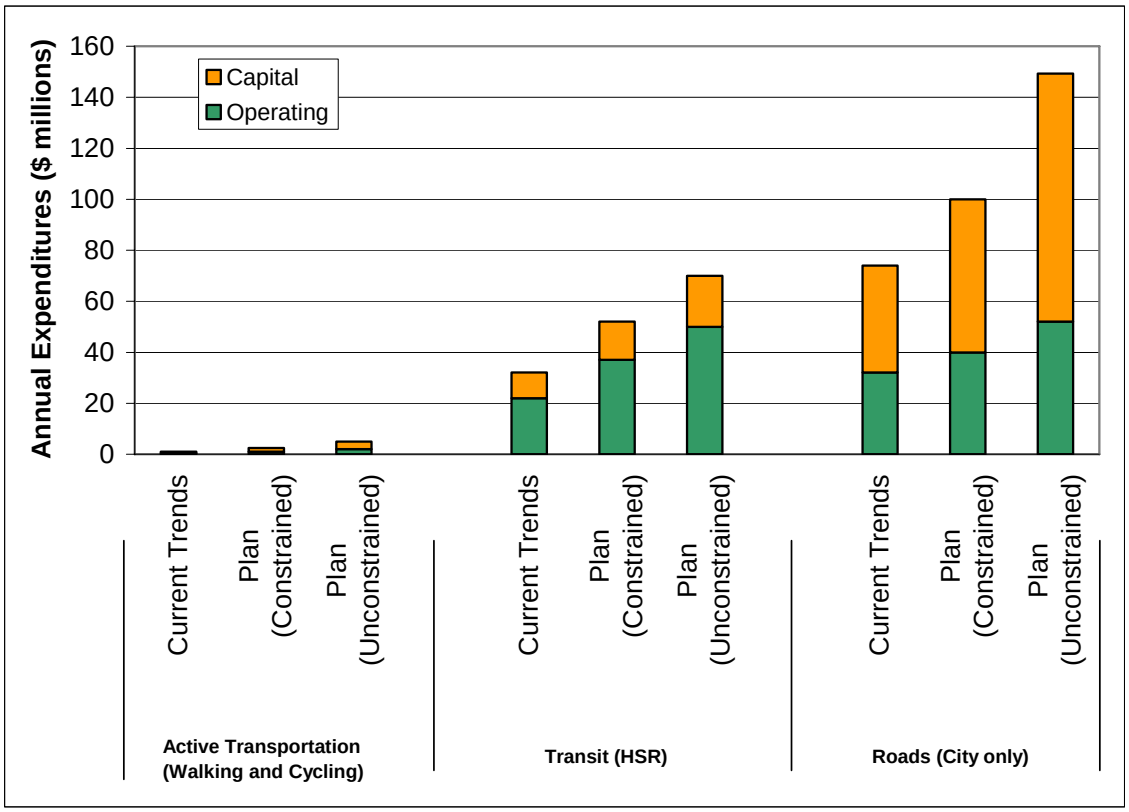
8. IMPLEMENTATION AND MONITORING

8.1 Funding Strategy

Exhibit 8.1 provides a summary of the estimated capital and operating costs in 2031 required to support the Transportation Master Plan, as well as on-going transportation needs. These costs represent gross costs exclusive of federal and provincial grants, gas taxes and development charges. Three scenarios are presented:

- A **Current Trends** scenario reflective of spending over past 5 years
- A **Plan (Constrained)** scenario representing the minimum expenditures required to implement the plan
- A **Plan (Unconstrained)** scenario representing the targeted funding required to address existing road rehabilitation needs and to fully implement desired transit improvements.

Exhibit 8.1: Financial Impacts (Potential Long Term Scenarios)



The unconstrained financial projections are based on the requirements for active transportation, transit and roads as outlined in Chapter 7 and include the following capital investments:

- A doubling of transit capital expenditures from $10 million per year to $20 million per year

- Increasing road capital expenditures from $42 million per year to up to $90 million per year to address the backlog of capital projects while investing an average of $16.7 million per year to improve and expand the road network, the bulk of which are required in the short to medium term

- Increasing the expenditures on walking and cycling improvements with a target capital investment of $3 million per year

Although these represent the long term funding targets, it is important that funding for priority areas including transit, active transportation and road maintenance be identified as early priorities so that appropriate adjustment can be made to capital budgets and that the "funding gap" can be identified.

In considering these funding requirements, Council will need to look beyond infrastructure's immediate impacts on economic development, and recognize that transportation infrastructure can be a tool to shape long-term development and influence travel in ways that ultimately reduce the overall cost of that infrastructure. For example, a target of increasing transit funding by $5 per capita per year over the next 10 years could be established to move towards the desired funding levels.

Federal and provincial governments must also share responsibility for funding transportation infrastructure. Accordingly, Hamilton must pursue programs such as the Canadian Strategic Infrastructure Fund (CSIF) that are available to cover major costs related to transit infrastructure. Unfortunately, these programs do not cover on-going operating costs and as such it will be necessary to identify other funding sources such as user fees and innovative taxation structures that minimize the burden on Hamilton's residents, but still provide stable and adequate funding.

8.2 Road Classification Policies

Road systems are typically classified according to a hierarchy that recognizes different types of roads serve different purposes. A roadway hierarchy is intended to reflect variations in design standards, flow characteristics, traffic volumes, traffic control, access control, vehicle type and abutting land uses. A road classification system consists of two basic elements - a list of defined roadway types and a list of corresponding characteristics of each roadway type.

As part of the Phase 2 Policy Papers, a separate discussion of Road Classification Policies was developed and a proposed road classification system was established. The resulting classifications are closely aligned with the established practices from the Transportation Association of Canada's (TAC) ***Geometric Design Guide for Canadian Roads*** (1999). In addition to provincial highways, six types are proposed for urban roads and three different roadway types are proposed for rural roads as follows:

Provincial Highways

Urban Roads

- Major Arterial

- Minor Arterial

- Industrial/Commercial Collector

- Residential Collector
- Industrial/Commercial Local
- Residential Local

Rural Roads

- Rural Arterial
- Rural Collector
- Rural Local

The defining characteristics of each of these roadways are described in the Road Classification Policy Paper and are summarized below. It should be noted that due to the long history over which the Hamilton road network has evolved, these criteria cannot be applied rigidly in all cases. For example, many of the major streets in the lower City have a 20 m right-of-way. The designation of these streets as arterials should not in any way suggest that these streets would be widened to satisfy the suggested road classification policies. In addition, certain circumstances may warrant, at the discretion of the municipality, an increase or decrease to the right-of-way widths listed herein. Such circumstances could include the characteristics of the surrounding land use, or the inclusion of strategic transportation infrastructure such as Bus Rapid Transit.

Provincial Highways

The following general policies shall apply to Provincial Highways:

1. There are two primary provincial highways located within the City – Highway 403 and the QEW. Additionally, Highway 6, Highway 8, Highway 5, Highway 6 are provincially owned facilities and have unique classifications. Development which falls within the Ministry of Transportation's permit control area is subject to the requirements of the Ministry of Transportation.
2. New entrances or the upgrading of entrances within the Ministry of Transportation's permit control area of a provincial highway shall be subject to the approval of the Ministry of Transportation. This may increase the access and traffic signal spacing requirements outlined for Major Arterial, Minor Arterial, Major Collector, Minor Collector and Local Roads that intersect with a provincial highway.
3. The City and the Ministry of Transportation will work cooperatively with respect to the planning of land development and associated access connections within the Ministry of Transportation's permit control area adjacent to all provincial highways and interchanges within the City, to protect the future capacity and operation of both the provincial highway network and the City's transportation facilities.

Major Arterial Roads (Urban)

The following general policies shall apply to Major Arterial Roads:

1. The primary function of a Major Arterial Road is to carry relatively high volumes of intra municipal and inter-regional traffic through the City in association with other types of roads, although land accesses are permitted they are under rigid controls;
2. The basic minimum right of way widths for Major Arterial Roads shall typically range from 26 to 36 metres, with 36 metres being the preferred minimum;

3. The right of way widths of Major Arterial Roads at major intersections should include left turn lanes. Right turn lanes may also be required to be provided at major intersections;
4. Traffic signals will be well spaced and at least 400 metres apart;
5. Major arterial roads will typically service up to 10,000 vehicles per day under uninterrupted flow conditions (except at signals), with an average running speed of 60-80 km/h, though be designed for 70-100 km/h;
6. Major Arterial roads should generally be organized in a grid pattern with collectors, arterials parkways and provincial highways;
7. All vehicle types, including trucks (subject to truck route network) and buses, are permitted, wider lanes or separate facilities should be in place to accommodate cyclists and sidewalks should be present on both sides for pedestrians, buffered with a 1.5-3.0 metre boulevard; and,
8. Parking should be prohibited or at minimum be restricted in the peak hours.

Minor Arterial Roads (Urban)

The following general policies shall apply to Minor Arterial Roads:

1. The main function of a Minor Arterial Road is to carry moderate volumes of intra municipal and inter-regional traffic through the City in association with other types of roads, but land accesses are permitted under some controls;
2. The basic minimum right of way widths for Major Arterial Roads shall typically range from 20 to 36 metres;
3. Traffic signals will be well-spaced and at least 200 metres apart;
4. They will typically service between 5,000 and 20,000 vehicles per day under predominantly uninterrupted flow conditions, with an average running speed of 50-60 km/h, though be designed for 70km/h;
5. Minor Arterial roads should generally be organized in a grid pattern with collectors, arterials parkways and provincial highways;
6. All vehicle types, including trucks (subject to truck route network) and buses, are permitted; wider lanes or separate facilities should be in place to accommodate cyclists and sidewalks should be present on both sides for pedestrians, buffered with a 1.5-3.0 metre boulevard;
7. Parking should be restricted in the peak hours; and
8. Gateway traffic calming features may be implemented where required.

Urban Industrial / Commercial Collector

The following general policies shall apply to Urban Industrial / Commercial Collector Roads:

1. The function of an Industrial / Commercial Collector is equally shared between providing direct land accesses and the movement of moderate volumes of traffic within and through industrial or commercial areas and connecting these areas to Minor Arterial Roads and Major Arterial Roads;
2. The basic minimum right of way widths for Urban Industrial / Commercial Collector Roads shall typically range from 20 to 26 metres;
3. Traffic signals will be well spaced and at least 60 metres apart;

4. They will typically service fewer than 12,000 vehicles per day under interrupted flow conditions, with an average running speed of 60 km/h;
5. All vehicle types, including trucks and buses, are permitted, wider lanes or separate facilities should be in place to accommodate cyclists and sidewalks should be present on both sides in commercial areas and where required in industrial areas for pedestrians;
6. Parking should be restricted only in the peak hours.

Urban Residential Collector

The following general policies shall apply to Urban Residential Collector Roads:

1. The function of a Residential Collector is equally shared between providing direct land accesses and the movement of moderate volumes of traffic within and through residential areas and connecting these areas to Minor Arterial Roads and Major Arterial Roads;
2. The basic minimum right of way widths for Urban Residential Collector Roads shall typically range from 20 to 26 metres;
3. Traffic signals will be well spaced and at least 60 metres apart;
4. They will typically service fewer than 8,000 vehicles per day under interrupted flow conditions, with an average running speed of 50-60 km/h, though be designed for 60km/h;
5. Passenger and service vehicle types are permitted, wider lanes or separate facilities should be in place to accommodate cyclists and sidewalks should be present on both sides for pedestrians, buffered with a 1.5-3.0 metre boulevard;
6. Parking should be restricted only in the peak hours; and,
7. Horizontal traffic calming features should be provided where required.

Urban Industrial / Commercial Local Road

The following general policies shall apply to Urban Industrial / Commercial Local Roads:

1. The primary function of an Industrial / Commercial Local Road is to provide direct land accesses, while the movement of low volumes of traffic to Collector Roads is secondary;
2. The basic minimum right of way widths for Urban Industrial / Commercial Collector Roads shall typically range from 20 to 26 metres;
3. Traffic signals will be well spaced and at least 60 metres apart;
4. They will typically service fewer than 3,000 vehicles per day under interrupted flow conditions, with an average running speed of 50 km/h, though be designed for 60km/h;
5. All vehicle types, including trucks, are permitted though transit service should be generally avoided, wider lanes should be in place to accommodate cyclists and sidewalks should be present on both sides in commercial areas and where required in industrial areas for pedestrians, buffered with a 1.5-2.5 metre boulevard;
6. Parking should not be restricted or should be restricted to one side.

Urban Residential Local Road

The following general policies shall apply to Urban Residential Local Roads:

1. The primary function of an Urban Residential Local Road is to provide direct land accesses, while the movement of low volumes of traffic to Collector Roads is secondary;

2. The basic minimum right of way widths for Urban Residential Local Roads shall typically be 20 metres;
3. Traffic signals will be well spaced and at least 60 metres apart;
4. They will typically service fewer than 1,000 vehicles per day under interrupted flow conditions, with an average running speed of 40-50 km/h, though be designed for 50km/h;
5. Passenger and Service vehicle types are permitted, no special facilities are required for cyclists and sidewalks should be present on one or both sides for pedestrians, buffered with a 1.5-2.5 metre boulevard;
6. Parking should not be restricted or should be restricted to one side; and,
7. Traffic calming may be implemented where required.

Rural Arterial Road

The following general policies shall apply to Rural Arterial Roads:

1. The primary function of a Rural Arterial Road is to carry relatively high volumes of intra municipal and inter-regional traffic through the rural area in association with other types of roads; land accesses are permitted but should be considered a secondary consideration;
2. The basic minimum right of way widths for Major Arterial Roads shall typically range from 20 to 36 metres;
3. They will typically service over 5,000 vehicles per day under uninterrupted flow conditions (except at signals), with an average running speed of 60-80 km/h, though be designed for 80-100 km/h;
4. Major Arterial roads should generally be organized in a grid pattern with collectors, arterials, freeways and provincial highways;
5. All vehicle types, including trucks and buses, are permitted, paved shoulders should be in place to accommodate cyclists and pedestrians; and
6. Parking should be prohibited.

Rural Collector Road

The following general policies shall apply to Rural Collector Roads:

1. The function of a Collector Road is equally shared between carrying moderate volumes of intra municipal and inter-regional traffic through the rural area and providing direct property accesses;
2. The basic minimum right of way widths for Collector Roads shall typically range from 20 to 26 metres;
3. They will typically service up to 5,000 vehicles per day under interrupted flow conditions with an average running speed of 60-80 km/h, though be designed for 80-100 km/h;
4. Collector Roads should generally be connected with locals, collectors and arterials;
5. Passenger and service vehicle types are permitted, paved shoulders should be in place to accommodate cyclists if the vehicle volume is above 1,000 vehicles per day, and sidewalks should be in place for pedestrians on one side if it connects a rural settlement to a school or community facility less than 2.5 km away; and
6. Parking should be prohibited.

Rural Local Road

The following general policies shall apply to Rural Local Roads:

1. The primary function of a Local Road is providing direct property accesses, while the secondary function is to move low volumes of traffic to Collector Roads;
2. The basic minimum right of way widths for Local Roads shall typically range from 20 to 26 metres;
3. They will typically service up to 1,000 vehicles per day under interrupted flow conditions with an average running speed of 50-70 km/h, though be designed for 60-80 km/h;
4. Local Roads should generally connected with other local roads and collectors;
5. Passenger and service vehicle types are permitted, no special features are required for cyclists and pedestrians; and,
6. Parking should be prohibited.

In addition to the core classification elements outlined for each roadway type above, there are several other roadway features that could apply to particular road sections including:

- higher order transit system features
- special character roads, heritage roads, and scenic routes
- truck routes
- culs-de-sacs
- sub-categories of roadways types within the Core Road Classification

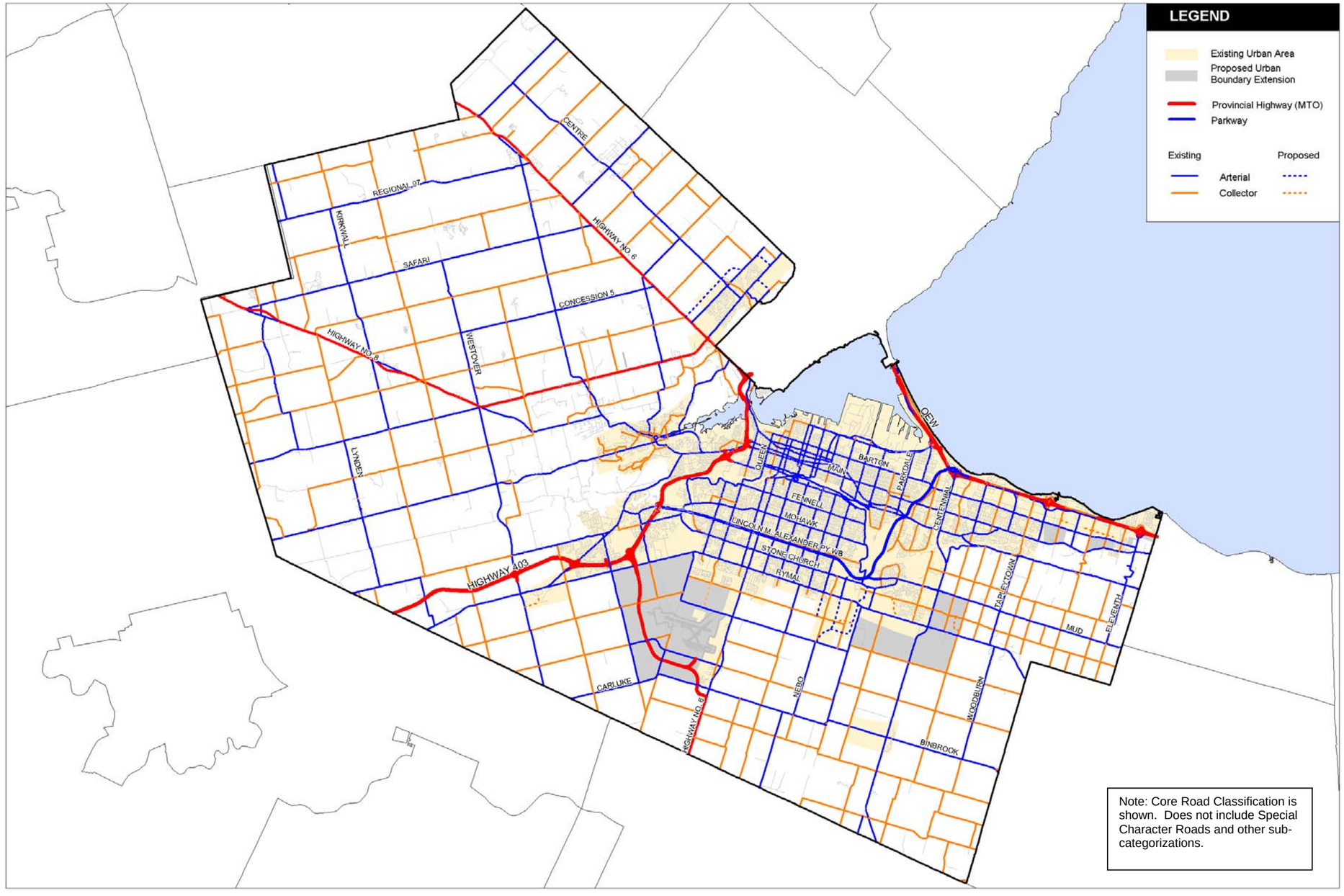
It is proposed that these features be considered on an “as justified” basis and be addressed through special studies either previously undertaken or to be undertaken in the future. An example of this variation in the road classification system would be Old Dundas Road, which has been identified as a **Special Character Road** in previous studies. Other examples include **Primary Mobility Streets** and **Neighbourhood Mobility Streets** identified in the Setting Sail Plan. The intent of the current Transportation Master Plan designations is not to over-ride these previously identified designations, but rather to provide an overall framework for further refinement.

Exhibit 8.2 shows the proposed functional road classification for arterial and collector roadways. This classification system was developed largely by examining the existing road classification system as defined in the Regional Official Plan and Official Plans for the six former local municipalities. This classification system should be considered as a Draft as the final designations will not be applied until the adoption of the Official Plan.

Further, it is noted that designations shown represent future roadway classifications. For example, the Waterdown/Aldershot Transportation Master Plan has identified the need to widen Waterdown Road to a four lane arterial road, whereas the current two-lane roadway is classified as a collector road.

In general, roads not specifically designated in the map would be considered local roads. Roads outside of the existing and proposed urban boundary would be considered rural and roads within the urban boundary urban. Similarly, roads through existing or future employment areas would be given an industrial/commercial classification. Further refinement will be required to classify arterial roads into major and minor roads, and to overlay special policy designations.

Exhibit 8.2: Proposed Roadway Classifications



It is also recommended that the City undertake further work, in consultation with affected residents, to determine an appropriate approach for balancing mobility objectives for vehicular movement and property access with liveability objectives for community design, landscape character, and non-auto modes. This could include the development of arterial road design guidelines, as well as design guidelines for proposed higher order transit facilities.

8.3 Performance Measurement

Performance measurement is necessary to gauge the effectiveness of the policies, programs and infrastructure improvements in achieving the Transportation Vision, objectives and targets as defined in Section 2. The performance measurement program provides a framework for the City to track changes in land use patterns, demographic characteristics, system performance and mode choice over time. This information will allow the City to assess the success of actions taken and provide guidance in further implementation of the Plan.

A proposed performance measurement framework is outlined in Exhibit 8.3, structured according to the seven strategic objectives of the Transportation Master Plan. This list represents a desirable set of indicators for monitoring the implementation of the TMP and resulting transportation performance. It is recognized that many of these indicators require extensive data collection and all may not be achievable given current data and staffing resources.

In general, comprehensive performance measurement should be conducted every 5 years in conjunction with updates to this Transportation Master Plan. Some indicators may be monitored more frequently given the nature of the data and their collection methods. Moreover, corridor and area-specific monitoring may be warranted to monitor localized changes from key strategic projects (e.g., Bus Rapid Transit corridors).

Proper reporting is a key aspect of performance measurement, because the knowledge generated by monitoring and analysis is only useful if decision makers and stakeholders are aware of it. Reports presenting readable information in a way that effectively communicates successes and ongoing challenges can capture the attention of community groups and the media, helping to raise public awareness of results achieved and the need for continued action. A report card should be developed based on the performance measurement framework providing simple rating for progress towards each objective (e.g., very good progress, good progress, little change, negative progress, very negative progress). A similar approach was adopted in the evaluation of policy options in the Policy Papers, where each option was assessed and rated (✚, +, 0, -, —) based on its application to a variety of social, economic, and environmental factors.

In some instances, the indicators may need to be interpreted in conjunction with other indicators. For example, improvements in road levels of service should be achieved as a result of mode shifts to transit.

Exhibit 8.3: Proposed Performance Measurement Framework

INDICATOR GROUP	Performance Indicator
Objective 1: Offer safe and convenient access for individuals to meet their daily needs	
Road Level of Service	Number of signalized intersections operating at LOS C or better
	Average AM peak period auto trip travel time (minutes)
Transit Supply and Level of Service	AM peak period transit supply (AM peak period transit seat-km per capita)
	All day transit supply (24-hr transit seat-km per capita)
	Completion of rapid transit network (%)
	Average AM peak period transit trip travel time (minutes)
Bicycle and Walking Facility Supply	Sidewalk coverage (percent of collector and arterial roads with sidewalks or pathways on both sides)
	Bicycle facility supply (kilometres of bicycle lanes, shoulder lanes, and multi-use paths)
	Completion of bicycle network (%)
Safety	Road injuries (number)
	Road fatalities (number)
	Reported pedestrian collisions (number)
	Reported cyclist collisions (number)
Objective 2: Offer a choice of integrated travel modes, emphasizing active transportation, public transit and carpooling.	
Auto Ownership & Use	AM peak period & all day auto mode share
	Automobile ownership (automobiles per capita)
	AM peak period & all day auto occupancy
Transit Use & Accessibility	AM peak period & all day transit mode share
	Transit use (Transit trips per 1,000 capita)
	Residential transit accessibility (proportion of households within 400 m of Transit Stops)
	Employment transit accessibility (proportion of employment within 400 m of Transit Stops)
Bicycle Use	AM peak period & all day bicycle mode share
Pedestrian Activity	AM peak period & all day walk mode share
Objective 3: Enhance the liveability of neighbourhoods and rural areas.	
Neighbourhood traffic issues	Neighbourhood traffic complaints received (number)
Objective 4: Encourage a more compact urban form, land use intensification and transit-supportive node and corridor development.	
Population Distribution	Population density (population per ha)
Employment Distribution	Employment density (employment per ha)
	Employment self-containment (% of employed labour force working in Hamilton)
	Home-based workers (number per 1,000 capita)
	Average journey to work trip distance (km)

Exhibit 8.2: Proposed Performance Measurement Framework (Cont'd)

INDICATOR GROUP	Performance Indicator
Objective 5: Protect the environment by minimizing impacts on air, water, land and natural resources.	
Land and Stormwater Runoff	Land consumption (occupied urban land by type of transportation infrastructure/total urbanized land)
Air Emissions	Greenhouse gas intensity of travel (CO_2e emissions/ person-trip)
	Air pollutant intensity of travel (NO_x, SO_2, CO, PM_{10}, $PM_{2.5}$, TPM, VOC emissions/ person-trip)
	Greenhouse gas emissions from personal travel (total CO_2e emissions from personal travel in Hamilton)
	Air pollutant emissions from personal travel (NO_x, SO_2, CO, PM_{10}, $PM_{2.5}$, TPM, VOC emissions from personal travel in Hamilton)
Objective 6: Support local businesses and the community's economic development.	
Goods Movement Conditions	Off-peak road congestion (volume/capacity)
Business-Employee Accessibility	Average auto commute time (minutes)
	Average transit commute time (minutes)
Objective 7: Operate efficiently and be affordable to the City and its citizens.	
Transit Network Efficiency	Transit vehicle utilization (passenger-km per vehicle-km)
	Transit off-peak period utilization (100% - % of daily transit person trips in AM & PM peak periods)
Road Network Efficiency	Road off-peak period utilization (100% - % of daily automobile person trips in AM & PM peak periods)
Transit Affordability	Increase in transit fare (%)
Transportation Funding	Capital investment in municipal transportation projects ($/capita) • Roads • Transit (facilities and fleet) • Pedestrian facilities • Cycling facilities
	Operating investment in municipal transportation projects ($/capita) • Roads • Transit (facilities and fleet) • Pedestrian facilities • Cycling facilities

8.4 Transportation Master Plan Review and Updating

Regular reviews and updates of the TMP will allow for the on-going assessment of its effectiveness and relevance. Establishing a stable transportation planning cycle ensures the Plan strategies remain flexible to respond to unforeseen developments and imprecise assumptions. The performance of the Plan in achieving the Transportation Vision can also be reviewed, and necessary adjustments in strategy made. The Municipal Class EA recommends that master plans be reviewed every five years to determine the need for a formal review and/or update.

The Planning Act requires the City to assess the need for an update to its Official Plan every five years. That review process provides a timely opportunity to revisit the assumptions of the TMP and consider the need for an update. The monitoring program discussed above will also provide an indication of the need for a review.

Over the time period preceding the formal review, Council decisions on transportation issues will have the inevitable effect of amending, deleting, replacing or complementing some of the recommendations in the TMP. For this reason, individuals must consider this plan in conjunction with the record of subsequent Council decisions to obtain a complete understanding of current policy and plans.