers 5.0 km of sidewalks/year. Even at this expenditure level, the policy in the plan may not be achieved.
9. KTMP growth requirements are based on $135.68 million for Growth Alt. 2 (Roadways) divided by 23 years. Costs are in $2003.
10. The $900,000/year and $540,000/year are for bus replacement or acquisition only and do not include any allowance for KAB replacement, storage and maintenance facilities, other equipment such as fare boxes, shelters, etc. The cost also does not include any allowance for Park n’ Ride facilities or shuttle services.
11. Estimates of any of the policy based initiatives for roadways have not been carried out. These could include costs for such things as: property acquisitions (e.g. sight triangles); traffic calming studies, designs and implementation and more.
12. The capital costs of the recommendations from the Cycling and Pathway Study for the short term (five years) have been included here divided by five to reflect an annual expenditure.
13. Parking costs have been excluded from the table as parking generates significant revenue and has an objective of being financially self-sufficient.

Table 13
City of Kingston Transportation Capital Spending

<table>
<thead>
<tr>
<th>Description \ Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeted Transportation Expenditure</td>
<td>$9.0</td>
<td>$17.2</td>
<td>$14.4</td>
</tr>
<tr>
<td>Total Budgeted Expenditure</td>
<td><strong>$38.8</strong></td>
<td><strong>$33.6</strong></td>
<td><strong>$35.0</strong></td>
</tr>
<tr>
<td>Transportation as Share of Budget</td>
<td>23.2%</td>
<td>51.2%</td>
<td>41.1%</td>
</tr>
</tbody>
</table>

While in 2001, Transportation capital spending was budgeted to be 23% of total capital expenditures; in both 2002 and 2003 this share was substantially higher at 51% and 41% respectively.
With respect to current capital financing policy, Kingston Access Bus and Parking capital expenditures are funded through program specific capital reserve funds. Other Roadway capital expenditures are generally funded from the Municipal Capital Reserve Fund, which is a tax-supported general municipal capital reserve fund, and where appropriate, Development Charges.

Table 12 also provides estimates for capital lifecycle expenditures that City staff identify as required, but not currently accounted for in the Capital Budget Forecast. With respect to the City’s identified backlog of capital works, Table 12 includes annual costs identified as immediate backlog costs. Any additional backlog costs are assumed to have significant overlap with future capital works and are excluded from the “backlog” column. Further, Table 12 provides an estimate of annual lifecycle costs associated with infrastructure constructed for the purpose of upgrading the existing transportation system to meet new standards; these costs are based on the same costs per kilometre (or lane kilometre) used for estimating the lifecycle costs of the existing system.

The second last column in Table 12 identifies the Capital Projects required for growth. This is simply the total capital cost of the projects identified in (2003 dollars) divided by 23 years to get an estimate of an average annual amount. Estimates of growth share for the purposes of development charges have been estimated. This was carried out as part of the Development Charge review, based on the final set of infrastructure plans and the preferred urban growth alternative as part of the Urban Growth Strategy.

What is highlighted in Table 12 is a significant capital funding gap. Existing expenditures of $12.1 million/year are far short of what is required for replacing the existing infrastructure, which is $22.0 million/year or $23.3 million if the accumulated unfunded backlog (immediate requirements only) is included. When the annual growth component and the amounts required as a result of policy desires of the community (as described in the KTMP) are added, including the related lifecycle costing, the annual amount increases to $31.9 million/year. This is an $19.8 million per year shortfall. What needs to be highlighted here is that by far the largest component of the shortfall relates to replacing existing infrastructure and is not a result of growth or any new policy direction.

### 11.2 Operating Costs

City Council approves an Operating Budget annually to finance the provision of the City’s core services. The Operating Budget cost components include: salaries and administration, purchase of goods and services, community grants, principal and interest on long term debt, and allocation to reserves and reserve funds. The final two categories are the primary linkage between the capital and operating budgets:

- funding sources for the Operating Budget include property taxes, payments in lieu of taxes (mainly from Federal and Provincial governments), Provincial subsidies, fees and service charges, and miscellaneous revenues; and
- annual City tax rates are calculated based on net costs (total costs, net of all non-tax sources of revenue) and the (adjusted) property assessment base.

The operating expenditure estimates are based on the 2003 Operating Budget. Gross budgeted expenditures in 2003 are $227.58 million and total net expenditures are $121.35 million. The current net transportation operating and maintenance expenditures of $14.5 million in Table 14 represent 12% of total municipal net expenditure. The adjusted operating expenditures in Table 14 assume that road and sidewalk maintenance costs can be reduced by working through the backlog of sidewalk and roadway capital upgrades. The result of this adjustment is a savings of over $650,000, or 4% of the transportation operating costs.

_Dillon Consulting Limited_
### Table 14
City of Kingston
Identified Annual Net Operating and Maintenance Expenditures

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Km of Sidewalk Or Lane - Km</th>
<th>Existing Net Operating Expenditures</th>
<th>Net Operating Expenditures With Adjusted Maintenance Costs(^1) Assuming No Capital Backlog</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total ($ 000s)</td>
<td>$/ km or $ / ln-km</td>
</tr>
<tr>
<td>Pedestrian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>375 km of Sidewalk</td>
<td>153</td>
<td>409</td>
</tr>
<tr>
<td>Maintenance</td>
<td>375 km of Sidewalk</td>
<td>1,232</td>
<td>3,286</td>
</tr>
<tr>
<td>TDM/TSM</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transit(^2)</td>
<td>0</td>
<td>3,544</td>
<td>3,544</td>
</tr>
<tr>
<td>Roadways(^3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>1,875 Lane – Km</td>
<td>920</td>
<td>491</td>
</tr>
<tr>
<td>Street Lights</td>
<td>1,875 Lane – Km</td>
<td>700</td>
<td>373</td>
</tr>
<tr>
<td>Traffic Signals</td>
<td><strong>1,875 Lane – Km</strong></td>
<td>393</td>
<td>210</td>
</tr>
<tr>
<td>Traffic Management</td>
<td>1,875 Lane – Km</td>
<td>610</td>
<td>325</td>
</tr>
<tr>
<td>Road Maintenance</td>
<td>1,875 Lane – Km</td>
<td>6,906</td>
<td>3,683</td>
</tr>
<tr>
<td>Parking(^4)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td><strong>14,458</strong></td>
<td><strong>13,774</strong></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Road and Pedestrian maintenance costs are reduced conservatively, as indicated by City of Kingston Operations staff. Maintenance costs include costs in respect of Winter Control and Catch Basins. Maintenance costs are based on 2002 actual.
2. Of total gross Transit expenditures of $8.3 million, $4.8 million is funded by transit revenue and the remaining $3.5 million is funded through property taxation.
3. Does not include the additional operating costs that may result from recommendations included in this KTMP (e.g. TDM Coordinator position and other staff that may be required).
4. Parking is a self-funded program, with net costs to the taxpayer of $0 in 2003. Operating expenditures net of debt and transfer to capital reserves is approximately $3.4 million, which is funded by parking fee revenue.

#### 11.3 Development Charge and Other Funding Sources

Development charges are levied on new residential, commercial and institutional development at the time of building permit issuance to assist in funding the City’s growth-related capital costs. Kingston’s development charge bylaw was passed in September 1999 based on the legislative provisions of the *Development Charges Act, 1997*. The charge is calculated based on projected eligible growth-related capital costs documented in a background study:

- with the exception of sanitary sewer and water charges, the development charges are uniformly levied on all City development.
- costs relating to the following services are included in the bylaw: protection, roads and bridges, parks and recreation, library, studies, storm sewerage.
- the capital budget identifies the projected annual level of development charge revenue available to fund eligible growth related works for each eligible service.
The City’s development charge bylaw expires in September 2004. It is anticipated that Council will consider a revised development charge bylaw prior to that time, reflecting the road program set out in this document.

The financial assessment of existing expenditures has identified a substantial funding gap in the City’s ability to pay for the required capital projects to maintain the existing infrastructure. This makes it exceedingly difficult to envision how the City will be able to pay for new capital projects identified in the KTMP.

New and innovative funding sources need to be pursued, but many of those with the greatest potential require federal support (e.g. infrastructure funds) and/or provincial support or legislative changes (e.g. fuel tax, tolls, vehicle registration fees). Municipalities have been limited to property taxes and development charges for funding capital improvements and the tax base has been, by far, the larger contributor.

Strategies for innovative funding for transportation improvements focus around two central approaches: user-pay and public-private partnerships. User-pay seeks to generate new revenues from those that most directly benefit, thereby increasing awareness of the full costs. It also has the benefit of reducing the net public costs. Increased involvement from the private sector seeks to get the private sector to invest in infrastructure, typically in exchange for a revenue stream (e.g. tolls). The most notable Canadian example is Highway 407 in the Greater Toronto Area.

Clearly, if the City of Kingston cannot take advantage of new revenue sources then other options will need to be pursued including:

- different ways of financing the costs;
- reductions in the range of programs provided;
- reductions in the level of service or deferring needed projects until financially viable;
- restrict growth and have it timed with ability to pay; and
- tax increases.

Each year at budget time the City makes many of these trade-offs. The transportation master plan and other ongoing studies, will give the City a framework for prioritizing the expenditures.

11.4 Staging Plan

The KTMP has identified a number of infrastructure improvements, polices and programs that require implementation, over the life of the plan. The realization of this plan requires a number of key items to come together including:

- adoption of the KTMP report and ultimately having the policies, programs and proposed infrastructure included in the City’s new Official Plan;
- maintaining and updating an annual capital and operating plan, including future needs, as currently done with the nine-year forecast; and
- identifying the funding sources to implement the plan.

The implementation plan documented here is an estimate based on the best information available. The key variables in that information are the location, timing and extent of development. Since these have a way of
evolving over time, the need to continuously monitor and update the plan is essential. The key, however, is to make those decisions on priorities consistent with the overall direction of the plan.

Table 15 outlines the key transportation projects and these are illustrated on Figure 9.

<table>
<thead>
<tr>
<th>Infrastructure Projects</th>
<th>Timing for Completion*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counter St. widening from 2 to 4 lanes – Princess St. to Division St.</td>
<td>2009</td>
</tr>
<tr>
<td>Counter St. Grade Separation</td>
<td>2008</td>
</tr>
<tr>
<td>Centennial Drive new construction of a 4 lane road – Gardiners Rd. to Princess St.</td>
<td>2020</td>
</tr>
<tr>
<td>Centennial Drive widening from 2 to 4 lanes – Princess St. to Bath Rd. &amp; CN Overpass</td>
<td>2019</td>
</tr>
<tr>
<td>3rd Crossing new construction of a 2 lane bridge – Elliott Ave. and Gore Rd.</td>
<td>2017</td>
</tr>
<tr>
<td>Wellington St. new construction as a 2 lane road – Bay St. to Montreal St.</td>
<td>2011</td>
</tr>
<tr>
<td>Division St. widening from 4 to 6 lanes – Counter St. to Highway 401</td>
<td>2013</td>
</tr>
<tr>
<td>Mid Block Arterial new construction of a 2 lane road – Montreal St. to Counter St.</td>
<td>2015</td>
</tr>
<tr>
<td>Highway 15 intersection/capacity improvements – Highway 2 to Highway 401</td>
<td>2017</td>
</tr>
<tr>
<td>Gardiners Rd. road widening from 4 to 6 lanes – Centennial Dr. to North Ramp of Highway</td>
<td>2020</td>
</tr>
<tr>
<td>City wide intersection/corridor improvements</td>
<td>2015</td>
</tr>
<tr>
<td>Cataraqui Woods new construction of a 2 lane road – Sydenham Rd. to Princess St.</td>
<td>2019</td>
</tr>
<tr>
<td>Leroy Grant new construction of a 2 lane road – Elliott Ave. to Concession St.</td>
<td>2020</td>
</tr>
<tr>
<td>Days Road new construction to align Gardiners Rd. and Days Rd. (taper from 4 to 2 lanes)</td>
<td>2012</td>
</tr>
<tr>
<td>Elliott Ave. new construction – Counter St. to 3rd Crossing (taper from 4 to 2 lanes)</td>
<td>2016</td>
</tr>
<tr>
<td>Princess St. Traffic Operations</td>
<td>2013</td>
</tr>
<tr>
<td>Bayridge Dr. new construction of 2 lane road – Cataraqui Woods to Creekford Dr.</td>
<td>2013</td>
</tr>
</tbody>
</table>

[Note: Timing for completion reflects the timing in the DC Transportation Background Paper, May 2004, which is subject to ongoing discussions related to the DC Roads Sub-committee work.]
12.0 MONITORING

The success of long-range plans depends on the ongoing monitoring of relevant conditions, actions, and impacts. The City of Kingston must remain aware of its progress toward key objectives, so that it can add, modify, or delete priorities as needed. The Kingston Transportation Master Plan (KTMP) must retain some measure of flexibility and be adaptable to changes in the travel behaviour, and other conditions. This can be best accomplished through ongoing monitoring of relevant conditions and periodic updates to the Travel Demand Model and master plan.

Through the study, the City has adopted a strategic direction and laid out a plan to attain the particular transportation goals associated with it. As identified in the plan, a number of transportation capital works projects would be required, along with other initiatives. Many of these components of the plan are based on forecasted future travel demand over the transportation network resulting from a particular development strategy. The Plan must be able to respond to changes in development patterns that might affect demand.

Ongoing monitoring would also be necessary in determining the effectiveness of the initiatives identified in the plan in meeting the adopted strategic direction. Ideally the performance measures can be tied to broader municipal management measures such as, the Municipal Performance Measurement Program (MPMP).

12.1 Transit Usage

Citywide monitoring of transit use should continue on a periodic (e.g., 5-year) interval using the recently developed household survey and other reporting methods. Monitoring of the transit system involves three components:

- the City of Kingston needs to continue to monitor individual route performance against established performance indicators on an ongoing basis and make minor adjustments accordingly;
- system performance should be based on criteria such as ridership increases, passengers per capita, and service provided per capita. Performance should be monitored and evaluated on an annual basis and required adjustments made; and
- periodic (i.e., 5-year) comprehensive transit service reviews should be completed and should involve thorough assessments of system-wide and route performance.

12.2 Traffic Flow

The ongoing monitoring of traffic flows over the City’s transportation network should continue to ensure that the City has up to date and comprehensive traffic data regarding traffic volumes. Traffic data represented a critical input to the development of the travel demand model and would likewise be vital to future model updates and ongoing traffic assessments.

A number of aspects of the current traffic data collected by the City were noted, and should be considered when planning future traffic data collection:

- Whenever practical, traffic data collected should distinguish between vehicle classes, in particular, attention should be paid to enumerating the number of heavy vehicle, cyclists and pedestrians on
the roadways. Some traffic volume data obtained from the City did not distinguish between vehicle classes.

- Background traffic data obtained from the City was quite comprehensive in terms of the count location distribution. However, the majority of the data was collected in the summer months. The count program conducted by the City should be expanded to include the undertaking of counts throughout the entire year, to better quantify the seasonal variation in traffic volumes.

- The count program should include a combination of 24 hour automatic traffic recorder counts and peak period intersection turning movement counts.

12.3 Parking Utilization

In recent years the City had commissioned a number of studies examining parking issues, in particular, a Parking Services Review of the City’s “Business Improvement Area” had been completed in 2001, and more recently a comprehensive Parking Utilization Study was completed.

A number of the components of the plan include recommendations with respect to the provision of parking facilities, in particular the provision of several park-and-ride lots. Ongoing monitoring should be undertaken to assess the effectiveness of existing facilities and new ones at supporting the transit and travel demand initiatives identified in the plan.

12.4 Transportation Master Plan Review & Updating

The KTMP was developed based on inputs obtained from the Kingston Household Travel Survey. Future updates to the travel demand model would require current information regarding travel patterns and socio-economic data. This would be most easily obtained by updating the travel survey component of this study.

As such, consideration should be given to participating in the periodic Transportation Tomorrow Surveys undertaken in many municipalities in Ontario. This is essentially identical to the Kingston household travel that was undertaken for this study, which enumerates resident travel behaviour and household socio-economic attributes. The surveys are conducted every 5 years. Four such surveys of the Greater Toronto Area (GTA) have been undertaken in 1986, 1991, 1996, and 2001. The City of Kingston’s survey, having been undertaken in January 2002, almost perfectly fits the schedule adopted for the Transportation Tomorrow Surveys. This schedule also coincides with the timing of the Canada Census, and thus, would ensure a comprehensive source of socio-economic data for the study area. It should be noted that with each successive survey, the extent of the Survey Area for the Transportation Tomorrow Survey have expanded, and currently include areas as far away from the GTA as the Regional Municipality of Hamilton-Wentworth, Simcoe County, Niagara Region and Peterborough County. The City of Ottawa has also undertaken a similar exercise.

Periodic updates to the travel survey would be critical inputs to any future updates to the travel demand model and would begin to develop a consistent set of time series data for monitoring changes in travel behaviour.

It is therefore recommended that the Travel Demand Model be updated after the undertaking of any significant future travel surveys as well. This provides the opportunity to validate previous forecasts and ensures an up-to-date model for City use.
Future transportation system improvements would be based on need, and the timing of their implementation would be determined through the monitoring of the transportation system performance, land developments, modelling results, and fiscal constraints.
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Annex 1
Comparative Evaluation of Roadway Alternatives
ANNEX 1
COMPARATIVE EVALUATION OF ROADWAY ALTERNATIVES

1.0 ROADWAY NETWORK PLAN

1.1 Introduction/Overview

The following section identifies and justifies the recommended roadway improvements to be included as part of the KTMP. The intent the EA planning process was to undertake an assessment and evaluation of alternative solutions at a strategic and screenline level of detail. As previously presented, the TMP involved the identification and assessment of expected future transportation demands and deficiencies. Having identified the nature and magnitude of the expected transportation deficiencies, opportunities for improvement at a strategic level were first identified to resolve them. These strategic level solutions included a variety of transportation modes as introduced in the previous sections of this report (e.g. cycling, transit, TDM etc.) Recognizing the vision of the TMP, an attempt was made to solve the deficiencies as much as possible through non-automobile oriented solutions. Thus, an initial step was to identify the extent to which alternative transportation mode initiatives could address, either in whole or part, the identified problems. In some cases it was possible to reduce the need for additional roadway lanes through these alternatives. This step constituted the strategic level assessment. Table 8 of the main report presents the transportation problem areas or screenlines. It includes forecast volume and existing capacity. The deficiency is highlighted in terms of the number of lanes needed to solve the problem even where some or all of the deficiency can be solved by non-auto modes. This essentially is an assessment of the future “do-nothing” option.

The Class EA process requires that the ‘do-nothing’ alternative be considered. The ‘do-nothing’ alternative will not alleviate the existing travel demand deficiencies, either locally generated or tourist generated. This alternative will have a negative effect on community growth and economic development in Kingston. Although this alternative has no direct physical impacts on natural habitat, community features and land use, there will be adverse local air quality effects within the community as traffic congestion increases. The social impacts with this alternative relate to effects of increasing traffic volumes in the community resulting in undesirable noise, dust and mobility concerns. Although the ‘do-nothing’ alternative has a lower implementation cost, it does not address the transportation problem and would significantly restrict growth and development. The do-nothing was therefore not considered to be a practical alternative. The one exception to this relates to a potential third crossing of the Cataraqui River. Recognizing the significant cost associated with this option and its implications with respect to development in east Kingston, the do-nothing alternative was carried forward into the evaluation of alternatives with respect to this problem area.

Despite the adoption of alternative solutions to address the capacity deficiencies, it was identified that many of the problems can only practically and cost effectively, be resolved through some amount of roadway improvements. The results of the strategic level evaluation concluded that the preferred overall solution to solve the transportation problems for the City was a combination of pedestrian, cycling, transit, TDM/TSM and roadway improvement initiatives.

This section presents the process that was undertaken to assess, evaluate and select the needed roadway improvements that forms part of the City’s TMP.
1.2 Roadway Evaluation Approach Overview

The evaluation of alternative roadway improvements was undertaken through the following steps:

Step 1: Evaluation Criteria Selection

The evaluation was guided by a set of criteria and indicators organized by the following criteria groups:

- Natural Environment;
- Social Environment;
- Economic;
- Cost; and
- Transportation Service.

The criteria were developed recognizing the nature of the study area, the proposed road improvements and their potential for impact and from previous experience with similar studies. Table A-1 presents the evaluation criteria and indicators.

Table A-1
Roadway Alternatives Evaluation Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NATURAL ENVIRONMENT</strong></td>
<td></td>
</tr>
<tr>
<td>Potential for impact on terrestrial features</td>
<td>Extent and quality of wildlife habitat removed</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential for impact on aquatic features</td>
<td>Extent and quality of wildlife habitat potentially disrupted</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SOCIAL ENVIRONMENT</strong></td>
<td></td>
</tr>
<tr>
<td>Potential for impact on residents</td>
<td># and extent of residential properties required</td>
</tr>
<tr>
<td></td>
<td>Potential for disruption to residents (# of homes adjacent to the roadway)</td>
</tr>
<tr>
<td>Potential for impact to community features including parkland</td>
<td>Extent of land required</td>
</tr>
<tr>
<td></td>
<td>Potential for disruption to users of the features (# and character of features)</td>
</tr>
<tr>
<td>Changes to community character</td>
<td>Compatibility of physical changes with existing community character</td>
</tr>
<tr>
<td></td>
<td>Barrier effects from new infrastructure (i.e. splitting communities)</td>
</tr>
<tr>
<td>Potential for impacts on heritage features</td>
<td>Presence of significant built heritage resources in areas likely to be affected.</td>
</tr>
<tr>
<td><strong>ECONOMIC</strong></td>
<td></td>
</tr>
<tr>
<td>Potential for impact on businesses</td>
<td># and extent of business properties required</td>
</tr>
<tr>
<td></td>
<td>Presence and nature of businesses potentially disrupted</td>
</tr>
<tr>
<td>Potential for impact on planned land use</td>
<td>Presence of approved future land uses along the route and potential for impact</td>
</tr>
<tr>
<td><strong>COST</strong></td>
<td></td>
</tr>
<tr>
<td>Estimated costs</td>
<td>Estimated capital cost</td>
</tr>
<tr>
<td><strong>TRANSPORTATION SERVICE</strong></td>
<td></td>
</tr>
<tr>
<td>Change in level of transportation service</td>
<td>Composite volume to capacity ratio at screenlines</td>
</tr>
<tr>
<td>Criteria</td>
<td>Indicators</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Supportiveness of other transportation modes</td>
<td>Qualitative assessment of supportiveness of other transportation modes (e.g. pedestrian, bicycle, transit etc.)</td>
</tr>
<tr>
<td>Efficiency of use of existing infrastructure</td>
<td>Use of existing transportation system capacity</td>
</tr>
</tbody>
</table>

**Step 2: Data Collection and Assessment**

On the basis of the evaluation criteria and indicators, data were collected for each of the alternative roadway improvement solutions being evaluated. Sources of information included:

- Available existing land use maps and air photos;
- Future land development strategy plans;
- Maps showing areas of significant natural environment areas;
- Kingston’s Official Plans;
- Inventories of heritage properties; and
- Reports from previous studies.

**Step 3: Comparative Evaluation of Alternatives**

Based on the collected data for each indicator, an assessment of potential impact for each roadway improvement alternative was made recognizing existing environmental conditions; future plans for the affected lands (i.e. whether they are designated for future development); and the physical magnitude of the improvement. This impact assessment was documented and is presented in sets of tables contained in the Technical Foundation Report. Also considered in the assessment were the potential for mitigation to either avoid or reduce the effect potential and/or magnitude. On the basis of this information, the alternatives were comparatively evaluated to select on balance, the alternative that has the most advantages and least disadvantages.

**Step 4: Network Options Development**

The final step of the evaluation was to build up the individual preferred roadway improvements into an overall network in order to determine whether these improvements together in combination, make sense from a network perspective.

**1.3 Identification of Roadway Improvement Alternatives**

As introduced above (Table A-1), different areas within the City were identified to have transportation capacity deficiencies that are best addressed through roadway improvements. For each of these problem areas or screenlines, the following presents the alternatives considered, their assessment and rationale for the selection of the preferred alternative. Figure 9 of the main report illustrates the recommended network. The detailed impact assessment results are included in the Technical Foundation Report.

**Division Street Screenline**

For the Division Street screenline, two roadway improvement options were identified including: 1) the widening of **Counter Street/Elliott Avenue** (Sir John A. Macdonald to Montreal) from 2 to 4 lanes and 2) the widening of **Concession Street/Stephen Street** (Princess to Montreal) from 2 to 4 lanes.
For each criteria group a relative preference ranking was established between the two options as presented in the table below:

<table>
<thead>
<tr>
<th>Criteria Group</th>
<th>Alternative Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Counter St./Elliott Ave.</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>2</td>
</tr>
<tr>
<td>Social Environment</td>
<td>1</td>
</tr>
<tr>
<td>Economic</td>
<td>1</td>
</tr>
<tr>
<td>Cost</td>
<td>1</td>
</tr>
<tr>
<td>Transportation Service</td>
<td>1</td>
</tr>
<tr>
<td>Overall Ranking</td>
<td>1</td>
</tr>
</tbody>
</table>

The Counter/Elliott option was considered preferred over the Concession/Stephen option for all criteria with the exception of Natural Environment due to potential for tree removal. Overall though, this one disadvantage was not considered to offset the other advantages. The Counter/Elliott option was therefore considered preferred.

**Cataraqui River Screenline**

This screenline considered the option of providing addition capacity to cross the Cataraqui River, either in the form of widening the existing LaSalle Causeway or through a new bridge to connect Elliott Avenue and Gore Road. Also considered in this evaluation was the ‘do nothing’ as previously introduced.

For each criteria group a relative preference ranking was established among the three options as presented in the table below:

<table>
<thead>
<tr>
<th>Criteria Group</th>
<th>Alternative Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LaSalle Causeway Widening</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>2</td>
</tr>
<tr>
<td>Social Environment</td>
<td>3</td>
</tr>
<tr>
<td>Economic</td>
<td>2</td>
</tr>
<tr>
<td>Cost</td>
<td>2</td>
</tr>
<tr>
<td>Transportation Service</td>
<td>2</td>
</tr>
<tr>
<td>Overall Ranking</td>
<td>2</td>
</tr>
</tbody>
</table>

The do-nothing alternative is disadvantaged in that it does not solve the problem nor does it support urban growth and development in east Kingston. Despite its low impacts on the Natural and Social environment and low cost, as it does not address the problem nor support development, it was not considered further. The LaSalle Causeway is considered to be less expensive than a new crossing and should result in less natural environment impacts, but is expected to result in slightly higher social impacts and is less preferred from a transportation service perspective (it still directs cars to the downtown core and does not support a mid-town city wide corridor). A new crossing at Gore/Elliott is clearly preferred from a transportation service perspective and supports economic considerations (new development). It is least preferred from a natural environment perspective (passes through an undisturbed area near the Great Cataraqui Marsh) although it is expected that most of the impacts can largely be mitigated. Its greatest disadvantage is with respect to cost at an estimate of approximately $32 million. After discussion of the tradeoffs with the Steering Committee, it was decided the advantages of the Gore/Elliott Third Crossing with respect to being better integrated with the overall envisioned transportation network for the City and its ability to support growth in east Kingston were significant advantages. As well, given that negative natural environment effects associated with this option can be mitigated, the new Third Crossing option was considered as preferred.
Little Cataraqui Screenline

Roadway improvement options considered to resolve capacity deficiencies at this problem area included: 1) **Counter Street** 2 lane widening (Princess to Sir John A. Macdonald), 2) **Princess Street** 2 lane widening (Counter to Sir John A. Macdonald) and 3) **Bath Road** 2 lane widening (Centennial to Sir John A. Macdonald).

For each criteria group a relative preference ranking was established among the three options as presented in the table below:

<table>
<thead>
<tr>
<th>Criteria Group</th>
<th>Counter St.</th>
<th>Princess St.</th>
<th>Bath Rd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Environment</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Social Environment</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Economic</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Cost</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Transportation Service</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Overall Ranking</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

The Counter Street improvement option was identified as preferred for all criteria groups. The Counter Street option was therefore considered preferred.

Joseph Street Screenline

Roadway improvement options considered to resolve capacity deficiencies at this problem area included: 1) **Wellington Street** extension (Bay to Railway), 2) **Rideau Street** two lane widening (Bay to Railway), 3) **Montreal Street** two lane widening, and 4) **Division Street** two lane widening (Queen to Railway).

For each criteria group a relative preference ranking was established among the four alternatives as presented in the table below:

<table>
<thead>
<tr>
<th>Criteria Group</th>
<th>Wellington St.</th>
<th>Rideau St.</th>
<th>Montreal St.</th>
<th>Division St.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Environment</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Social Environment</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Economic</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Cost</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Transportation Service</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Overall Ranking</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
<td><strong>2</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

The alternatives were considered to be largely equal with respect to the cost and transportation service (Wellington was considered to be slightly cheaper). Differences among the options with respect to natural environment were identified to not be overly significant due to an absence of significant natural areas that could be affected by the road improvements. The greatest difference and potential for impact was with respect to the social environment criteria group. Rideau, Montreal and Division Streets all have significant numbers of residences that front onto the roadway. Property and possibly building removals could be required to accommodate the widened roadway. As well, the road widenings would result in changes to the character of these areas. As the Wellington Street extension would largely pass through an area of vacant industrial land, social impacts are predicted to be minimal. Similarly, for the Economic criteria group, the Wellington Street alternative is favoured as it will not affected existing businesses and
will support new development in the lands to the east of Rideau Street. For these reasons, the Wellington Street extension was identified as preferred overall and is the recommended alternative.

**Elliott Avenue Screenline**

Roadway improvement options considered to resolve capacity deficiencies at this problem area included: 1) **Montreal Street** 2 lane widening (Railway to Elliott), 2) **Division Street** 2 lane widening (Railway to Elliott) and 3) **Mid-Block Arterial** extension of Wellington Street.

For each criteria group a relative preference ranking was established among the three alternatives as presented in the table below:

<table>
<thead>
<tr>
<th>Criteria Group</th>
<th>Alternative Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Montreal St.</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>3</td>
</tr>
<tr>
<td>Social Environment</td>
<td>3</td>
</tr>
<tr>
<td>Economic</td>
<td>1</td>
</tr>
<tr>
<td>Cost</td>
<td>2</td>
</tr>
<tr>
<td>Transportation Service</td>
<td>1</td>
</tr>
<tr>
<td><strong>Overall Ranking</strong></td>
<td>3</td>
</tr>
</tbody>
</table>

The Mid-Block Arterial option was identified as equal or preferred for all criteria groups except for a minor difference in cost. It was therefore identified as the preferred alternative overall.

**Princess Street-Counter Street and Highway 401 South-West Screenlines**

Roadway improvement options considered to resolve capacity deficiencies at this problem area included: 1) **Gardiners Road** widening to 6 lanes (Princess to Highway 401); 2) **Centennial Drive** lane widening from 2 to 4 lanes (Princess to Gardiners) plus Gardiners Road 4 to 6 lane widening (up to Highway 401); and 3) **Sydenham Road** from 2 to 4 lane widening (Highway 401 to Cataraqui Woods) plus Centennial Drive 2 lane widening (Princess to Cataraqui Woods).

For each criteria group a relative preference ranking was established among the three alternatives as presented in the table below:

<table>
<thead>
<tr>
<th>Criteria Group</th>
<th>Alternative Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gardiners Rd.</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>2</td>
</tr>
<tr>
<td>Social Environment</td>
<td>1</td>
</tr>
<tr>
<td>Economic</td>
<td>2</td>
</tr>
<tr>
<td>Cost</td>
<td>1</td>
</tr>
<tr>
<td>Transportation Service</td>
<td>2</td>
</tr>
<tr>
<td><strong>Overall Ranking</strong></td>
<td>2</td>
</tr>
</tbody>
</table>

In reviewing the alternatives and their advantages/disadvantages, the Centennial/Gardiners widening was considered preferred with respect to Economic and Transportation Service considerations. The options were considered equal with respect to cost. From a Natural Environment perspective, Centennial/Gardiners was ranked second; though the area is designated for development, the road would result in the loss of some habitat. Similarly from a social perspective, it is only slightly less preferred than Alternative 3 as Centennial is expected to pass through a future residential area. These two disadvantages were
considered to be minimal as compared to the transportation service and economic advantages. As a result, the Centennial/Gardiners alternative was identified as preferred and is the recommended option.

Other Roads

The KTMP has focussed on assessing the major transportation deficiencies in the City using screenlines to aid in the assessment. In some cases, transportation issues can be solved by transportation system management (TSM) techniques such as, installation of traffic signals, minor intersection improvements, or traffic signal coordination. The following locations have been identified as corridors that would benefit from this:

- **Princess Street Corridor** – The use of traffic operations improvements in this corridor will be targeted to favour transit through priority measures.
- **Highway 15 Corridor** – operational improvements here will increase capacity so as to delay the need for a major widening.
- **Front Road/Days Road Intersection** – operational improvements.
- **Bayridge Drive** – north from Princess Street to Cataraqui Woods will benefit from geometric and operational improvements.

Although the project is a little more substantive, the elimination of the jog at Gardiners Road / Days Road was also identified as an operational improvement that would help solve traffic deficiencies.

There are also examples in developing areas where the completion of the arterial/collector road network needs to be built out and this is not captured by the screenline analysis, but is still required. These roads are typically identified through the completion of a Secondary Plan or Concept Plan if they are not identified in the Official Plan. In Kingston, the development of the lands bounded by Collins Creek, Creekford Road, Bayridge Road, and Princess Street (part of Growth Alternative No. 2) is just such an example. **Bayridge Drive** would need to be extended north to Creekford Road and **Cataraqui Woods Drive** would need to be extended west to serve this development. Subject to an approved plan of subdivision the road is being shown connecting to Collins Bay Road as a continuous road.

In addition, on the east side of Gardiners Road there is a need to complete **Cataraqui Woods Drive** easterly to connect to Sydenham Road. This leaves a short section of Cataraqui Woods Drive between Midland and Gardiners Road that needs to be complete to serve as a continuous collector through this developing area.

Another example would be the Alcan lands. If this parcel were to develop, an appropriate collector road would need to be introduced to serve the development. The plan has identified the completion of **Leroy Grant Drive** to form a complete road between Counter Street and Concession Street.

A **Division Street** widening from four to six lanes between Counter Street and Highway 401 was also identified as part of the overall network plan. The assessment of the need to widen Division Street stems from a review of the Weller Road screenline, the South of Highway 401 screenline and the role this stretch of road plays in the network.

The Weller Road screenline (Division Street and Montreal Street) does not show a deficiency. The modelling does, however indicate that Division Street in this stretch will be over capacity for a four-lane road. The Highway 401 South-West screenline (Gardiners Road, Sydenham Road, Sir John A. Macdonald and Division Street) shows a one-lane deficiency. This is a rather long screenline and it is not reasonable to expect that a north-south deficiency in the Gardiners Road/Sydenham Road corridor can be
solved properly by capacity on Division Street or vice versa. We examined this screenline by also looking at two corridors — a west one and an east one. The west corridor included Gardiners Road and Sydenham Road and it highlighted that a lane of capacity is required in this corridor. The capital plan includes a widening of Gardiners Road from four to six lanes between Highway 401 and Centennial/Creekford. The east corridor shows a marginal deficiency at 0.95 or about 200 vehicles. In theory transit should be able to resolve this deficiency but the corridor would be at capacity and so is the link.

In addition to the screenline analysis, we considered the role that Division Street currently plays in the network and the role it will play in the future. There is a considerable amount of commercial and industrial activity in this corridor that adds to the turns on and off this road and the friction to available capacity. This in combination with its location adjacent to Highway 401 will add additional pressure to the existing four lanes. Having developed an additional lane of capacity up to Counter Street/Elliott Street and with the expected redevelopment of the Alcan Lands and the construction of Leroy Grant it was viewed as prudent to include the widening of Division Street from four to six lanes up to the south ramp to eastbound Highway 401.

There is an approved Class EA for the connection of Centennial Drive across the CNR line. This will provide connectivity from this neighbourhood and additional flexibility in the network, providing a through connection between Bath Road and Princess Street. The need for widening Centennial Road to four lanes through this stretch stems from the Highway 33 (Bath Road) screenline (Collins Bay Road, Bayridge Drive, Gardiners Road). There is a demonstrated need for an additional lane of capacity (in each direction) on this screenline. The multi-discipline comparative evaluation included in the approved Class EA shows a widening of Centennial Drive to four lanes to address a future additional deficiency of one lane of capacity. It was selected as the preferred solution and included in the capital plan.

1.4 Network Overview

Having completed the individual assessments, it was necessary to ensure that the combination of improvements make sense in a network context. Continuity of capacity and directness in a transportation system is an important concept.

For the evaluations undertaken across the east-west screenlines, the following infrastructure projects were identified (from west to east):

- Counter Street: Princess Street to Sir John A. Macdonald widening from two to four lanes;
- Counter Street/Elliott Avenue: Sir John A. Macdonald to Montreal Street widening and realignment from two to four lanes. It should noted that an Class EA has been completed for the Counter Street/Elliott Avenue realignment between Division Street and Montreal Street; and
- Gore Road/Elliott Avenue Third Crossing of the Cataraqui River as a two-lane bridge.

The combination of these three projects has the effect of enhancing and extending an east-west arterial corridor through the City. This works well from the perspective of capacity continuity and directness.

For the evaluations undertaken across the north-south screenlines, the following projects were identified:

- Wellington Street Extension: new two-lane road from Bay Street to Railway Street;
- Mid-Block extension of Wellington Street: Railway Street to Elliott Avenue as a new two-lane Road;
- Division Street: Counter Street to the south ramp of Highway 401;
Centennial Drive: Bath Road to Gardiners Road widening from two to four lanes plus Gardiners Road from Centennial Drive/Creekford Road north to Highway 401 from four to six lanes.

The combination of Wellington Street, the Mid-Block extension of Wellington Street and the Division Street projects effectively creates a new north-south roadway between the downtown, the Counter Street/Elliott Avenue corridor and north to Highway 401. Again here the capacity connectivity and directness of the three projects will be effective in a network context. The Centennial Avenue widening from two to four lanes provides the needed extra capacity to serve not only the developing area, but also north-south travel to and from Highway 401. The widening of Gardiners Road from four to six lanes recognizes that a number of roadways come together at the Gardiners Road/Creekford Road-Centennial Road intersection and that the portion of Gardiners Road north from this intersection to Highway 401 will need additional capacity to handle the demand.

Overall, the projects identified fit the network structure in a systems context quite well. They provide the needed capacity in broad corridors that will help support, transit, cycling and other modes of travel.
Annex 2
Glossary of Transportation Planning Terminology
GLOSSARY OF TRANSPORTATION PLANNING TERMINOLOGY

The following are terms used within the Kingston Transportation Master Plan (KTMP). They are typical terms used in numerous transportation planning exercises throughout North America.

Access: Refers to the ability to reach or connect to a roadway.

Access Management: Techniques of transportation infrastructure management intended to: reduce congestion and accident rates, lessen need for highway widening, conserve energy, and reduce pollution. Examples include; limiting entrance and exit of traffic on highways, use of medians and turn lanes, placement and timing of signals, as well as implementation of supportive local by-laws and policies.

Accessibility: (1) The extent to which facilities are barrier free and useable by disabled persons, including wheelchair users. (2) Ability to reach a destination or use a facility or service without being impeded by physical or other barriers due to auditory, visual, mobility, or cognitive disabilities. (3) A measure of the ability or ease of all people to travel between various origins and destinations.

Alternative Modes (of Transportation): The term “mode” is used to refer to and distinguish between each of the various forms of transportation, such as automobile, transit, ship, bicycle and walking. “Alternative mode” refers to any mode other than the single-occupant vehicle.

Arterial: A major street or highway. It is a general term, which includes expressways, major and minor arterial streets, and provincial highways having regional continuity. It is a road intended to move a relatively large volume of traffic at higher speeds.

Bicycle (or “Bike”): A vehicle propelled by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term also applies to three- and four-wheeled human-powered vehicles, but not tricycles for children.

Bicycle Facilities: Improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities, bike lanes, paved shoulders and wide outside lanes.

Bicycle Lane (“Bike Lane”): A portion of a roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bicycle Path (“Bike Path”): See Shared Use Path Bicycle System. A system of bikeways designated by the jurisdiction having authority with appropriate directional and informational signage. Bicycle systems should establish a continuous routing, but may be a combination of any and all types of bikeways.

Bikeway: A generic term for a road, street, or path that in some way is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Capacity: The volume of vehicles a road was designed to carry per unit of time, such as per hour; can also be applied to transit or bicycle/pedestrian paths.

Collector: A street or highway that collects traffic from local streets and land-access roads and directs it to the arterial street network.
Community: A physical or cultural grouping of stakeholders with common interests created by shared proximity or use. Community can be defined at various levels within a larger context (e.g., neighbourhood or city or region).

Commute Alternatives: Carpooling, vanpooling, transit, bicycling, walking, and telecommuting. Also includes any alternative work-hours program.

Commute: A repetitive home-to-work or work-to-home trip.

Commuter: Person who travels regularly between home and work or school.

Corridor: A geographic area that is defined by major roads and rail facilities, and major flows of travel. Transportation corridors are identified for the purpose of analyzing the patterns and flows of traffic between origins and destinations.

Freeway: A multi-lane divided highway without traffic signals and with opportunities for access and egress limited to interchange ramps.

Highway Capacity Manual (HCM): Published by the transportation research Board, the HCM outlines fundamental information and computational techniques on the quality of service and capacity of highway facilities.

Headway: The scheduled time interval between any two transit vehicles operating in the same direction on a route. Headways may be load driven (i.e., developed on the basis of demand and loading standards), or policy based (i.e., dictated by policy decisions such as service every 30 minutes during the peak periods and every 60 minutes during the base period).

High-Occupancy Vehicle (HOV) Lane: A roadway lane designated for the exclusive use of high-occupancy vehicles, such as carpools, vanpools, other ridesharing modes, and buses.

Impacts: The effects of a transportation project, including (a) direct (primary) effects; (b) indirect (secondary) effects; and (c) cumulative effects.

Intelligent Transportation System (ITS): A system that uses modern electronic communication and control technologies to provide travelers with better information on traffic conditions, provide vehicles with safety equipment and improve the transportation infrastructure. Also includes technologies that identify, monitor, or control vehicles.

Intermodal: The term “mode” is used to refer to and distinguish between various forms of transportation, such as automobile, transit, ship, bicycle and walking. Intermodal refers specifically to the connections between modes (e.g., park-and-ride facilities).

Intermodal Planning: Planning that reflects a focus on connectivity between modes as a means of facilitating linked trip making.

Land Use: The purpose for which land or the structures on the land are being utilized (e.g., commercial, residential, retail).
Level of Service (LOS): A qualitative measure used to characterize the operating conditions of a transportation service, as perceived by its users. It is usually used to describe a section of road or an intersection as experienced by drivers, but can also be applied for users of other modes of transportation. LOS designations typically go from A (best) to F (worst). At signalized intersections, LOS is an indication of delay, generally outlined in the *Highway Capacity Manual* as: A <= 10 sec, B = 10-20 sec, C = 20-35 sec, D = 35-55 sec, E = 55-80 sec, F > 80 sec.

Liveable Community: A neighbourhood, community or region with compact, multidimensional land use patterns that ensure a mix of uses, minimize the impact of cars, and promote walking, bicycling and transit access to employment, education, recreation, entertainment, shopping and services.

Local Roads: Provide access to private property or low-volume public facilities.

Local Service: A type of transit service that involves frequent stops and consequent low speeds, the purpose of which is to deliver and pick up transit passengers as close to their destinations or origins as possible.

Measures of Effectiveness (MOE): Parameters describing the quality of service provided to drivers, passengers, and pedestrians. Speed, delay, passenger loadings, and transit vehicle travel time could be examples. Qualitative rankings such as Level of Service and On-Time Performance would be based on these measures.

Mode: Any one of the following means of moving people or goods: aviation, bicycle, highway, paratransit, pedestrian, pipeline, rail (commuter, intercity passenger and freight), transit, space and water. A way people or goods get from one place to another, such as using cars and trucks, freight and passenger trains, walking, bicycling, and riding buses.

Modal Split: The percentage of trips taken by each of the possible modes of travel (auto, transit, bicycle, walking). Modal split does not refer to the number of trips, but rather to the proportion of people that use each of the various modes of transportation. It also describes the process of allocating the proportion of people using modes.

Multi-modal: Refers to the availability of multiple transportation options, especially within a system or corridor. A multi-modal approach to transportation planning focuses on the most efficient way of getting people or goods from place to place, be it by truck, train, bicycle, automobile, airplane, bus, foot, or even a computer modem.

Multi-modal Planning: Planning that reflects consideration of more than one mode to serve transportation needs in a given area.

Multi-use Path: A transportation corridor physically separated from motorized vehicular traffic by an open space or barrier and either within the roadway right-of-way or within an independent right-of-way. Shared use paths are used by pedestrians, skaters, wheelchair users, joggers, cyclists, and other non-motorized users. Also referred to as a Shared Use Path.

Natural Environment: The surroundings not made by humans within which the transportation system operates. This includes both physical and ecological aspects, including traditional cultural resources.

Non-Motorized Travel: Travel accomplished by cycling, walking, in-line skating, etc.

Pedestrian: One who walks or journeys on foot; a walker.
**PM Peak:** A 60-minute interval during the primary weekday afternoon / evening commuter period, representing the typical maximum demand conditions on the transportation network. The KTMP transportation model and analyses use PM peak hour traffic volumes.

**Right-of-Way:** A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes. Also refers to the right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.

**Roadway:** A general term denoting a public way intended for vehicular use.

**Screenline:** An imaginary line drawn at a specified location across selected parallel roads for the purpose of tracking the volume of traffic moving from one location to another and the capacity available to serve that traffic.

**Shoulder:** The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base and surface courses. In rural areas, this portion may also be used for bicycle and pedestrian travel.

**Sidewalk:** The portion of the street or highway right-of-way designated for preferential or exclusive use of pedestrians.

**Single-Occupant Vehicle (SOV):** A vehicle containing only the driver and no other passengers.

**Sustainable:** Able to meet the needs of the present without compromising the ability to meet the needs of the future.

**Transit:** Generally refers to urban passenger transportation service, local in scope, provided to the public along established routes with fixed or variable schedules at published fares.

**Transportation Demand Forecasting Model:** A tool for representing and analyzing the major ways people get around. Usually this tool is a software package which incorporates a road network, land use data, and a mathematical formula to distribute and route trips. The model is calibrated to existing traffic counts. Then it can be used to forecast traffic and test the effect of changes in the road network. Also referred to as a Travel Demand Model.

**Transportation Management Association (TMA):** An organization established to develop transportation demand management (TDM) measures in order to reduce the need for commuter parking. Measures may include carpool matching services, transit subsidies, shuttle vans, etc. By working as a group, TDM measures are more effective.

**Transportation Master Plan:** A long-range document that identifies facilities and programs that should function as an integrated transportation system and includes a financial plan that demonstrates how the long-range plan can be implemented. The plan must show that the current system can be operated and maintained over the long term, as well as recommend capital expansion projects to be constructed.

**Transportation Planning:** A collaborative process of examining demographic characteristics and travel patterns for a given area. This process shows how these characteristics will change over a given period of time, and evaluates alternatives for the transportation system of the area and the most expeditious use of funding. Long-range planning is typically done over a period of twenty years; short-range programming of specific projects usually covers a period of three to five years.
Transportation System Management (TSM): Techniques for increasing the efficiency, safety, capacity, or level of service of a transportation facility without increasing its size. Examples include, but are not limited to, traffic signal improvements, traffic control devices including installing medians and parking removal, channelization, access management, ramp metering, and restriping for high occupancy vehicle (HOV) lanes. The goal of TSM is to shift emphasis from expanding capacity to making better use of existing transportation systems.

Travel Demand Management (TDM): A set of strategies or actions that promote increased efficiency of the transportation system by influencing individual travel behaviour. Often this is accomplished by encouraging travelers to use alternatives to driving alone. TDM strategies may be developed for a single work site, specific corridor, or area.

Travel Time: The time it takes to travel from origin to destination.

Vehicle Kilometres of Travel (VKT): The sum of all the kilometres traveled by vehicles (not people) in a specified amount of time.

Volume: The number of vehicles that actually pass through a given roadway location in a unit of time such as a day; can also be applied to multi-use paths.