



Transport Canada

STRATEGIES FOR SUSTAINABLE TRANSPORTATION PLANNING: A REVIEW OF PRACTICES AND OPTIONS

FINAL REPORT

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In association with



and



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1. INTRODUCTION

1.1 Background

Over the last two decades, municipalities have placed an increasing emphasis on sustainable transportation planning. Considerable progress has been made in improving Canadians' understanding of the need for more sustainable transportation, within municipal governments as well as among the general public. This is in part due to the now widely recognized *New Vision for Urban Transportation* published by the Transportation Association of Canada (TAC) in 1993. It is also a result of the fact that society is now experiencing the impacts of unsustainable transportation systems in terms of economic impacts (congestion, infrastructure maintenance and renewal backlogs), environmental impacts (air quality, degradation of natural environments) and social impacts (health impacts, obesity, accidents and injuries).

Despite these positive changes in our overall understanding of sustainable transportation, there remains a wide variance in municipal approaches to incorporating sustainable transportation principles into municipal transportation and land use plans. For example, there is no widely accepted definition of sustainable transportation from a municipal planning perspective, nor are there any accepted measures for determining whether a transportation master plan will actually lead to a more sustainable transportation system. It seems that each municipality essentially starts from scratch when developing these plans. Another major concern is that in those Canadian municipalities with master plans that promote more sustainable transportation, actual observed trends have been moving in the opposite direction. Perhaps most telling is the finding of TAC's Urban Indicators Survey that gasoline fuel use per capita (a surrogate measure for many sustainability indicators) grew by more than 11% between 1991 and 2001 in major Canadian cities.

There is a significant need for improved resources to help municipalities efficiently and effectively prepare transportation plans that promote and help create more sustainable transportation systems. TAC's Sustainable Transportation Standing Committee, with the assistance of Transport Canada, is working to develop a set of guidelines for the benefit of municipalities of various sizes across Canada. These guidelines must be based on a sound understanding of current practices, opportunities and challenges, and they must also be sensitive to the jurisdictional, technical and cultural differences that exist among Canadian urban communities.

1.2 Study objectives and scope

A key objective of this study is to provide a foundation on which to build a set of guidelines for incorporating sustainable transportation principles into municipal transportation plans. The specific objectives of the study are:

- To develop a comprehensive understanding of best practices for developing effective and "implementable" transportation plans that promote sustainable transportation.
- To develop initial directions and options for guidelines that could help create such transportation plans in Canada.

The best practices review included a review of related transportation planning practices in Canada as well as internationally. The review included both a ‘desktop’ review of completed and in-progress plans, as well as interviews with various municipal representatives.

1.3 Key principles for sustainable transportation planning

In order to identify ways that transportation plans could be used as tools in the pursuit of sustainable urban transportation, it is appropriate to first define what is meant by sustainable transportation. At a very general level, sustainable transportation is a concept that promotes a balance of the economic and social benefits of transportation with the need to protect the environment. The Centre for Sustainable Transportation further articulates this concept as follows, stating that a sustainable transportation system:

- Allows individuals and societies to meet their access needs safely and in a manner consistent with human and ecosystem health, and with equity within and between generations;
- Is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy; and
- Limits emissions and waste within the planet’s ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.¹

Since the focus of this study is on the transportation planning process as a means for promoting more sustainable transportation, as opposed to broader initiatives, it was also necessary relate the above definition for sustainable transportation to principles or themes that could be addressed in a transportation plan. Based on a combination of sources including the *New Vision for Urban Transportation* developed by the Transportation Association of Canada, a total of 12 principles for sustainable transportation planning were identified, as listed below. These principles are not intended to be specific recommendations at this point, but rather as key themes for the purpose of reviewing and discussing various elements of the transportation planning process. These principles are also used to develop options for guiding the development of transportation plans.

Key principles for sustainable transportation planning	
Sustainable communities & transportation systems	Sustainable & effective transportation planning
<i>Principle 1:</i> Integration with land use planning	<i>Principle 7:</i> Strategic approach
<i>Principle 2:</i> Environmental health	<i>Principle 8:</i> Implementation guidance
<i>Principle 3:</i> Economic and social objectives	<i>Principle 9:</i> Financial guidance
<i>Principle 4:</i> Modal sustainability	<i>Principle 10:</i> Performance measurement
<i>Principle 5:</i> Transportation demand management	<i>Principle 11:</i> Public involvement
<i>Principle 6:</i> Transportation supply management	<i>Principle 12:</i> Plan maintenance

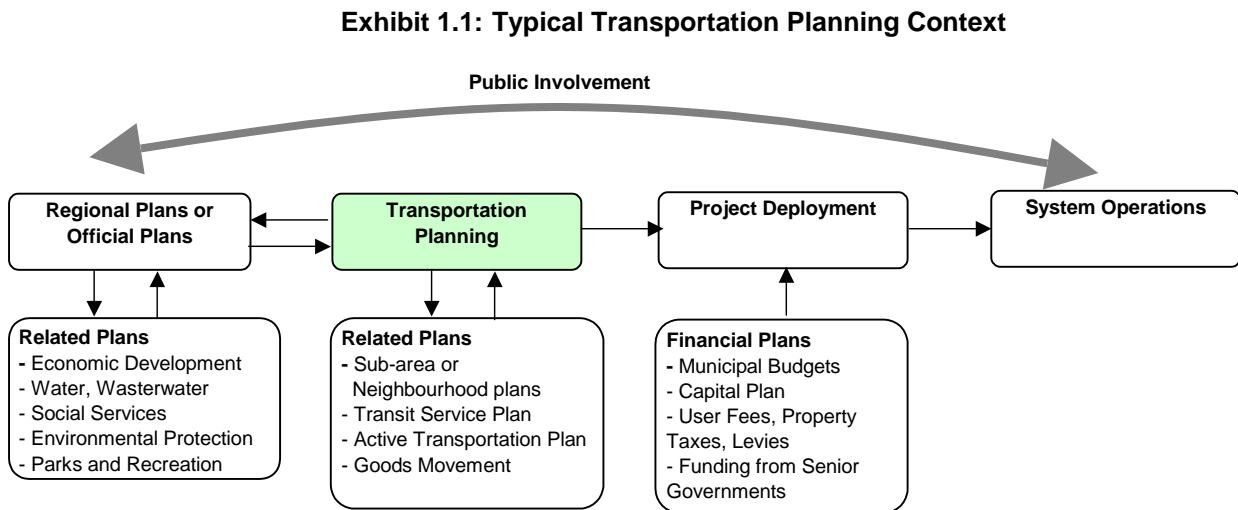
The first six principles primarily deal with the “what” aspects of transportation master plans while the latter six principles deal with the “how.” This is an important and deliberate distinction since several

¹ Centre for Sustainable Transportation, 2003

experts consulted during this study felt that many plans do a reasonable job of identifying what is required to achieve more sustainable transportation, but are less effective in identifying how key objectives will actually be achieved.

1.4 Transportation planning context

Transportation planning in Canada takes many forms, ranging from mode- or project-specific planning to comprehensive long range multi-modal planning; the latter is the primary focus of this study. Even at the level of long range planning for entire urban areas, there are many different contexts within which transportation plans may be prepared. Exhibit 1.1 conceptually summarizes a typical transportation planning context for most Canadian cities, and some of the related processes that influence, or are influenced, by the transportation plan.



Virtually all urban areas have a general community plan (e.g. official plan, regional plan) that sets out land use patterns and major infrastructure networks, and may include a vision and goals for community development. The results of comprehensive long-range transportation planning may be fully integrated within this document, or only partly integrated (likely limited to high-level transportation goals, policies and infrastructure). In the latter case, a community may also develop a complementary, self-contained transportation plan that addresses transportation issues in greater detail.

Self-contained long-range transportation plans take many titles — they may be referred to as transportation strategies, transportation plans, transportation master plans, master transportation plans, integrated transportation plans, or other names. They also vary in scope. Some transportation plans remain at a high level, but focus on tightly integrating transportation goals, objectives and policies with the community’s land use, economic, environmental and social plans. Other transportation plans set out very detailed recommendations for specific transportation facilities, programs and services (even to the point of identifying the cost and recommended timing of each project). To compensate for their lack of detail, high-level transportation plans frequently recommend subsequent work through the completion of adjunct plans (e.g. those specific to individual modes like transit or active transportation, or specific to a geographic area like the downtown).

One distinction between comprehensive long-range transportation plans in Ontario and those in other areas is that Ontario communities frequently develop such plans in conformance to the Class Environmental Assessment Process, as a means of simplifying the future implementation of projects. These plans tend to involve more detail on the evaluation of alternatives, consultation with the public, and mitigation of environmental effects of individual proposed projects.

This project has been structured to address these varying contexts for transportation planning. The plans researched (as discussed in the following section) include *general community plans*, *high-level transportation plans*, and *detailed transportation plans* (e.g. transportation master plans).

More importantly, the concepts and conclusions documented herein are applicable to long-range transportation planning regardless of contextual issues. They are as relevant to the development of a regional growth strategy for a large urban area, as they are to the development of a detailed transportation plan for a smaller community. The common factor linking these two examples is the objective of conducting transportation planning that promotes sustainable transportation both effectively and efficiently.

1.5 Methodology

The primary objective of this study was to gain a comprehensive perspective on current transportation planning practices that promote sustainable transportation. This perspective was developed through four key steps (as discussed in the following subsections):

- A review of transportation plans for Canadian and international communities
- Interviews with Canadian transportation planning practitioners
- Conduct of an teleconference workshop with an “expert panel” of practitioners
- Synthesis of options for future guidelines

1.5.1 REVIEW OF PLANS

Canadian plans. The review of existing transportation plans focused primarily on planning documents themselves. A “long list” of some 20 plans from across Canada was identified by study team members from which 10 representative plans were selected, taking into account the need to represent various geographic areas across Canada, a range of planning experience, and urban areas of different sizes. The ten plans selected were as follows:

Large urban areas (population greater than 750,000)

- City of Montréal (Que.) — Greater Montréal Area Transportation Management Plan (2000)
- City of Ottawa (Ont.) — Transportation Master Plan (2003)
- City of Calgary (Alta.) — GoPlan (1995)

Medium urban areas (population between 150,000 and 750,000)

- Halifax Regional Municipality (N.S.) — Draft Regional Plan (2005)
- City of London (Ont.) — London Transportation Master Plan (2004)
- Capital Regional District (Victoria, B.C.) — TravelChoices (2005)
- Communauté régionale de l’Outaouais (now City of Gatineau, Que.) — Plan intégré (1994)

Small urban areas (population smaller than 150,000)

- City of Kingston (Ont.) — Kingston Transportation Master Plan (2004)
- City of Kamloops (B.C.) — Travelsmart Project (1999)

- City of Peterborough (Ont.) — Comprehensive Transportation Plan (2002)

A structured approach to the review was undertaken, generally following the 12 principles listed previously.

International plans. The review of transportation plans for selected international cities followed the same process and structure as the review of Canadian plans. International plans were based on study team knowledge and an Internet search. The primary intent of reviewing plans from outside of Canada was to see if urban transportation plans in other countries approached the issue of sustainable transportation in a distinctly different manner than seen in transportation master plans for Canadian cities. After considering an extensive list of international plans, the following six plans were selected for detailed review:

United States

- Portland Metro Area (Oregon) — Regional Transportation Plan (2000)
- City of Santa Cruz (California) — Master Transportation Plan (2000)
- City of Boulder (Colorado) — Transportation Master Plan (2003)

Other International

- Helsinki Metropolitan Area (Finland) — Transport System Plan PLJ (2002)
- Auckland Regional Council (New Zealand) — Auckland Regional Land Transport Strategy (RLTS) (2003)
- Melbourne (State of Victoria, Australia) — Melbourne 2030 (2002)

The following table categorizes the Canadian and international plans according to the three major planning contexts discussed in Section 1.4: general community plan with integrated transportation component, high-level transportation plan, and detailed transportation plan.

Categorization of reviewed plans by context	
General community plans with integrated transportation component	Detailed transportation plans
<ul style="list-style-type: none"> • Halifax Regional Municipality (N.S.) — Draft Regional Plan (2005) • Melbourne (State of Victoria, Australia) — Melbourne 2030 (2002) 	<ul style="list-style-type: none"> • City of Montreal (Que.) — Greater Montréal Area Transportation Management Plan (2000) • City of Ottawa (Ont.) — Transportation Master Plan (2003) • City of Calgary (Alta.) — GoPlan (1995) • City of London (Ont.) — London Transportation Master Plan (2004) • Communauté régionale de l'Outaouais (now City of Gatineau, Que.) — Transit and Road Systems Integrated Plan (1994) • City of Kingston (Ont.) — Kingston Transportation Master Plan (2004) • City of Peterborough (Ont.) — Comprehensive Transportation Plan (2002) • Portland Metro Area (Oregon) — Regional Transportation Plan (2000) • City of Boulder (Colorado) — Transportation Master Plan (2003) • Auckland Regional Council (New Zealand) — Auckland Regional Land Transport Strategy (RLTS) (2003)
High-level transportation plans	
<ul style="list-style-type: none"> • Capital Regional District (Victoria, B.C.) — TravelChoices (2005) • City of Kamloops (B.C.) — Travelsmart Project (1999) • City of Santa Cruz (California) — Master Transportation Plan (2000) • Helsinki Metropolitan Area (Finland) — Transport System Plan PLJ (2002) 	

1.5.2 PRACTITIONER INTERVIEWS

Recognizing that transportation plans rarely provide full documentation of the challenges and alternatives addressed during its preparation, and that they inherently cannot reflect subsequent actions based on or derived from the plan, a significant part of this study included interviewing practitioners who were known to have played a significant role in their local transportation planning processes and (where possible) at least one major transportation plan. Attempts were made to gain perspectives from different regions of Canada as well as different urban area contexts and sizes. Potential candidates were provided with an introduction to the study as well as a list of discussion topics by e-mail, and the interviews (which ranged from 45 minutes to 2 hours in duration) were conducted by telephone.

The following is a list of individuals who were interviewed in this part of the study:

- Salah Barj, Société de transport de l'Outaouais, Que.
- Alan Brownlee, Transportation Planning Branch, City of Edmonton
- Christine Caron, Chef du Service de la planification et des stratégies d'intervention, Ministère des Transports du Québec
- Gene Chartier, Commissioner of Works, Township of Scugog, Ont. (formerly Manager of Transportation, Planning and Design, Regional Municipality of Durham, Ont.)
- Al Cunningham, Director of Management Systems Development, City of Moncton, N.B.
- Scott Edwards, Strategic Transportation Planning Engineer, Transportation Division City of Vancouver
- Monique Kealey, Senior Traffic Engineer, City of Regina, Sask.
- Paul May, Director of Transportation and Infrastructure, Region of York, Ont.
- David McCusker, Manager of Transportation, Halifax Regional Municipality, N.S.
- Larry Roberts, Division Manager, Regional Transportation Planning, Capital Regional District (Victoria, B.C.)
- Jeff Roziere, Manager of Transportation and Waste Management, City of Brandon, Man.
- Graham Vincent, Director of Transportation Planning, and JoAnn Woodhall, Manager of TDM, Region of Waterloo (Ont.)

As with the review of plans, a semi-structured approach to the interviews was followed. The results of the interviews are integrated into the discussions of “practitioner perspectives” in Chapters 2 and 3 of this report (note that detailed interview notes are not provided to maintain the confidentiality of respondents).

1.5.3 EXPERT PANEL

The final method used to gain an understanding of options for improved strategies for sustainable transportation planning was a two-hour workshop teleconference held with a panel of invited experts. Prior to the call, each participant was asked to consider how Canadian municipalities could make more effective use of transportation plans as tools in the pursuit of sustainable urban transportation. The panel discussion also served as an opportunity for the study team to obtain guidance on strategic options related to sustainable transportation planning, and the challenges and opportunities associated with these options.

Expert panel participants included:

- Richard Gilbert, Centre for Sustainable Transportation
- Paul Bumstead, Totten Sims Hubicki
- Tom AppaRao, Region of Peel
- Neal Irwin, IBI Group
- Brian Hollingworth, IBI Group
- Geoff Noxon, Noxon Associates
- Alain Paquet, Transport Canada

The results of the expert panel workshop are integrated into the discussions of “practitioner perspectives” in Chapters 2 and 3 of this report.

1.5.4 SYNTHESIS OF OPTIONS

Based on the review of plans, practitioner interviews, expert panel workshop, and the professional experience of the study team, a summary discussion was prepared to outline suggested directions and notable options that could inform guidelines for transportation planning, based on the 12 transportation planning principles listed earlier in this chapter. This “synthesis of options” is presented in Chapter 4 of this report.

2. SUSTAINABLE COMMUNITIES AND TRANSPORTATION SYSTEMS

The six principles addressed in this chapter focus on the pursuit of community sustainability through transportation, and on the pursuit of sustainable transportation itself. They relate to *substantive* issues — that is, those tied to the desired outcomes of a transportation plan.

Exhibit 2.1 provides a high level overview of each plan review and where they were considered to be notable with respect to any of the twelve principles. This is not intended to be a critique of each plan, but rather a guide to those plans that have addressed a principle comprehensively, and with a view to promoting more sustainable transportation. Those plans that are discussed throughout the text are indicated. Others may be notable, but are not discussed for reasons of repetition.

Exhibit 2.1: Summary of Plans Reviewed and Notable Considerations

Principles	Notable Canadian plans										Notable international plans					
	Victoria	Kamloops	Calgary	London	Peterborough	Kingston	Ottawa	Gatineau	Montreal	Halifax	Boulder	Santa Cruz	Portland	Helsinki	Auckland	Melbourne
SUSTAINABLE COMMUNITIES AND TRANSPORTATION SYSTEMS (Chapter 2)																
1. Integration with land use planning	●	●	★			●	★			★		★	●	★	●	●
2. Environmental health			★				★			★			★	★		●
3. Economic development and social objectives			★				★		★	★			★			●
4. Modal sustainability	●		●		★	★	★	★	★		★		●	★		★
5. Transportation demand management	●	●	●	★	★		★	★					★			
6. Transportation supply management	★			★			★						★			
SUSTAINABLE AND EFFECTIVE TRANSPORTATION PLANNING (Chapter 3)																
7. Strategic approach	●	★	★	●	●		★	★		●	●	★		●		★
8. Implementation guidance			★	●	★		★	●	●		●	★	★	★		
9. Financial guidance			★	★		★	★				★		★		★	
10. Performance measurement	★			★			★			●	★	★	●		★	
11. Public involvement			★	★			★					★	●			★
12. Plan maintenance			★	★			★						★			●

★	Notable consideration and discussed in text
●	Notable consideration, not discussed in text.

2.1 Principle 1: Integration with land use planning

2.1.1 SCOPE AND IMPORTANCE

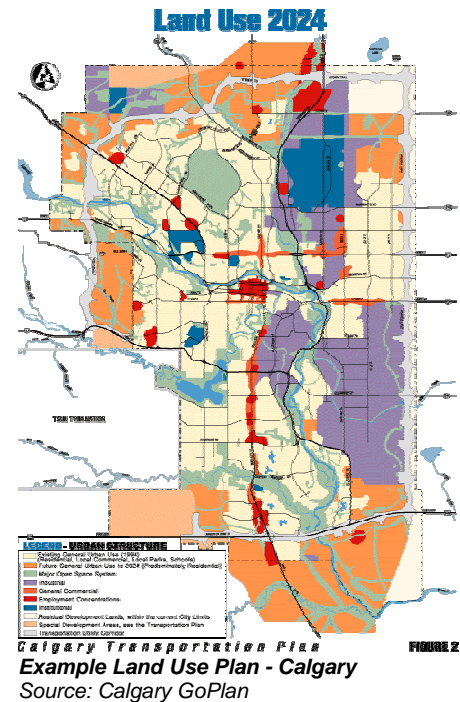
Several key characteristics of urban travel demand (e.g. origin and destination locations, trip lengths, modal choice) are shaped to a great extent by land use patterns and densities. The location and form of development thus play a principal role in determining the opportunity for urban transportation activity to be sustainable. It is equally true that transportation systems influence the form and nature of land development, and for this reason land use and transportation are viewed as having an interdependent and organic relationship.

Proactive and concurrent planning of urban land use and transportation systems can maximize their mutual sustainability. By doing so, transportation systems can be planned to serve land uses that are, in turn, planned to maximize the sustainability of the transportation system. The increasing prevalence of growth management strategies in Canadian urban areas is a result of this idea, in that they strive to manage growth in a way that maximizes overall benefits while minimizing overall costs.

One challenge faced by transportation plans is that land use planning is typically a separate process. It is ideal, though, for the two planning processes to be integrated, consistent and mutually respectful. Land use plans may contain transportation goals, policies and programs; likewise, transportation plans may contain policies to favourably influence the location and form of development. Another challenge with integrating transportation and land use planning is that slow growth rates in many urban areas can limit the potential to materially change the status quo within the time horizons (e.g. 20 years) typically considered in long range plans.

2.1.2 REVIEW OF PRACTICE — CANADIAN PLANS

The extent to which transportation and land use planning are conducted on an integrated basis for an entire urban region often depends directly on the local government structure as well as the mind-set of the planners involved. For example, if there is a single local government and/or planning agency for the entire urban region, an integrated approach is much more likely than for cases where the urban region is made up of several local governments. Similarly, if planning activities are organized so that land use and transportation fall within a single agency or are effectively coordinated at the staff level, an integrated transportation/land use planning approach is considerably more likely than in areas with separate planning agencies for transportation and land use. In the latter case a likely outcome is that the land use planning agency provides a single projection of the distribution of population and jobs throughout the planning area, and the transportation plan treats this as a “given” without the opportunity of demonstrating, as part of the master plan, how the cost and performance of the transportation system can be greatly affected by alternative land use distribution patterns and how, in turn, alternative transportation systems can significantly affect the distribution and density of land use activities into more sustainable and less automobile-dependent growth patterns.



Of the ten Canadian transportation plans reviewed, a majority included notable consideration of the links between land use and transportation, and included general policies and/or specific recommendations to affect land use. Several notable examples include:

- **City of Calgary — GoPlan (1995)**
The plan accepts that there will continue to be growth in suburban areas but includes policies to promote more compact, mixed-use development in new growth areas that is more supportive of transit, walking and cycling. The target density for new suburbs is at least 7 units per acre (17.3 units per hectare).
- **City of Ottawa – Transportation Master Plan (2003)**
The plan summarizes key policies related to the transportation aspects of new development (compact mixed-use design and multimodal facilities) and refers to more comprehensive policies in the City’s Official Plan (completed concurrently). The land use forecasts modelled in the plan were shaped through a process that considered where growth could be allocated to enable the most efficient servicing with transportation, water and wastewater infrastructure.
- **Halifax Regional Municipality – Regional Plan (Draft, 2005)**
The plan was based on a process that initially evaluated all candidate future development sites using a range of criteria including the feasibility and cost of transportation servicing. Then, three alternative growth and transportation servicing concepts were compared using the preferred development sites. This analysis led to a preferred growth pattern and transportation servicing strategy.

In contrast to the above plans, the plans for London and Peterborough are based on land use allocations developed through a separate planning process. Those plans explicitly recognize that unless land use and transportation planning processes are integrated, there is little that can be done through a transportation plan to influence the location of future development.

2.1.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

In terms of integrated transportation and land use planning, international examples were not distinctly different than Canadian examples in that they are largely reactive, as opposed to proactive, in developing transportation systems to serve future land use scenarios. Two notable plans were:

- **City of Santa Cruz – Master Transportation Plan (2000)**
The plan includes land use as a strategic initiative, with the objective of establishing a hierarchy of walkable, mixed-use, transit-oriented village centres. These centres are to include liveable streets and pedestrian-oriented design to enhance transportation choices. The plan thus focuses mostly on the nature and form of development, rather than on the location of new development.
- **Helsinki Metropolitan Area – Transport System Plan PLJ (2002)**
The plan recognizes the links between transportation and land use, and identifies goals including concentrated growth and transit-supportive development forms. It notes that the enhancement of services in local communities can increase opportunities for walking and cycling. The plan also describes population, land use and transport trends in detail and explains their implications for the Helsinki Metro Region.

2.1.4 PRACTITIONER PERSPECTIVES

In the survey of municipal practitioners, as well as the expert panel discussion, the need for more integrated transportation and land use planning was generally seen as a desirable objective. There are multiple levels at which this integration can occur, and practitioner input was specific to each level.

At the level of overall growth management, the need to consider the transportation implications of the locations of future growth was clearly recognized. This could be done outside the context of a transportation planning process *per se* (e.g. by including transportation criteria in the analysis of growth options), or within a transportation planning process that is being conducted concurrently with the land use planning portion of a growth management strategy. Practitioners did recognize that many transportation plans, particularly in smaller centres, are necessarily based on future land use projections that are developed without significant transportation consideration.

Practitioners also recognized that transportation plans can effectively promote sustainable transportation by emphasizing the need for supportive development forms (rather than locations), specifically in encouraging development and urban design to be supportive of walking, cycling and transit.

Several notable examples were raised by practitioners:

- One practitioner noted that a growth management analysis that considered the transportation and air quality impacts of growth alternatives proved to be highly beneficial because it led to extensive media and public involvement, and effectively stimulated a dialogue on transportation and land use issues.
- Another practitioner noted that the modelling exercise conducted for a transportation plan actually contributed directly to the community's decision to strengthen development in the area's town centres in support of higher-order transit services.
- Another practitioner reported that the transportation servicing requirements were very influential in shaping the location of future development plans. However, in planning the forms of development within a given growth pattern transportation considerations were secondary to issues such as community style and quality of life.
- Another practitioner in a rapidly growing area expressed regret that in developing a transportation plan they did not adopt a more strategic approach to studying the infrastructure implications of the proposed growth pattern, and to addressing the effective integration of land uses with the transportation facilities that serve them. The practitioner also acknowledged that even if transportation and land use planning processes are separated, the transportation plan can reinforce the fact that follow-through on supportive land use policies can be essential to the successful achievement of transportation objectives.

2.2 *Principle 2: Environmental health*

2.2.1 SCOPE AND IMPORTANCE

The construction and operation of transportation systems consume huge amounts of natural resources such as fossil fuels, aggregates, metals, rubber and greenspace. They also produce emissions of a wide range of pollutants that contaminate our air, water and land, as well as greenhouse gases that are affecting the earth's climate.



Factors such as this make environmental health a primary consideration in the pursuit of more sustainable transportation. Another contributing factor is the close linkage between environmental health and public health. In addition to issues such as obesity, which are discussed in the next section, there is a direct link between polluted air, water and soil caused by transportation activities and demands on our health care systems. Through planning for a more sustainable environment, we can help to create transportation systems that consume fewer natural resources and lead to less pollution, and in turn to better health.

2.2.2 REVIEW OF PRACTICE — CANADIAN PLANS

Most transportation plans consider environmental issues at the project level (where specific projects are detailed), but do not meaningfully consider environmental issues at the regional, national or global level. For example, none of the 10 Canadian plans reviewed in this study considered targets related to greenhouse gas emissions or transportation energy use. Although many recognized the need to reduce single-occupant vehicle travel, the primary rationale was for reasons related to transportation system capacity rather than environmental impacts. This same deficiency was identified in the recent TAC Urban Indicators Survey where only two of 27 urban areas surveyed indicated that they had established formal targets for reducing greenhouse gas emissions and/or energy use. One reason for this is the current lack of formal requirements for municipalities to contribute to Canada's national commitment to reducing greenhouse gas emissions, despite the fact that urban transportation alone contributes to approximately 10% of Canada's total GHG emissions.

Notable examples where transportation plans have been shaped to recognize or respond to environmental issues include:

- **City of Calgary — GoPlan (1995)**
The plan's main approach to environmental health is an overall principle of minimizing the number of new river crossings, and of mitigating the negative impacts of any new crossings on communities, natural areas and parks.
- **City of Ottawa — Transportation Master Plan (2003)**
The TMP recognizes the links among transportation, the environment and quality of life. A chapter on environment protection addresses the impact of transportation on air quality, climate change, water quality, vegetation, land consumption and noise. It calls for a future air quality and climate change plan to identify effective transportation measures and a leadership role in reducing greenhouse gases from City work travel and fleets. It also recommends public education and involvement, the application of best practices to

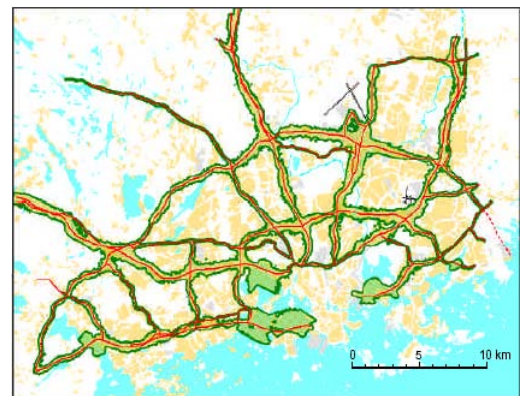
mitigate environmental effects, and the greening of transportation facility designs. It includes several noise-related policies, including the direction to minimize noise impacts through design and landscaping rather than through the use of noise attenuation barriers, whenever possible.

- **Halifax Regional Municipality – Regional Plan (Draft, 2005)**

The growth strategy recognizes the importance of the integration of environmental preservation and conservation, land use planning and transportation planning. It states that, “These three areas are so interdependent that it is not possible to look at one in isolation of the other two.” The Environment chapter includes a section on emissions reduction, noting that long-term solutions to air pollution will depend on land use and transportation decisions. It points out the benefits of compact development, active transportation, transit, renewable and lower-carbon fuels. It also identifies greenhouse gases, ozone and particulates as a focus for action, and calls for the development of an emissions reduction plan.

2.2.3 REVIEW OF PRACTICE – INTERNATIONAL PLANS

International plans reviewed also appear to focus on environmental issues at the local or project level and deal with broader environmental issues such as climate change at a policy level as opposed to identifying specific mitigation measures. For example, Portland’s Regional Transportation Plan includes regional policies for several aspects of transportation including protecting the environment and designing the transportation system appropriately, e.g. “protect and enhance the air quality so that as growth occurs, human health and visibility of the Cascades and the Coast Range from within the Region is maintained”.



Example Noise Map from Helsinki Metropolitan Area Transport System plan

One environmental issue that is not dealt with in detail in any Canadian plans, but is considered in International plans is the impact of noise on public health. In particular, the Helsinki Area Transport System plan states that “the construction of noise barriers is the last resort of noise abatement efforts, in which conditions that have been created earlier are corrected. In planning housing areas and land use, good solutions have to be found, using all means available, to reduce existing noise problems and to avoid the creation of new ones”.

A major distinction between the transportation planning in Canada and the US with respect to environmental health is that Metropolitan Planning Areas (MPOs) are governed by the Clean Air Act (CAA) of 1990, which identifies the actions that they must take to reduce emissions from on-road mobile sources. The act requires that transportation and air quality planning be integrated in areas designated by the U.S. Environmental Protection Agency (EPA). In fact, in nonattainment and maintenance areas (i.e. those that don’t meet established standards for air quality), federal funding and approval for transportation projects is only available if transportation activities are consistent with air quality goals. (FHWA, 2004)

2.2.4 PRACTITIONER PERSPECTIVES

During the expert panel discussion, the issue of environmental health was discussed in the context of energy use and the need to conserve fuel. Energy use was stated as an emerging and important issue to be addressed by transportation plans. Otherwise, practitioners confirmed that environmental health issues were largely confined to very local and project-specific issues, and they expressed no strong views on whether or not this was appropriate.

2.3 *Principle 3: Economic and social objectives*

2.3.1 SCOPE AND IMPORTANCE

Urban transportation has a wide range of social impacts, both positive and negative. These include effects on access to employment opportunities, neighbourhood cohesion and liveability, the ease and costs of doing business, personal injury and death, and other elements that help determine the quality of life in Canada's cities. These are issues of vital societal importance, and transportation plans can provide an opportunity to integrate and support community objectives such as those related to economic development, social equity and public safety. Integration may extend from the level of vision (e.g. by making road safety a key transportation goal) to the level of action (e.g. by alleviating congestion in key freight corridors).

Our society is also just starting to realize the link between transportation systems and public health, both in terms of obesity caused by a lack of physical activity as well as the effects of air pollution on hospital admissions and death rates. Public health is affected by a multitude of contributing factors, but should not be overlooked by transportation plans.



2.3.2 REVIEW OF PRACTICE — CANADIAN PLANS

One common way that master plans address economic and social objectives, either explicitly or indirectly, is through the promotion of modal choice. Many plans recognize that individuals may not have access to private automobiles, due to financial or physical limitations, and that it is socially and economically desirable for transportation systems to provide options for all members of society.

Of the Canadian plans reviewed, four addressed economic or social issues in a notable fashion:

- **City of Calgary — GoPlan (1995)**
The plan includes a section on social issues, which focuses primarily on providing mobility choices for persons who are not mobility-independent.
- **City of Ottawa — Transportation Master Plan (2003)**
The plan includes a section on improving transit service for customers with disabilities; a section on road safety that sets out relevant objectives, policies and programs; and a section on goods movement.

- **Halifax Regional Municipality – Regional Plan (Draft, 2005)**
The growth strategy's section on economic development includes a discussion of the transportation infrastructure needs of Halifax Harbour, and of the need to improving rail and rail/truck infrastructure including how to address rail within a new proposed regional governance structure for transportation.
- **City of Montréal — Greater Montréal Area Transportation Management Plan (2000)**
The plan is one of the few to feature freight prominently, stating that the ability to more efficiently rely on transportation as an economic development tool will have positive repercussions on businesses and employment not only in the Greater Montréal area but also throughout Québec.

Transportation plans were found to commonly address economic development by preserving an adequate level of service on the roadway network, thereby minimizing the costs of congestion to the business sector and society in general. It is interesting to note that there is a strategic tension between this objective and the often concurrent objective of shifting travel demand away from the automobile, although this tension (while tangible and important) is rarely explored to any degree.

For smaller municipalities the consideration of economic issues in transportation master plans tends to revolve around the viability of commercial districts. For example, Peterborough's plan considered changing a one-way street system back to two-way operation as a means of improving visibility for downtown businesses.

2.3.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

Like Canadian plans, most of the international plans reviewed include some acknowledgement of economic and social objectives in overall policy statements. There was one notable example of a plan that comprehensively considers economic and social objectives:

- **Portland Metro Area – Regional Transportation Plan (2000)**
The plan calls for barrier-free transportation and providing access to more and better transportation choices for travel throughout the Region and serve special access needs for all people, including youth, elderly and disabled (and economically disadvantaged). It calls for improving the safety of the transportation system through policies such as encouraging bicyclists, motorists and pedestrians to share the road safely and anticipating and addressing system deficiencies that threaten the safety of the travelling public. It also includes a number of policies for the regional freight system.

2.3.4 PRACTITIONER PERSPECTIVES

Practitioners expressed a variety of perspectives on economic and social issues. There was a general acceptance that transportation plans should acknowledge social issues, in particular the need to provide transportation options for all members of society. There was also acknowledgement that the link between transportation systems and economic development is indirect, and that economic growth is influenced by a number of factors.



One practitioner noted that freight mobility is naturally at tension with community quality of life (e.g. due to noise and emissions) and as a result there will inevitably be a requirement to make trade-offs. The need for trade-offs should be acknowledged early on at the level of principle, but will have to be explicitly resolved during planning at the project/corridor level.

2.4 *Principle 4: Modal sustainability*

2.4.1 SCOPE AND IMPORTANCE

At the heart of urban transportation plans is typically a set of policies, programs and projects that define how various transportation modes will be developed to support the plan's overall goals.

Some modes (e.g., walking, cycling and public transit) are usually positioned as fundamentally more sustainable than automobile travel, and the general objective with regard to these modes is to promote their use to help moderate the growth of automobile use. While automobile travel is usually recognized as less sustainable, plans may identify opportunities to make it more sustainable in a relative sense (e.g., through carpooling, vehicle and information technologies, or parking management). Similarly, in the realm of goods movement, plans usually treat rail and marine modes as more sustainable alternatives to trucking, but they may also identify opportunities to make trucking more sustainable. Still other "modes" (e.g. telecommuting) are actually not means of travel, but rather substitutes for it. Finally, intercity travel modes (e.g. air, rail, bus) typically lie outside the jurisdiction of municipal authorities, but the sustainability of the interfaces between them and urban passenger modes can be considered.

2.4.2 REVIEW OF PRACTICE — CANADIAN PLANS

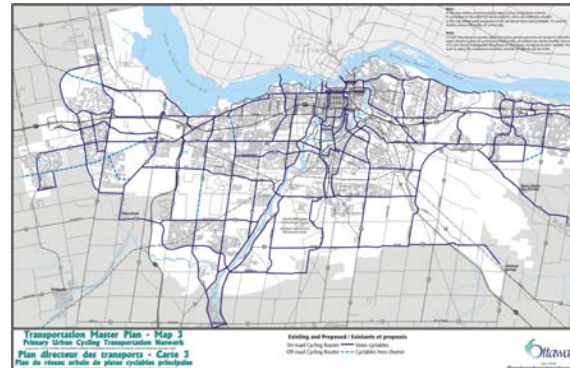
There does not seem to be a consistent manner in which sustainable passenger transportation modes (e.g. transit, cycling, walking) or the sustainability of road transport (both passenger and freight) are considered in transportation master plans. All Canadian plans reviewed were found to address most of these issues at least at the level of general policy, while some went into much greater detail for one or more modes regarding operational policies, facility guidelines and standards, or network identification. A few plans called for subsequent planning exercises to develop detailed mode-specific plans (e.g. transit service plans, cycling plans, goods movement strategies). Others set specific quantitative objectives for the future share of travel to be carried by sustainable modes (typically including transit but sometimes cycling, walking or ridesharing as well).

Some notable examples of how different plans address modal sustainability are:

- **City of Kingston – Kingston Transportation Master Plan (2004)**
The plan includes a detailed transit service strategy, and integrates the results of a concurrent cycling and pathways study. For walking, the plan calls for minimum sidewalk provision and other linkages especially to transit routes, as well as the creation of pedestrian facility design guidelines, ten-year network targets and a rolling five-year implementation plan. A similar approach is taken for cycling.
- **City of Peterborough – Peterborough Comprehensive Transportation Plan (2002)**
The plan includes a thorough transit service strategy, pedestrian-supportive planning and design guidelines, as well as a recommended system of bikeways. Policy recommendations are also made for truck route management and planning, neighbourhood traffic management, and parking management. The Peterborough plan is notable because TMPs for smaller urban areas usually focus on the road network only.

- **City of Ottawa – Transportation Master Plan (2003)**

The TMP includes a range of pedestrian- and cycling-supportive policies and calls for the subsequent completion of comprehensive pedestrian and cycling plans. It also includes a detailed transit plan including supportive policies, strategies for various service components, expanded transit priority and rapid transit networks, fleet expansion needs, and initiatives to improve passenger safety and security. The plan includes a chapter on ridesharing that outlines opportunities for future facilities and issues to be considered in subsequent planning. It also encourages telecommuting and the shifting of freight from road to rail. Finally, the plan also aims to make automobile use more sustainable through transportation system management strategies to combat congestion and inform drivers of operating conditions.



Ottawa Transportation Master Plan: Urban Cycling Network.

- **City of Montréal — Greater Montréal Area Transportation Management Plan (2000)**

The plan provides a list of priority initiatives aimed at making mass transit more widely available, including a new metro line and upgrading/expansion of commuter rail lines. It is interesting that one of the justifications used for these improvements is that a reduction in the number of commuters travelling by car will enhance traffic flows on the road network, which is needed for the transportation of goods. Few plans place this level of emphasis on freight movement.

- **Communauté régionale de l'Outaouais (now City of Gatineau, Que.) — Plan intégré (1994)**

The plan includes specific “interventions” for non-motorized travel including walking and cycling. Specifically, it recommends that when any new regional road project is introduced, it be considered as a multimodal corridor which accommodates automobiles, trucks, public transit, bicycles and pedestrians. The plan also places a high emphasis on reserved bus lanes for high occupancy vehicles.

2.4.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

The most notable examples of international plans that promote modal sustainability are:

- **City of Boulder – Transportation Master Plan (2003)**

The plan’s goals include the provision of an integrated, multimodal transportation system, and emphasize the role of walking as a primary mode of travel. One of the plan’s four “focus areas” is multimodal corridors, which are major transportation facilities that accommodate automobile, bus, bike and pedestrian travel. Walking, cycling, transit and automobile arrangements, improvements and investments are described for each multimodal corridor. It is interesting to note that Boulder has made solid progress towards a more sustainable transportation system (see Section 3.4 of this report).

- **Helsinki Metropolitan Area – Transport System Plan PLJ (2002)**

The plan addresses policies and specific initiatives for transit, walking, cycling and goods movement/logistics.

- **Melbourne, State of Victoria – Melbourne 2030**

The plan sets out eight transportation policies in support of the regional vision, including coordinated development of all transport modes, emphasis on improved public transport, more priority to cycling and walking, and promoting the use of sustainable travel options. Initiatives for better co-management of passenger and freight movement on roadways are highlighted along with more aggressive development of walking and cycling infrastructure and improved application of intelligent transportation systems technologies to improve the efficiency of road operations.

2.4.4 PRACTITIONER PERSPECTIVES

Practitioners agreed that transportation plans should do more to facilitate travel by modes other than the automobile, given that they generally do well in terms of policy but are less successful in leading to action.

Practitioners in two cities that have yet to address sustainable transportation modes in their long-range plans stated that one of the reasons is the general public's focus on vehicle access issues and lack of concern about transit, walking and cycling facilities. This public perspective directly influences the priorities of elected officials, who may tend to favour spending on road improvements over options such as better transit service.

Another challenge noted by practitioners is that many plans make less specific recommendations for facilities and services to support sustainable modes, than they do for roads. This results in a tendency to let such projects slip over time, even though at the policy level they may be of at least equal importance to roads.

One practitioner noted that a key advantage in addressing all modes comprehensively in a plan is that it ensures the compatibility of recommendations for each mode. For example, it could be problematic for a cycling plan to recommend bike lanes in a constrained corridor while a separate transit plan recommends dedicated transit lanes. The inclusion of all modes in the TMP offers a single "transportation policy portal" that can resolve such conflicts in a considered and consistent manner.

A final recommendation from one practitioner was to ensure that all staff and stakeholders who are responsible for implementing recommendations for sustainable modes be made aware of their role and its importance in supporting the plan's overall objectives. This includes simple actions such as ensuring properly designed and located signs and pavement markings for cyclists.

2.5 *Principle 5: Transportation demand management*

2.5.1 SCOPE AND IMPORTANCE

Through much of the twentieth century's latter half, Canadian urban transportation plans were preoccupied with providing new supply to serve increases in population and automobile usage. But growing through the 1980s and 1990s was a potent combination of environmental awareness, public resistance to road expansion, and fiscal constraints. This change signalled a new era in transportation system management, and a realization of the need to manage transportation demand as well as provide supply.

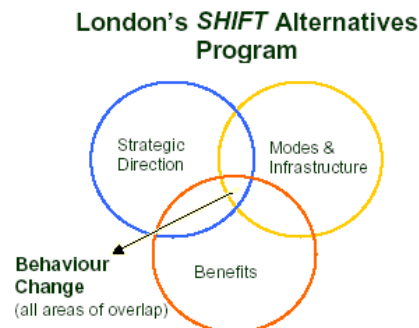
Transportation demand management (TDM) strategies influence whether, why, when, where and how people choose to travel. While TDM is very much a developing discipline in Canadian urban areas, from a planning perspective it is a crucial concept. At its broadest, TDM encompasses the need to reform land use as a critical factor affecting trip lengths and modal choice. It also encompasses transportation pricing, marketing, public education and awareness, innovative services and partnerships.

2.5.2 REVIEW OF PRACTICE — CANADIAN PLANS

Canadian transportation plans consistently recognize the importance of TDM in reducing the need for new road infrastructure. However, they vary in their consideration of a detailed TDM strategy, and in the degree of success they expect TDM to have. Some plans place a high degree of functional reliance on TDM, whereas others see it as contributing more toward social or environmental objectives. Some notable examples are:

- **City of London – London Transportation Master Plan (2004)**

The TMP introduces a new management approach for TDM called “Solutions to Help Individuals Find Transportation” or the SHIFT Alternatives Program. This includes initiatives to improve infrastructure for transit and non-motorized transportation (walking, cycling) and encourage use of these modes. The main TDM emphasis related to automobile use is a parking management program, parking rates and “TDM-friendly” parking lots to encourage spreading of automobile traffic peaks and increased automobile occupancy. It recommends encouraging travel behaviour changes through partnerships with local organizations (under an Environmental Awareness, Education and Community Partnerships Program), use of City and transit websites to circulate information, and assigning a large percentage of TDM resources to developing and disseminating public information.



- **City of Peterborough – Peterborough Comprehensive Transportation Plan (2002)**

The Comprehensive Plan includes assessment of possible TDM application in the city based on: market-based TDM (e.g. road pricing, other automobile user fees); behaviour-based TDM (e.g. facility design/operation and regulatory changes); land use-based TDM (e.g. more compact, mixed-use centres corridors to encourage greater use of transit, walking and cycling). Targets for TDM include reducing automobile driver/passenger from 86% to 82% of total travel, increasing transit from 5% to 6%, and increasing walking and cycling from 7% to 9%.

- **City of Ottawa – Transportation Master Plan (2003)**

The TMP calls for a comprehensive TDM strategy, leadership by example for staff commutes and business travel, links to health/recreation/environmental programs, outreach and education, TDM supportive site design, commuter options programs, school programs, efforts with community groups, and efforts with the festival/tourism sector. The TDM program also includes calls for land use and transportation to mutually support each other through nodal development urban design, neighbourhood plans, walking/cycling/transit/road provision, and parking controls.

- **Communauté régionale de l'Outaouais (now City of Gatineau, Que.) — Plan intégré (1994)**

The plan provides a detailed outline of potential TDM measures including ridesharing programs, reserved lanes for HOVs, park and ride facilities, public transit use incentives, parking management programs, road pricing, telecommuting options, preferential measures promoting public transit, variable work schedules and intelligent vehicle highway systems. It goes beyond the norm to provide specific recommended actions related to each of the TDM measures. It is noted that a public opinion poll showed an unfavourable response to TDM measures having a monetary impact and a favourable response to incentive measures, and this appears to have impacted the selection of potential measures.

2.5.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

TDM is considered in all international plans reviewed, but to varying degrees. One plan was notable in its aggressive consideration of TDM, albeit mostly at a policy level:

- **Portland Metro Area – Regional Transportation Plan (2000)**

The plan positions TDM as a way to enhance mobility and support the use of alternative transportation modes by improving regional accessibility to public transportation, car pooling, telecommuting, bicycling and walking. It includes a regional parking management policy to optimize the efficient use of public and commercial parking in the central city, regional centres, town centres, main streets and employment centres. It also establishes a peak period pricing policy concerning the use of automobile user fees to manage and optimize the use of highways in the region to reduce congestion, improve mobility and maintain accessibility within limited financial resources.

2.5.4 PRACTITIONER PERSPECTIVES

Practitioners expressed great support for the inclusion of TDM in transportation plans. They identified several plans that call for, or have led to, the establishment of a TDM coordinator position (e.g. Kelowna, Waterloo, Durham). However, they cautioned that creating a staff position for TDM will not result in measurable progress — rather, a program of specific actions with resource requirements and timelines is needed, along with the clear identification of all stakeholder roles.

One practitioner noted in his city the idea of TDM was sold on the basis that it was similar to other conservation initiatives already in place (e.g. waste reduction and water conservation).

One practitioner cautioned that TDM is a challenging and newly emerging field, and that it should be positioned as a complement to basic services such as transit, rather than as a replacement. TDM efforts offer long-term returns, and should not be promoted as a “silver bullet” for transportation challenges.

In some of the smaller cities interviewed, it was noted that TDM can be a “hard sell” to the public because cars simply provide a higher level of service than the available options for most people.

2.6 Principle 6: Transportation supply management

2.6.1 SCOPE AND IMPORTANCE

Just as TDM has gained prominence as a means of shaping demand to meet available or prospective supply, various other strategies have grown in importance as ways of making the most of existing facilities and resources. The notion of supply management includes disciplines such as asset management (i.e. optimizing the cost and useful life of physical assets like roads, bridges, transit fleets and related facilities), congestion management, incident management, and traffic signal management.



At the heart of supply management strategies is the realization that building infrastructure is just the first step toward a successful transportation system. Once built, facilities must be maintained and renewed, optimized for financial efficiency and effective service, and adjusted in response to changing demands.

2.6.2 REVIEW OF PRACTICE — CANADIAN PLANS

Most Canadian plans implicitly addressed supply management by proposing to first optimize the operation of the road network before considering expansion. However, three plans are notable for their explicit acknowledgement of the various ways this could be done.

- **Capital Regional District (Victoria) – TravelChoices**
The plan includes a roadway investment management program which seeks to maximize multimodal mobility within the existing roadway system. It calls for corridor management, land use changes and so on to optimize mobility in primary corridors, an incident management plan, possible parking information systems, signal systems management, route restrictions, congestion management, maintenance policies to ensure cost/effective treatment of priority modes in primary corridors and limiting road improvements to areas where growth has most affected accessibility/safety. Priority modes (e.g. transit as well as autos and trucks) are to be addressed in road design which will also preserve walking and cycling access in the face of roadway changes.
- **City of Ottawa – Transportation Master Plan (2003)**
The plan proposes actions to make best use of existing facilities and reduce costs, calls for the specification of new infrastructure/services to provide adequate capacity and service levels, and attempts to maximize infrastructure efficiency through an intelligent transportation systems strategy that focuses on enforcement, incident/congestion management, signal optimization, and traveller information. An asset management and maintenance component calls for maintenance investments to be given priority over new infrastructure spending, and for the application of life-cycle costing through the consideration of maintenance and rehabilitation costs as well as construction costs in infrastructure planning and design processes.
- **City of London – London Transportation Master Plan (2004)**
The plan includes a policy on arterial roadway capacity optimization, which calls for the achievement of a 5% average increase in arterial network capacity by 2024 through access management techniques, and improved signal operations and coordination.

2.6.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

Surprisingly, the concept of supply management was not generally addressed in the international plans reviewed. This may be due to the fact that supply management is already entrenched in the planning practices of communities like Auckland and Helsinki. There are also significant philosophical differences between Canada and the United States, where road expansion is more commonly seen as the appropriate reaction to congestion. The only international plan that notably addressed supply management was:

- **Portland Metro Area – Regional Transportation Plan (2000)**

The plan's policy on regional transportation system management calls for the use of TSM techniques to optimize performance of the region's transportation systems, including strategic corridor segments between major centres, using techniques such as intelligent transportation systems, advanced transit management systems, and access management practices. The plan addresses asset management through a policy on transportation system maintenance and preservation, which emphasizes the maintenance, preservation and effective use of transportation infrastructure in the selection of projects and programs for inclusion in the plan.

2.6.4 PRACTITIONER PERSPECTIVES

Practitioners confirmed that transportation plans are generally challenged to provide sufficient infrastructure to satisfy all future transportation demand at traditional levels of service — therefore, they must apply transportation management principles. In some communities, this is done by reducing the minimum acceptable level of service for roadway operation (i.e. accepting increased levels of congestion) before road expansion is considered. Other communities are having to increasingly rely on supply management options to improve service because low rates of growth generate insufficient funds to expand the transportation system in conventional ways (i.e. new or wider roads).

3. SUSTAINABLE AND EFFECTIVE TRANSPORTATION PLANNING

The six principles addressed in this chapter focus on ways to make sustainable transportation planning processes and documents more robust and effective (where “robust” describes a plan’s ability to retain its authority and relevance over time).

Exhibit 2.1 shown previously indicates plans reviewed that were considered notable and those that are discussed in the sections below.

3.1 *Principle 7: Strategic approach*

3.1.1 SCOPE AND IMPORTANCE

While the basic notion of sustainability is relatively simple, the concept of sustainable transportation is not. In all likelihood, urban transportation systems will never be truly sustainable — but they can be *more sustainable* than what is currently considered acceptable, and they have a real role in improving *community sustainability* as a whole.

Sustainable transportation is a complex, multi-faceted goal that requires a wide range of actions. The establishment of a strategic framework for planning can be helpful for two key reasons: (1) to guide planners in moving from vision to action; and (2) to help decision-makers and the public understand the rationale and linkages behind specific recommendations. A strategic framework might include elements such as a **vision** that describes a desired future state, **principles** to guide actions or decisions, thematic or qualitative **goals**, and more specific or even quantitative **objectives**. The most appropriate form and content of such a framework will vary from one place and time to another, but an effective framework would be comprehensive in scope, traceable in linking a hierarchy of elements, and articulate in expressing meaningful outcomes.



Another important aspect of strategic planning relates to the identification of a vision or desired future state. Planners can do more than “predict and provide” — they can apply tools to manage demand and supply to actively shape future conditions, rather than simply respond to them. A typical manifestation of this approach is the establishment of quantitative objectives to guide actions — which also ties into the idea of a strategic framework, as discussed in the preceding paragraph.

3.1.2 REVIEW OF PRACTICE — CANADIAN PLANS

Virtually all Canadian plans reviewed contain some combination of a vision, goals, objectives or principles. Differences between plans relate to the degree to which the vision, goals, etc. are detailed and manifested throughout the plan and into the recommendations. While not all visions refer directly to sustainable transportation, most are based on the concept that changes are required to bring urban transportation systems into balance with social, economic and environmental needs.

Similarly, most plans were based on the strategic analysis of alternative future scenarios (i.e. different land use patterns, transportation networks, or both). Most plans also set some quantitative

objectives, although the number of objectives and degree of ambition they reflect varied considerably from one plan to another.

While most plans were notable in some way, the five plans that perhaps best represent a variety of strategic strengths are:

- **City of Kamloops – Travelsmart Project (1999)**
The plan's introduction stresses the importance of studying alternative future land use/transportation scenarios in a strategic fashion, adopting a more proactive approach than the former "predict-and-provide" approach. Six alternative land use scenarios were considered (each assigning different levels of growth to different sectors) and the degree to which each minimized roadway requirements was evaluated. Differences in travel behaviour other than trip distribution and assignment were not considered; that is, trip generation and modal choice changes possibly arising from different land use and transportation scenarios were not considered. The plan is based on seven guiding principles that highlight the need to meet social and environmental objectives, implement TDM, integrate land use and transportation planning, and improve cost effectiveness. The plan also sets the quantitative objective of reducing per-capita automobile trips in the afternoon peak hour by 5%.
- **City of Calgary — GoPlan (1995)**
The plan developed and assessed five scenarios with varied emphasis on autos or transit, including "base case," "compact" and "dispersed" land use scenarios. The plan does not discuss the evaluation of these scenarios, but seems to adopt a balance by emphasizing both transit and road networks. The plan is based on a comprehensive strategic framework comprised of a vision, goals and principles. It also sets the quantitative objective of achieving a 50% transit mode split for downtown trips by 2024.
- **City of Ottawa – Transportation Master Plan (2003)**
The plan is based on serving future travel demands arising from a land use scenario that took into account the ability to service growth cost-effectively. A primary goal of maximizing transit usage led to the objective of a 30% city-wide transit mode split in the afternoon peak hour, and corresponding transit mode splits for major corridors and trip types. Other targets set in the plan include a 10% walking modal share, a 3% cycling modal share, a 30% reduction in fatalities and injuries due to road traffic collisions by 2010, and a peak hour average automobile occupancy of 1.3 persons/vehicle. The plan is based on a comprehensive transportation vision with nine elements and 26 principles to guide future decision-making.
- **City of Peterborough – Peterborough Comprehensive Transportation Plan (2002)**
The plan is based on the strategic evaluation of six alternative transportation networks. Five of these were generally roads-oriented, but one stressed transit as a transportation demand management (TDM) solution and tested an increase in the daily transit mode share from 5% to 6%. The plan was also founded on a set of four transportation planning principles that addressed mobility, environmental, economic and affordability considerations.
- **Communauté régionale de l'Outaouais (now City of Gatineau, Que.) — Plan intégré (1994)**
The plan makes a strong point that it is a new approach to transportation planning in that it presents an integrated approach to various modes of transportation, including non-motorized modes, as well as taking into account the reciprocal and closely related effects of land use in the Communauté urbaine de l'Outaouais (CUO). This is all the more significant since the plan was undertaken by STO, the regional transit operator.

As mentioned previously, in Ontario, transportation master plans often follow the Environmental Process, which recommends that alternative solutions to a transportation problem be examined. Many transportation plans in Ontario consider alternative solutions such as a road-focused option, transit focus option and demand management focused option.

3.1.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

International plans that were found to be notable in their strategic approach included:

- **City of Santa Cruz – Master Transportation Plan (2000)**
The plan is based on a vision developed through extensive community consultation, and on a supporting set of 16 “sustainability principles” that provide guidance on how the city can become a global model for sustainable transportation. While the plan reflects a proactively selected preferred future, there is no indication that alternative future scenarios were systematically identified and evaluated.

- **Melbourne, State of Victoria – Melbourne 2030**
The plan is highly strategic and well organized, setting out nine “key directions,” of which one is focused on transportation and is broken into eight “policies” that more closely represent vision elements or goals. The plan does not explicitly discuss alternative future scenarios, but describes the implications of current population and development growth trends and how the plan seeks to manage them from a sustainability perspective.

3.1.4 PRACTITIONER PERSPECTIVES

There was some variance in practitioner perspectives on the value and effectiveness of strategic alternatives or vision statements in the development of transportation plans. However, there was some consensus on the fact that if goals and objectives for sustainable transportation are identified at the start of a plan, they should be carried through in a traceable manner and linked to specific actions and outcomes. Similarly, if a strategic option (e.g. a transit-focused option) is identified, specific infrastructure recommendations should be consistent with it. It was noted that even some plans that target large increases in transit usage end up emphasizing the need for road projects.

Some practitioners felt that there were significant benefits to setting goals and targets, provided they are realistic. For example, one felt that setting quantitative targets was helpful from a political perspective, as it represented a tangible expression of the plan’s goals and reinforced the need to do things differently. Another felt that setting transportation targets invites controversy, since some stakeholders will see them as too aggressive and others will see them as too weak to promote sustainable transportation (interestingly, some practitioners apparently view this situation as confirmation that targets have been set appropriately).

One practitioner questioned the need to adopt arbitrary targets for transportation. Instead, a plan that focuses on general priorities and policies (e.g. no road expansion inside fully developed urban areas) rather than quantitative targets (e.g. a specific transit modal share) may be more likely to stay relevant over time.

Practitioners in other cities that have not elected to take a more strategic approach towards pursuing more sustainable transportation noted that one of the reasons is that there is a need for an overall change in the public mindset to occur first. Presently, transportation is viewed by most as a commodity to be consumed at will. In these cases, one of the elements that is inhibiting the need for change is the lack of severe system pressures (e.g. congestion) that would normally lead a community to consider more sustainable alternatives.

3.2 *Principle 8*: Implementation guidance

3.2.1 SCOPE AND IMPORTANCE

Transportation planning documents that consist mainly of a strategic framework (e.g., vision, guiding principles, goals and objectives) can serve an important purpose, but ultimately do not provide sufficient guidance to enable the development of more sustainable transportation systems. At some point, effective transportation planning processes provide support to the strategic framework by stating what needs to be done to move toward the vision and related objectives.

This implementation guidance can include policies to guide future decisions, or recommendations to conduct programs, projects or other initiatives. It may identify needed facilities and services, where they should go, when they should be implemented, who is responsible for them, and what the outcomes should be. Without this guidance, stakeholders can only guess at the actions required of them, leading inevitably to *ad hoc* and arbitrary decision-making.

3.2.2 REVIEW OF PRACTICE — CANADIAN PLANS

In many cases, transportation master plans provide a listing of recommended projects and their timelines. Where such a list is provided, it always includes road projects, but may or may not include specific recommendations for other modes. Notable examples of how Canadian plans have provided implementation guidance are discussed below.

- **City of Calgary — GoPlan (1995)**

One of the plan's three main sections addresses implementation and monitoring, and identifies the need for follow-up subordinate planning relating to both smaller geographic areas and shorter time frames (e.g. area plans, community traffic studies, City budgets). The plan does not appear to attach timing to specific projects, and directs that construction priorities for transit and road networks are to be governed by a separate works program that is updated annually.

- **City of Peterborough – Peterborough Comprehensive Transportation Plan (2002)**

A recommended implementation program includes Official Plan amendments to reflect plan recommendations, and a short-term action plan that addresses TDM, pedestrian planning, cycling planning, public transit, the roadway network, truck route management, neighbourhood traffic management, parking management and regional roadway connectivity.

- **City of Ottawa – Transportation Master Plan (2003)**

The plan's chapter on implementation and monitoring notes that the plan's implementation process includes securing funds, monitoring, updating, and "trickling up" of solutions from corridor or area plans. The capital works plan calls for improvements to be made based on need as determined through ongoing monitoring and determination of the City's ability to pay, reflected in the annual budget process. A phasing plan identifies all recommended capital projects by mode (walking/cycling, transit priority, light rail, bus rapid transit, roads) for each of three population thresholds (corresponding to time horizons of roughly 5, 10 and 18 years). Desired outcomes are not specified, but an annex to the plan describes the rationale for each project (e.g. access to what land use, linking of which nodes, improvements to transit travel times or roadway level of service).

3.2.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

Notable approaches to implementation from the international examples include:

- **City of Santa Cruz – Master Transportation Plan (2000)**
The plan does not include a detailed implementation program, but does specify seven criteria for identifying future implementation projects: alignment with vision; cost; cost-effectiveness (i.e. cost per person-trip-mile); ease of implementation; feasibility (i.e. economic, political, physical, etc.); marketability; and innovation. The plan includes recommendations for specific short-term and long-term initiatives and programs tied to the plan's vision and principles. The plan also articulates five major components of successful implementation: (1) monitoring, review and reporting; (2) education campaign; (3) personal and community commitment to positive change; (4) strong local and regional partnerships; and (5) community imagination and engagement.
- **Portland Metro Area – Regional Transportation Plan (2000)**
The plan's chapter on implementation describes the steps necessary to implement the plan including: compliance with federal, state and regional planning requirements; implementation of the plan through local municipal plans; a process for updating and amending the plan; a process for completing refinement plans and locations where refinement plans must be completed; and outstanding issues that must be considered in future updates. In addition, specific proposed transportation projects and programs are described in detail in an appendix to the plan.
- **Helsinki Metropolitan Area – Transport System Plan PLJ (2002)**
The implementation program is presented in two sections. Section 17, Development Program, identifies specific policy actions and objectives and links them back to goals articulated in Section 5. Annex 1, Transportation Policy Measures and Road and Rail Projects of PLJ 2002, lays out the costs and phasing over time for specific initiatives in the development program.

3.2.4 PRACTITIONER PERSPECTIVES

One theme consistently expressed by practitioners is that current funding levels are barely sufficient to cover basic needs let alone major expansions. This is a major challenge facing the development of an implementation program.

Several practitioners suggested that it is preferable to provide less (rather than more) detail on the recommended timing of specific projects in the implementation plan, in order to build buy-in to the plan. Attaching a proposed timing and cost to projects may incite political battles over such specifics, and divert the focus of the public and elected officials from the plan's "big picture" and key philosophies. It was also acknowledged that the long-range estimation of costs is problematic, that ways to implement projects at a reduced cost may not be obvious at an early planning stage, and that it may be unrealistic and unnecessary to give one project greater priority over another, far in advance of actual need.

On the other hand, some practitioners were strongly supportive of identifying major project priorities for the short, medium and long term. Such phasing was considered helpful in setting public expectations about relative priorities, even if the actual timelines eventually shift.

Several practitioners saw the need for plans to provide more specific implementation guidance for multimodal facilities and services (e.g. bikeways, TDM programs). Such projects tend to get overshadowed by highly specific and relatively costly road and transit capital programs, which

attract the most public and political attention. Only by emphasizing the need for adequate resources and timely action are “softer” multimodal projects likely to be promoted equitably. Similarly, the implementation of policies and programs for sustainable transportation can benefit from specific recommendations for follow-up studies — for example, if the transportation plan only identifies general cycling policies, it may be advisable to recommend the subsequent development of a designated cycling network.

3.3 *Principle 9: Financial guidance*

3.3.1 SCOPE AND IMPORTANCE

Over the last 15 years, the cost of building, operating and maintaining transportation systems has become a predominant concern for urban communities in Canada. Financial support levels for urban transportation by federal and provincial governments have declined (notwithstanding provisions in the 2005 federal budget), and municipal budgets have been pressured by the downloading of service responsibilities and rapidly rising costs.

Now more than ever, transportation plans and programs face the unpleasant reality of financial constraints within local government. Cities can no longer assume that facilities will be built or services provided just because they are identified in a plan. Capital costs, which typically arise irregularly and sometimes in substantial amounts, are always of great interest. However, because municipal capital and operating funds come from different sources, and because federal and provincial financial support generally extends to infrastructure projects only, the expected costs of facility operations and maintenance as well as the cost of support services such as TDM programs are also crucial. Life-cycle cost analysis is one way of capturing and comparing the overall cost implications of alternative systems or elements thereof.

Of course, an understanding of costs is only half the picture, the other half being an understanding of where the revenues needed to pay those costs will come from: development charges/levies, reserve funds, property taxes, provincial government grants, borrowing or other sources. While future revenues can never be known with certainty, it is reasonable to ask how far current circumstances or trends, if continued, would go toward paying for planned transportation facilities and services. If a gap exists, it is important to identify how big it is. Can additional revenue sources be found? If not, what are the planning implications for both actions (e.g. deferral or cancellation of individual projects, a rejuggling of priorities, changes to land use patterns) and results (e.g. adjustment of targets)?

3.3.2 REVIEW OF PRACTICE — CANADIAN PLANS

Financial limitations are starting to be reflected in many transportation plans, yet most plans adopt a “fiscally unconstrained” approach based on the results of technical analysis (i.e. without explicitly considering affordability). The reasoning behind this approach is that new funding sources may become available over the life of the plan, and that projects only have a chance of being funded if they are identified (i.e. limiting projects to those that are affordable may reduce opportunities to attract additional funding). Regardless, a key consideration for sustainable transportation is the balance between spending on sustainable transportation modes (e.g. transit, cycling) versus spending on auto-oriented road projects.

Four plans that are notable in their consideration of either funding for sustainable transportation modes, or (more broadly) the financial sustainability of the plan are discussed below.

- **City of Calgary — GoPlan (1995)**

The plan outlines a financial framework that projects transportation costs and revenues including possible funding sources. The plan anticipates that funding from other levels of government is likely to decline, and identifies the expected shortfalls. The plan proposes the concept of user pay to generate needed revenues, but since the plan's 1995 completion the Province of Alberta began to offer annual grants to Calgary and Edmonton for urban transportation equivalent to 5 cents per litre of gas sold locally.
- **City of London – London Transportation Master Plan (2004)**

The plan includes a schedule of road capital costs in the 0-to-5, 5-to-10 and 10-to-20 year planning horizons, along with broad annual operating estimates and estimates of annual transit capital and operating costs. However, funding sources are not identified and the implications of any potential gap between costs and revenues funding are not addressed.
- **City of Kingston – Kingston Transportation Master Plan (2004)**

The plan identifies current capital spending and life-cycle cost needs of existing infrastructure, noting that annual expenditures for the latter greatly exceed current budgets. Kingston is notable in that it is the only plan reviewed to consider life-cycle costs. It identifies annualized capital costs of new policies, new network changes, and additional related life-cycle costs, including shortfalls between current capital spending levels and expected capital costs. It indicates that operating costs may be reduced in some cases by capital improvements but states that new funding sources must be identified to address projected shortfalls for both capital and operating requirements.
- **City of Ottawa – Transportation Master Plan (2003)**

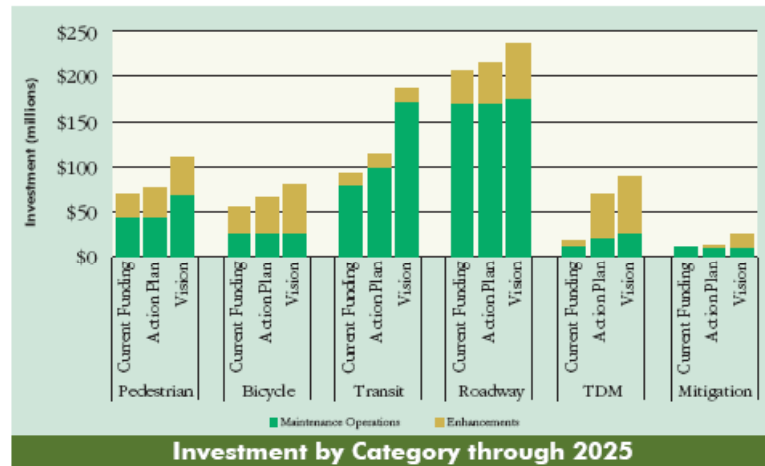
The plan acknowledges substantial funding gaps for recommended projects, noting that a future lack of funds would require cutbacks, lower standards/service levels, deferral of projects, growth constraints, user fees, and/or tax increases. The plan leaves decisions/tradeoffs in resolving the funding gap to the annual budget process. The plan identifies capital and operating/maintenance costs for transit and roads (including walking and cycling requirements) over the life of the plan. It also identifies the breakdown of transit capital costs by rapid transit running ways, LRT support facilities, park and ride lots, LRT vehicles, BRT vehicles, surface bus vehicles and facilities. Capital cost requirements for transit and roads are presented on a staged basis for each of three phases. The plan qualitatively discusses possible new funding sources, and calls for more development charges, user fees and public-private partnership approaches.

3.3.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

International cities also suffer from insufficient funding for transportation programs and limitations are addressed in different ways. Most notable are the following:

- **City of Boulder – Transportation Master Plan (2003)**

Funding is one of the plan’s four focus areas. The plan articulates annual revenue needs to accomplish its priorities, and options for funding those needs. It shows annual revenue forecasts and trends in transportation spending for operations, maintenance and enhancements. Transportation investment is prioritized through the three investment programs - a current funding level, a strategic action plan level and a vision level. In each of these investment programs, funding of transportation operation/maintenance and safety is the highest priority.



Boulder’s Investment Packages by Mode

- **Portland Metro Area – Regional Transportation Plan (2000)**

The plan proposes two options, namely a priority plan which is fiscally constrained (i.e. affordable based on foreseeable revenues) and a preferred plan which is fiscally unconstrained (i.e. based on true needs to achieve plan objectives). The plan projects fiscal needs and gaps associated with implementing the preferred plan, proposes a variety of funding options and recommends additional study to determine the best course of action.

- **Auckland – Regional Land Transport Strategy (2003)**

This plan includes a fiscally constrained analysis, including assessment of current funding availability, the funding gap and options for addressing it in the near and long-term. It also includes a prioritization scheme to address the gap and ensure the most critical projects are implemented with available resources.

3.3.4 PRACTITIONER PERSPECTIVES

Guidance from practitioners on the financial aspects of transportation plans varied. Most emphasized the importance of ensuring funding is allocated to sustainable transportation modes, or at least quantifying the allocation for public scrutiny. In many cases, particularly Ontario, development charges legislation inherently biases funding towards roads. For example, development charges cannot result in an increased level of service for a particular mode; they can only include growth-related capital spending. Therefore, increasing transit service levels, or funding significantly expanded bicycle networks are not considered eligible for development charges.

In some other cases, such as the City of Vancouver, the agency developing the transportation master plan was not responsible for transit services and costs. As a result, major transit investment was not possible within the current planning framework.

One respondent suggested following up a transportation plan with a “business plan” that puts needed resources into place, establishes new budget line items, and creates required staff positions. Without these changes, getting new directions off the ground can be a challenge.

3.4 *Principle 10: Performance measurement*

3.4.1 SCOPE AND IMPORTANCE

Transportation plans start to become obsolete as soon as they are approved: external conditions change, action plans are adjusted, costs rise or revenues fall, and early initiatives shift the playing field for later ones.

One way to provide decision makers with continuously relevant guidance is to supplement approved plans with a rigorous performance measurement process. Such a process is likely to focus on actions taken and progress made toward both qualitative and quantitative objectives, but could also identify changes in analytical assumptions, shifts in social or economic circumstances, and updated financial positions. A thorough performance measurement strategy for a transportation plan might identify key targets and the relevant indicators to be tracked; data collection activities, resources and schedules; and reporting parameters and frequencies.

3.4.2 REVIEW OF PRACTICE — CANADIAN PLANS

The degree to which the reviewed Canadian plans addressed performance management ranged from complete avoidance to comprehensiveness. Three notable examples were:

- **Capital Regional District (Victoria) – TravelChoices**

While the TravelChoices document does not include a performance measurement element, the CRD’s Regional Growth Strategy of which it is part does specify a monitoring program that measures transportation outcomes against overall quality of life/sustainability objectives, as well as against specific established targets. The monitoring indicators for Strategic Initiative #7 (Increase Transportation Choice) include: annual transit ridership (total and per capita); number of insured passenger vehicles (total and per capita); work trip modal shares for the CMA and subregions; modal shares (24 hour, p.m. peak period) for various modes; p.m. peak period non-automobile modal shares to/from/within the metropolitan core or CBD; weekday vehicle kilometres of travel (VKT) per capita; length of cycling facilities by type in various areas; and percent of homes within 400 metres of minimum-frequency transit service. The program calls for required data to be gathered every one, two or five years depending on the indicator, and compared to 2001 baseline data. It also calls for benchmark comparisons against other communities every 5 years; narrative reporting on levels of inter-jurisdictional cooperation; annual reporting on regional growth strategy progress; and state-of-the-region reports every 5 years.

- **City of London – London Transportation Master Plan (2004)**

The plan’s implementation recommendations identify the need to report annually on the “state of the system” and any required plan amendments arising from new traffic data, trends, capacity optimization progress, TDM initiatives or provincial actions. The plan

includes performance indicators for measuring the reduction in use of single-occupant vehicles, the increase in overall average road capacity, and the transit mode share. The plan also includes monitoring and review recommendations dealing with coordinated administrative reporting, travel data updating, and plan updating.

- **City of Ottawa – Transportation Master Plan (2003)**

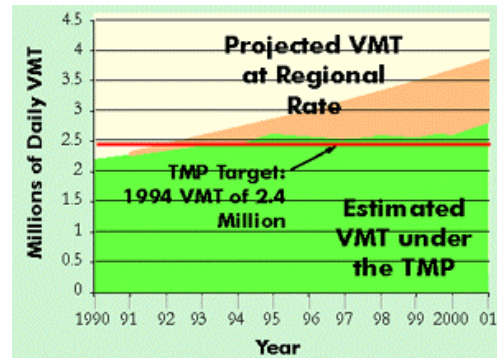
The section of the plan that addresses performance measurement documents shows how the plan’s vision was disaggregated into 29 functional performance objectives, each of which has one or more representative indicators. A detailed annex shows the period, frequency and location of monitoring activities needed, and also estimates the degree of influence that the City has over each indicator. Target values are given, where possible and available. The plan calls for regular reporting on progress toward objectives, in part to help with ongoing adjustments to the infrastructure phasing plan.

3.4.3 REVIEW OF PRACTICE – INTERNATIONAL PLANS

As with the Canadian plans, the international plans reviewed were mixed in their approaches to performance measurement. Two notable examples were:

- **City of Boulder – Transportation Master Plan (2003)**

The plan calls for performance measurement using both traditional vehicle-based performance measures as well as measures reflecting multimodal accessibility and mobility. Nine indicators are specified: (1) alternative modes as a percent of total trips; (2) vehicle-hours of congestion; (3) percent of arterial lane-miles congested; (4) carbon monoxide (CO) emissions; (5) volatile organic compound emissions; (6) nitrogen oxide emissions; (7) corridor level of service; (8) quality of facility performance (pedestrian, bicycle, transit); and (9) city-wide mobility index for all modes, using a weighted index.



TMP Performance Monitoring – Boulder, Colorado

- **City of Santa Cruz – Master Transportation Plan (2000)**

The plan lays out a performance measurement framework and process including specific measurement categories, the measurement tools/data sources to be used, and the geographic scale of measurement to be undertaken. The five key measurement categories are: (1) mode split; (2) vehicle trip generation; (3) participants/riders; (4) intersection level of service/vehicle trip reduction; and (5) vehicle miles travelled. The City Transportation Commission is responsible for a bi-annual report on implementation progress.

- **Auckland – Regional Land Transport Strategy (2003)**

This plan describes how the effectiveness of the policies of the Regional Land Transport Strategy will be measured against the five objectives of the strategy. Each objective will be measured against appropriate and relevant indicators, which are to be measured on an on-going basis. The indicators are also to be reported as part of the Auckland Regional Land Transport Strategy Annual Report and used to help plan and implement a transport network that meets the goals of the RLTS.

3.4.4 PRACTITIONER PERSPECTIVES

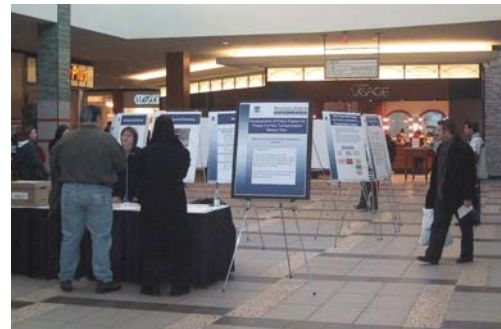
Practitioners agree that performance measurement is an important part of successful transportation plan implementation. However, most regret that performance measurement activities rarely are conducted as they should be — reasons for this are seen to include staff and budget limitations, and a greater general priority on “doing” compared to “monitoring”. More than one reported that while the first round of performance measurement may be undertaken according to the plan, later efforts tend to slip in priority.

Notwithstanding actual practice, reporting on performance measures is seen as essential to maintaining public and political interest in transportation plans, and keeping them “alive” and relevant. One respondent suggested that an effective communications plan is needed to add value to monitoring reports that can tend to be very technical and full of jargon – for example, by producing an accessible and less technical report on plan progress for members of the public, and by using the media to transmit major findings of public interest.

3.5 *Principle 11: Public involvement*

3.5.1 SCOPE AND IMPORTANCE

At their best, transportation plans represent a broad societal consensus about the future and reflect a high degree of buy-in among elected officials and staff at all levels of government, external organizations, and individual members of the public. In the pursuit of sustainability, plans can act as agents of change — but change is only realistic if key stakeholders are willing to follow through on their responsibilities. The process by which transportation plans are developed can be an avenue for building this kind of public support.



Transportation plans can also recognize the value of ongoing public involvement in maximizing success. This involvement might take the form of consultation as a routine part of project implementation; outreach and education measures to build awareness of problems and solutions; and active partnerships with community associations and other interest groups in areas like TDM and area traffic management.

3.5.2 REVIEW OF PRACTICE — CANADIAN PLANS

Not all transportation plans document the public involvement that helped to shape them, so a desktop review of plans will have some limitations in identifying the techniques or success of public involvement. However, one notable observed example was the Calgary GoPlan, which identifies four major public involvement components to the plan’s development: opinion surveys, working groups, focus groups and newsletters.

Three plans are notable in their recognition of the importance of public involvement after the completion of the plan:

- **City of Calgary — GoPlan (1995)**

The plan identifies the need to periodically advise Council and Calgary citizens on its status using a “report card” format. Since the plan’s 1995 adoption, follow-up reporting has been extensive and includes publication of: *Mobility Monitor*, on transportation issues; and *CityVision*, part of the ongoing effort to implement the City’s transportation and development plans. Another key feature of the Calgary plan is that it is written using forward-looking statements that directly address the general public, a tactic that may improve its relevance to the average reader.
- **City of London – London Transportation Master Plan (2004)**

The plan proposes an ongoing program of public involvement called “Solutions To Help Individuals Find Transportation” or SHIFT Alternatives. It will encourage travel behaviour change in three ways: (1) partnerships with local organizations and environmental awareness education; (2) use of City and transit websites to circulate information; and (3) assigning a large percentage of TDM resources to developing and disseminating public information.
- **City of Ottawa – Transportation Master Plan (2003)**

One of the plan’s four main strategic directions is “forging a community partnership” including: (1) an ongoing two-way dialogue between the City and the public on transportation needs and options; (2) continued public input as a basis for rebalancing program and project priorities; and (3) TDM partnerships with schools, businesses and community groups. The plan calls for TDM efforts to build public awareness of the benefits of walking, cycling, transit and ridesharing, improve public attitudes towards those modes, and measures to encourage their use through education and promotion. The plan’s transit priority and road safety sections also call for public awareness and promotion programs.

3.5.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

Two of the international plans reviewed also acknowledge the importance of continuous public involvement.

- **City of Santa Cruz – Master Transportation Plan (2000)**

The plan’s five “factors of success” include an education campaign to inform the community of the importance of individual travel choices, and the establishment of personal and community commitments to making travel behaviour more sustainable. The plan includes a short-term education and promotion initiative to engage the community with new programs and education campaigns that inspire innovation, develop mutually beneficial networks, and encourage sharing of resources. The plan also recommends long-term regional collaboration and partnerships with key stakeholders including educational institutions, business associations and major employers.
- **Melbourne, State of Victoria – Melbourne 2030**

The regional growth strategy includes directions for public involvement that are applicable to transportation issues, including a policy to involve the community in the strategy’s implementation. Specific initiatives include the provision of opportunities for meaningful local participation in government projects, and the use of a “place management approach” in development initiatives that emphasizes collaborative and “bottom-up” efforts among governments, business, citizens and non-profit sectors.

3.5.4 PRACTITIONER PERSPECTIVES

Practitioner perspectives on public consultation were generally favourable but mixed. The advantages and disadvantages of public involvement noted by practitioners were:

<i>Benefits of public involvement...</i>	<i>Drawbacks of public involvement...</i>
<ul style="list-style-type: none"> • Makes public aware of issues • Public can help suggest ideas for improving system • Generates support for plan and follow-up implementation 	<ul style="list-style-type: none"> • Requires extensive resources and effort for limited return • Public turnout tends to be low for strategic planning exercises • General public has difficulty with conceptual planning issues

One respondent from a smaller city observed that a strong public dialogue during the planning process led to strong community buy-in to recommended projects, virtually eliminating later controversy over the need for or cost of new facilities. The same respondent felt that such public involvement should be continued in subsequent planning exercises, because re-educating elected officials and residents (both groups that experience significant turnover with time) is an important but continuous task; it also lays a strong foundation for the next transportation plan. The same respondent noted that the plan's TDM provisions have led to significant, successful involvement of community groups such as neighbourhood associations, schools, employers and cycling groups, and that these ongoing TDM efforts are valuable because they illustrate that changes are not being imposed by a "big brother" but rather through an overall social and cultural shift that the community desires and accepts.

Another respondent felt a communications strategy to accompany performance measurement and monitoring activities can maintain the public's awareness and understanding of transportation conditions and the required responses by the City or community. Local cable stations were suggested as a potentially valuable channel of "free advertising" that can generate a continual stream of requests for information when a general information video clip is played periodically.

The same respondent noted that public involvement in the early stages of the plan development led to the identification of a strong public desire to control automobile use, which in turn led to key elements of the vision and the development of quantitative targets for automobile use reductions. This highlights the importance of "starting with a clean slate" when identifying the community's true vision. Later on in the planning process, the respondent noted that public input on a draft plan led to significant revisions in the final plan that made it more multimodal in nature.

3.6 *Principle 12: Plan maintenance*

3.6.1 SCOPE AND IMPORTANCE

Provincial planning legislation generally requires that municipalities revisit their overall urban plans (e.g. official plan, municipal development plan) on a regular basis — typically every five years. However, transportation-specific plans are neither required nor governed by legislation for most communities. Transportation stakeholders may thus find it helpful for a plan to specify a general window within which a review should be conducted of the need to update or replace the plan, based on the degree of confidence in the plan's assumptions and analysis. Of course, other factors may lead to the need to revisit a transportation plan. These could include performance measurement

efforts that indicate unexpected changes in circumstances, or significant variations in land use policies or development activities that shift the plan's very foundation.

3.6.2 REVIEW OF PRACTICE — CANADIAN PLANS

None of the reviewed plans provided detailed guidance on how the plan would be actively maintained over time, but the plans that made the most notable efforts were:

- **City of Calgary — GoPlan (1995)**
The plan notes that it is not a static document, and that there is a degree of uncertainty in the assumptions about growth. It identifies a key benefit of monitoring efforts as the reduction of risks by enabling timely remedial action when necessary. A major review of the 1995 GoPlan is now underway. It should be noted that the priorities and timing of specific infrastructure projects (which are the most likely elements of most plans to become outdated, when included) are not contained in the plan itself, but rather are determined annually through the City's capital works program.
- **City of London – London Transportation Master Plan (2004)**
The plan recommends that annual monitoring reports identify any need for amendments to the plan owing to new traffic data, new trends, capacity optimization progress, TDM initiatives or provincial actions. It also calls for a plan review with any required updates every five years, in association with reviews of the Official Plan required by provincial planning legislation.
- **City of Ottawa – Transportation Master Plan (2003)**
The plan notes that it should be reviewed every five years, when the City's Official Plan is also reviewed. It also notes that because ongoing decision-making by City Council can have the effect of modifying or superseding the plan's policies, readers are instructed to review the record of Council decisions as a complement to the plan itself, in order to gain a complete picture of City transportation policy.

3.6.3 REVIEW OF PRACTICE — INTERNATIONAL PLANS

Only one international plan offered a notable approach to the issue of maintenance:

- **Portland Metro Area – Regional Transportation Plan (2000)**
The plan provides for preserving its currency in a comprehensive and consultative manner, driven partly by regional and state laws. It is notable that each version of the plan is considered to be an update of previous versions, rather than a new effort. The plan acknowledges that many of its proposed solutions are conceptual in nature, and that they require further refinement. Such refinement is expected to occur (in part) as local governments and transportation agencies bring their own plans into compliance with the regional strategy. The plan notes that such refinements should be included in future updates.

3.6.4 PRACTITIONER PERSPECTIVES

In general, practitioners agreed that plans should be maintained, and that a general perception of a plan as obsolete can lead to ad hoc, arbitrary decision making. One respondent offered their city as a model for this principle, noting that 25 years without an updated transportation plan led to valuable transportation corridors that should have been protected being lost to development instead.

Two practitioners from large cities felt that, while the completion of specific projects will gradually erode any plan's currency, a plan that emphasizes general priorities and policies (rather than quantitative objectives and detailed project commitments, for example) is more likely to stay current over time. Both cities' plans remain current after nearly a decade because their basic precepts and priorities have not changed, and they still effectively guide implementation efforts. In both cities, frequent mentioning of the plans in Council reports helps to maintain their profile and relevance.

In another city, the transportation plan called for the subsequent completion of several highly detailed mode-specific plans that have superseded much of the original plan's content. The practitioner interviewed noted that this situation is not necessarily negative. Rather, it has laid the groundwork for the next iteration of the transportation plan to be less comprehensive and rely more on references to the existing modal plans.

4. SYNTHESIS OF OPTIONS

This chapter of the report identifies a number of options for improving support for sustainable transportation through long-range transportation planning. The options represent actions that could be taken in the course of developing a plan. They are not alternatives, in the sense that it would be necessary to choose between them — and in fact, not all of them would be appropriate to any given plan or planning context.

It is important to note that the options presented here do not constitute a set of recommended guidelines. Rather, it is expected that Transport Canada and Transportation Association of Canada will use these options (as well as the rest of this report) as the basis for further consultation and analysis leading to the eventual development of guidelines for sustainable transportation planning.

For quick reference, Annex A provides a condensed listing of the options by key principle.

4.1 Sustainable communities and transportation systems

4.1.1 PRINCIPLE 1: INTEGRATION WITH LAND USE PLANNING

The review of plans revealed a strong emphasis on the integration of transportation and land use planning, although the mechanisms to achieve this within a transportation plan varied. Practitioners strongly advocated for the integration of land use and transportation decisions as a way to maximize the efficiency of urban systems. Experts felt that even though land use changes may not be noticed for many years, it is important to make the right decisions now. Largely based on the advice of the expert panel, three options for the integration with land use planning are provided below.

Option: Conduct transportation planning concurrently with land use planning, so that the results reflect the implications of land use on transportation demand and supply, as well as the implications of transportation systems on the demand for, and patterns of, land development.

Importance: High

Benefits: Maximizes the ability to achieve sustainable transportation objectives, including not only reduced capital costs for transportation facilities, but also services that coincide with transportation facilities including water and wastewater, road maintenance, garbage pick-up, etc. Efficient planning will lead to reduced tax burden and potentially attract economic development.

Challenges: Requires synchronization of land use and transportation planning efforts to ensure consistency. Predicting the subtle and varied interactions between land use and transportation systems is a developing discipline.

Option: Encourage desirable land use form and design (e.g. compact, mixed-use, pedestrian/bike-friendly) through transportation plan policies.

Importance: High

Benefits: Raises awareness of the vital importance of area and site plans to the success of transportation strategies. Provides land use planners with understanding and policy

backing they need to shape site plans, especially in negotiations with developers. Can lead to monitoring of land use decisions/developments as part of transportation plan performance measurement.

Challenges: Transportation plan policies do not have legal status in the same way that (for example) Official Plan policies do in Ontario.

***Option:* Highlight the importance of supportive land use policies to the achievement of transportation objectives (e.g. modal shifts, trip length reductions).**

Importance: Moderate

Benefits: Where certain land use attributes are assumed as the basis for more sustainable transportation activities, it helps to emphasize this relationship in order to create a sense of accountability for the land use planning and development approval process.

Challenges: None

4.1.2 PRINCIPLE 2: ENVIRONMENTAL HEALTH

Most Canadian and International transportation plans recognize the link between transportation activities and environmental health and include policy directions on the need to reduce these impacts. Many plans also include environmental impacts as an evaluation criteria in selecting a preferred plan or in evaluating specific transportation corridors. Most practitioners and experts felt that there will be increasing pressures in the future for plans to take more meaningful steps to address environmental health within long range transportation plans. Ways which this can be done are discussed below.

***Option:* Include environmental impacts (e.g. emissions of greenhouse gases and other air pollutants, consumption of non-renewable resources, ecological footprint) as criteria in the strategic evaluation of alternative land use or transportation scenarios.**

Importance: High

Benefits: Demonstrates the degree to which transportation systems contribute to (or hinder) the achievement of national or local environmental objectives. Allows meaningful and explicit tradeoffs of environmental benefits versus others in the decision-making process.

Challenges: Quantifying emissions confidently enough to compare alternative model scenarios requires advanced modelling tools.

***Option:* Adopt a “leadership by example” position by identifying actions to reduce the environmental impacts of municipal fleets, contractor operations, business travel and staff commuting.**

Importance: Moderate

Benefits: Leadership by example can be a powerful influence that shapes the behaviour of external stakeholders.

Challenges: Getting buy-in from corporate stakeholders (e.g. fleet managers, facility managers, senior administrators) to related policies and actions can take considerable time and effort. Recommendations for follow-up work may be required.

Option: Identify strategies to mitigate the air impacts of transportation activities.

Importance: High

Benefits: Climate change and air pollution are major public concerns, and addressing these issues can help create buy-in to the plan.

Challenges: Many of the key factors related to vehicle emissions are outside the direct influence of municipal governments (e.g. fuel economy standards, fleet purchasing decisions, vehicle inspection and maintenance programs). The main tool available to municipal governments, aside from modal shift, is outreach and education to encourage more sustainable choices by individuals and businesses with regard to vehicle purchase and operation.

Option: Identify strategies to mitigate water and land impacts of transportation activities.

Importance: Moderate

Benefits: While many of these strategies are likely to be operational in nature (e.g. minimizing and treating road runoff, greening of road corridors), highlighting their strategic importance in a plan can ensure subsequent attention.

Challenges: It may be difficult to explore detailed operational strategies in a planning document, and follow-up work may be required.

Option: Identify strategies to mitigate noise impacts of transportation activities.

Importance: Moderate

Benefits: While many of these strategies are likely to be operational in nature (e.g. setting threshold noise levels, guidelines for attenuation barriers), highlighting their strategic importance in a plan can ensure subsequent attention.

Challenges: It may be difficult to explore detailed operational strategies in a planning document, and follow-up work may be required.

4.1.3 PRINCIPLE 3: ECONOMIC AND SOCIAL OBJECTIVES

Economic and social objectives comprise a wide range of topics and as such the approach to including these objectives in long-range plans is also varied. Most plans include policy directions on accessibility and modal choice. Compared to passenger transportation, freight transportation and its importance to the economy receive considerably less attention in most long-range plans for urban areas. Practitioners and experts suggested that there is a need for long range plans to better reflect (or at least discuss) the relationship between transportation systems and the economy, both in terms of positive and negative impacts. Most plans also avoid discussion of trade-offs between measures to solve congestion problems and their impacts on the environment.

Option: Identify ways that transportation systems influence the achievement of the community's economic or social objectives. Provide support in the plan's strategic directions.

Importance: High

Benefits: Demonstrating a transportation plan's support for other key community priorities is a good way to create buy-in (e.g. by improving access to jobs and reducing congestion, a strong transit strategy offers significant economic benefits and can attract support from the business community).

Challenges: None

Option: Recognize the importance of ensuring access to opportunity for disabled and low-income persons, recent immigrants, youth and the elderly. Set goals and objectives for reducing the need to travel, improving transit mobility, and preserving minimum levels of service on roadways. Identify related strategies.

Importance: High

Benefits: One role of a good plan is to avoid gross inequities in transportation systems. The social costs of such inequities can be high. For example, when lower-skill jobs are concentrated at the urban periphery the absence of effective transit service has been shown to affect individuals (who have trouble getting to work) as well as employers (who have trouble finding and retaining employees).

Challenges: A lack of data on the transportation needs of relevant social groups can prevent robust planning analysis. A more qualitative approach may be required.

Option: Address the transportation needs of persons with disabilities, notably with regard to public transit service and barrier-free design practices in public rights-of-way.

Importance: High

Benefits: The issue of transportation equity for persons with disabilities is one that can have costly, long-term implications that should be explored at the planning level. Strong policy backing may be needed to ensure that required actions take place.

Challenges: None

Option: Recognize the impacts of freight movement on quality of life (e.g. noise, emissions). Identify effective strategies for prevention or mitigation (e.g. routing alternatives, criteria for making trade-offs between business and community needs).

Importance: Moderate

Benefits: Conflicts between goods movement and neighbourhood priorities will increase as freight volumes continue to rise. A strategic framework for minimizing and addressing these conflicts can have long-term benefits.

Challenges: This is an area where compromise is required, but at a planning level it may be difficult to get stakeholders to agree to compromise.

Option: Recognize the public health impacts of transportation activity arising through road safety, pollution and physical activity levels. Identify effective strategies to strengthen positive impacts and lessen negative ones.

Importance: High

Benefits: Public health concerns are becoming more vital, and the transportation links to them are becoming clearer. Many sustainable transportation goals (e.g. more active transportation, fewer emissions, safer streets) are directly linked to health benefits, providing support for the plan. Encouraging more active transportation, both for utilitarian and recreation purposes, can help to encourage more active and healthy choices in other areas of community living.

Challenges: None

Option: Recognize the impact of transportation-related death and injury on quality of life and the economy. Set goals and objectives for multimodal road safety. Identify effective road safety strategies.

Importance: High

Benefits: Death and injury on urban roads have a huge cost, but are almost entirely preventable. A strategic framework and strong program directions can help to ensure progress.

Challenges: None

4.1.4 PRINCIPLE 4: MODAL SUSTAINABILITY

Almost universally, transit is a key consideration in long range urban transportation plans for medium-large areas. Conversely, plans for walking, cycling and other active transportation are not always included, but may be addressed through other planning processes. Similarly, as noted above the degree to which alternative freight transportation modes are included in urban transportation plans varies.

Option: Identify strategies, policies, facilities and services to increase walking, cycling, other active transportation, transit, ridesharing and teleworking.

Importance: High

Benefits: A benefit of addressing all urban passenger modes is to ensure consistency and synergy among recommendations. Because facilities themselves cannot maximize modal shift, it is important to also identify supportive policies and services. The scope of transportation planning with regard to active transportation need not be constrained to facilities within the road right-of-way, but may also include off-street trails, urban parks and supporting facilities and amenities.

Challenges: Exploring mode-specific issues at an appropriate level of detail may require extensive work and consultation, so plans may need to specify subsequent follow-up projects.

Option: Recognize synergies and tensions among different modes (e.g. potential for multimodal cycling-transit trips, potential for modal shift from transit to ridesharing). Address possible implications for transportation objectives.

Importance: Moderate

Benefits: This approach enables full consideration of the fact that users of sustainable modes are much more likely than automobile drivers to make regular use of several different modes, and even to use multiple modes in the course of a single journey. For example, it recognizes the fact that the effects of improved transit service may be muted unless the walking environment is also improved.

Challenges: Given the complicated behavioural choices involved, the potential for an analytical approach is low and a qualitative assessment of issues may be the best available option.

***Option:* Include objectives, strategies, policies, facilities and services to make transit operations more sustainable.**

Importance: Moderate

Benefits: There is a benefit to having transit systems “lead by example” when it comes to sustainability. This is demonstrated by the fact that operators are increasingly under pressure to reduce fuel use and adopt cleaner technologies. Practices that increase load factors also reduce costs.

Challenges: Because financial resources needed to update transit fleets and facilities could otherwise be spent on improving the quality or reliability of service, it is necessary to find an appropriate balance.

***Option:* Include objectives, strategies, policies, facilities and services to achieve transportation goals through parking management.**

Importance: High

Benefits: Parking management is fundamentally linked to both land use issues and the competitive balance between automobile use and more sustainable modes. Plans should consider how parking management (either supply or pricing) can help to achieve other goals.

Challenges: A majority of urban parking facilities are typically controlled by private interests, and municipalities may have very limited influence on their operation. This, however, is all the more reason to think creatively about parking management tools that may be available.

***Option:* Acknowledge the potential to make automobile use more sustainable through more efficient roadway operations. Identify relevant strategies (e.g. incident management, signal optimization, etc.)**

Importance: High

Benefits: Maximizing the service that can be extracted from current infrastructure will help to defer or avoid the need for new infrastructure. Minimizing congestion also reduces emissions and social costs due to delay.

Challenges: The details of required strategies are likely to be highly operational, requiring subsequent work to follow up.

***Option:* Identify linkages between urban and intercity passenger transportation systems (e.g. terminal accesses, grade crossings). Identify strategies to make linkages more effective and efficient (e.g. better transit service to terminals, grade separations).**

Importance: Moderate

Benefits: Plans can support the viability of intercity transportation services, and encourage the use of sustainable modes to access them.

Challenges: None

Option: Identify objectives, strategies, policies, facilities and services to support effective and efficient goods movement (e.g. by minimizing congestion in key corridors)

Importance: High

Benefits: Preserving an acceptable level of mobility for trucks that serve local businesses (and by extension the local populace) is an important objective. The process of considering goods movement in a transportation plan can bring stakeholders together and lead to dialogue where none existed before, creating the opportunity for new partnership-based solutions.

Challenges: The acceptance of growing congestion levels, which is supportive of municipal fiscal objectives and even modal shift objectives to some degree, has negative impacts on goods movement efficiency and the businesses that rely on it. It may be necessary to focus efforts on key corridors, which may do little to help stakeholders whose concerns lie elsewhere. Goods movement is also almost entirely under private-sector control, and it can be challenging to get stakeholders to agree on a course of action.

Option: Identify objectives, strategies, policies, facilities and services to make freight activity more sustainable (e.g. shift from road to rail, improve routing practices)

Importance: Moderate

Benefits: Efficiencies or modal shifts that can moderate the growth in road freight activity can reduce negative impacts like noise, congestion and emissions.

Challenges: Municipal governments have little direct influence on operational freight practices, so must rely on outreach and education to make an impact.

4.1.5 PRINCIPLE 5: TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management is a wide-ranging topic and may include both hard and soft measures. One variation in Canadian transportation plans is in the reliance on TDM as a means to off-set infrastructure investments. Some plans rely heavily on TDM to meet the gap between infrastructure needs and what can be afforded. One aspect of TDM that is absent from most transportation plans is an emphasis on pricing, something the expert panel felt could have a significant impact on progress towards more sustainable transportation.

Option: Place strategic priority on TDM as a necessary complement to the management of transportation supply

Importance: High

Benefits: The plan can build buy-in to a TDM strategy by demonstrating that it can help defer or reduce infrastructure investment needs while maximizing the value of infrastructure investments that are made.

Challenges: It may be necessary to manage expectations for TDM, given that it is a relatively new discipline and that it depends on the basic competitiveness of options to automobile travel (which may limit the effectiveness of some approaches to larger cities).

Option: Recognize the full range of TDM approaches (land use, pricing, incentives, outreach) and identify relevant strategies, policies and services for each.

Importance: High

Benefits: TDM offers a set of linked options that should be considered simultaneously to maximize synergies and avoid redundancies. The need for difficult or controversial measures can be minimized through the effective use of more acceptable ones.

Challenges: TDM depends on the basic competitiveness of options to automobile travel (which may limit the effectiveness of some approaches to larger cities).

Option: Identify key stakeholders in TDM implementation, the nature of their roles and resource requirements.

Importance: Moderate

Benefits: A plan that spreads responsibility for TDM beyond a single stakeholder serves to alert a variety of interests that their involvement will be required.

Challenges: Detailed operational issues may require subsequent follow-up work.

4.1.6 PRINCIPLE 6: TRANSPORTATION SUPPLY MANAGEMENT

There is a clear indication from the review of plans that cities in Canada and elsewhere are moving in the direction of optimizing existing infrastructure before considering expansion. This trend is reflected in the options below.

Option: Acknowledge the implications of various minimum standards for roadway level of service, and select a preferred standard.

Importance: High

Benefits: A level of service standard (which can vary by time of day, location, or other factors including the concentration of freight activity) is required to enable infrastructure decisions as well as to provide a context for transit service planning and TDM efforts.

Challenges: Level of service standards can be controversial among members of the public and elected officials. Detailed consultation may be needed to explain the implications of various alternatives and achieve buy-in.

Option: Include objectives, strategies, policies, facilities and services to maximize the multimodal capacity of current infrastructure.

Importance: High

Benefits: A multimodal approach to maximizing capacity supports other goals of reducing costs and increasing transit use, by encouraging the consideration of transit priority or ridesharing strategies.

Challenges: None

Option: Include objectives, strategies, policies, facilities and services to manage recurring and non-recurring congestion.

Importance: High (in large centres) or moderate (in medium-sized centres)

Benefits: Limiting the severity and duration of congested periods has substantial benefits for transit service efficiency and reliability, as well as for emissions and user delay.

Challenges: None, aside from the considerable cost of some solutions that make use of advanced technologies

Option: Include objectives, strategies and policies to manage transportation assets (e.g. maintenance, repair, rehabilitation, renewal).

Importance: High

Benefits: In an era where affordability is a key pillar of sustainability, asset management is one way to optimize transportation service and reduce life-cycle costs. It also encourages the concurrent consideration of capital costs and a major component of transportation operating costs.

Challenges: None

4.2 Sustainable and effective transportation planning

4.2.1 PRINCIPLE 7: STRATEGIC APPROACH

Most plans reviewed contain a vision, goals or objectives, but not all of these goals are directly tied to sustainability issues. The ability for a plan to take a strategic approach is somewhat dependent on who is preparing the plan (i.e. is it a joint effort between several departments or a more focused effort) and the characteristics of the urban area in question (i.e. is it a rapidly growing area or a more stable area). These variances are reflected in the options below.

Option: Establish a comprehensive strategic framework consisting of a vision, goals and other elements. Illustrate linkages to other community visions or goals.

Importance: High

Benefits: A strategic framework expresses the desire for change, and motivates and guides required actions. A comprehensive framework should translate into a comprehensive plan, if all elements are addressed. Demonstrating linkages to other community priorities can validate the strategic framework and build buy-in.

Challenges: A comprehensive vision and goals imply the need for a comprehensive plan, which in turn implies the need for time, effort and money to complete it.

Option: Consider alternative futures for land use and transportation systems, and evaluate their requirements and implications.

Importance: High

Benefits: In an era of planning when we have tools to manage demand and supply, and when we face complex criteria for measuring success, a comparison of alternative futures is essential to underpin any progress toward sustainability. Careful and informed deliberation among realistic alternatives will limit the possibility of arbitrary decision-

making. It can also create a valuable public dialogue over the value and features of different futures, and lead stakeholders to buy into the results.

Challenges: None, other than the time and effort that are likely required to do a thorough job.

***Option:* Set quantitative objectives in a deliberate and realistic manner. Identify conditions required for their achievement, and the implications of the failure to achieve them.**

Importance: High

Benefits: Quantitative objectives (e.g. modal share targets, average trip lengths, annual transit ridership) can build stakeholders' understanding of the degree of change that is being pursued by the plan. They also provide a basis for measuring progress towards plan success. When they are accompanied by highlighting of required external circumstances or prerequisite actions, as well as a clear illustration of the implications of not achieving the targets, they can also motivate efforts to maintain momentum and truly create "winning conditions."

Challenges: It is always a challenge to set quantitative objectives that are ambitious enough to avoid being viewed as "easy," yet achievable enough to avoid being labelled as "unrealistic." Targets in either of these categories run the risk that the public and politicians will not take them seriously, which can undermine support for the entire plan.

4.2.2 PRINCIPLE 8: IMPLEMENTATION GUIDANCE

It is in the implementation of a plan that almost all practitioners and experts stated that significant improvement is needed to ensure that what is envisioned in the plan in terms of sustainability is actually implemented. At the present time, there is a potential to pick out the easy to implement recommendations, which are often road improvements. The major difference in the plans that were reviewed is in the amount of detail provided on implementing the various plan elements. Implementation details tend to be very specific for road improvements and less specific for other non-motorized transportation modes.

***Option:* Address recommended implementation program in great detail.**

***Or:* Address recommended implementation program at a strategic level.**

Discussion: This is an option where mutually exclusive alternatives clearly exist. A detailed implementation program (i.e. one that estimates costs and suggests timelines for individual projects) gives readers a very clear understanding of what the plan entails as far as required actions, and can yield a degree of confidence over the plan's financial implications. However, implementation programs are subject to frequent amendment due to "real world" concerns — so including them as part of a policy document may eventually invite a perception of irrelevance that could spread to other parts of the plan. As well, controversy over specific elements of a detailed implementation program can limit buy-in to the plan and divert political or public attention away from the plan's more important "big picture" vision and philosophy. A more strategic implementation program that focuses on major principles and priorities may create a more durable plan that dates less easily. To be effective, however, it must also call for the creation and annual maintenance of an implementation program that is linked to the plan document but remains outside it.

Option: Address facilities, services, programs and policy actions to be implemented.

Importance: High

Benefits: To ensure the fullest degree of compliance, an implementation program should address the widest range of required actions, rather than focus on “big ticket” infrastructure items. Municipal administrators who are responsible for operating budgets can then plan ahead and make necessary adjustments to financial or human resources. This approach also ensures that infrastructure is always accompanied by the services, programs and policies that are required to maximize the value of the capital investment. This is particularly important for the achievement of modal shift to sustainable modes, which tends to rely on continuing programs and services to complement facilities.

Challenges: None

Option: Identify a short-term priority action plan that prescribes important “first steps” to build momentum and lay the foundation for long-term changes.

Importance: Moderate

Benefits: Particularly when a more strategic approach is taken to the implementation program, the identification of short-term priority actions can help to focus public and political attention on the plan’s most immediate and vital requirements.

Challenges: None

Option: Specify subsequent planning efforts that are needed to develop additional implementation details (e.g. area or modal plans, facility plans, management strategies).

Importance: High

Benefits: A plan cannot include sufficient details on all recommended facilities and services to enable immediate implementation, so identifying the subsequent planning efforts that are required can ensure that work proceeds in a timely manner.

Challenges: None

Option: Describe criteria for ongoing implementation decisions (e.g. setting or revising project priorities and schedules).

Importance: High

Benefits: Transportation plan implementation programs are inevitably modified on a regular basis, usually in conjunction with annual budgeting processes. Decisions are thus regularly made that affect the scheduled timing or relative priorities of projects (whether infrastructure, programs or services). A plan that provides guidance for that decision-making process will help ensure the survival of its principles and philosophies, keeping it a “living document.” One of the most important decision-making situations is the point at which expected funding becomes unavailable, or unexpected funding becomes available — in these cases, it is important to have thoughtful guidance on how to adjust the implementation program while adhering to the goals of the plan.

Challenges: Providing criteria for decision-making that are precise enough to ensure the ongoing relevance of the plan, yet flexible enough to adapt to changing circumstances, is a

challenge. Rigid or precise criteria risk being ignored altogether. Principles and concepts that reflect the spirit of the plan are more likely to be upheld.

4.2.3 PRINCIPLE 9: FINANCIAL GUIDANCE

Most plans reviewed recognized the realities of constrained funding for transportation systems; differences related to how the plans were adapted to reflect these realities. Several options have been identified that may help to improve the credibility and usefulness of the financial component of long range transportation plans.

Option: Identify an estimate of expected future revenues and capital and operating costs (including costs for facility construction, operation and maintenance, fleets, programs and services) associated with the plan. Identify expected funding gaps.

Importance: High

Benefits: A plan that does not identify costs and revenues runs the risk of being unaffordable, recklessly raising expectations, and even misleading the public. On the other hand, doing so puts the implementation program into perspective: What is the likelihood that the plan is affordable (thus “doable”), or the likelihood that major amendments (e.g. scaling or slowing down) will be required? Identification of funding gaps is necessary to know how much extra revenue is needed, and can motivate efforts to find it.

Challenges: It is trickier to estimate costs if a strategic approach is taken to the plan's implementation program. In that case, it may be possible to at least establish a range of costs by “testing” one or more representative implementation programs.

Option: Illustrate the implications of funding gaps by comparing “fiscally constrained” and “fiscally unconstrained” implementation scenarios.

Importance: High

Benefits: Comparing the levels of transportation service and social/economic/environmental impacts resulting from a “fiscally constrained” implementation program (i.e. assuming expected revenues only) and a “fiscally unconstrained” implementation program (i.e. assuming all needed revenues become available) is an illustrative way of identifying the implications of funding gaps. Stakeholders may find that the implications of constrained funding are either better or worse than they might have imagined without an explicit comparison. Of course, the comparison will depend on the assumptions incorporated into the “fiscally constrained” scenario (i.e. which facilities or services are excluded as “unaffordable”).

Challenges: None

Option: Identify options for overcoming funding gaps.

Importance: Moderate

Benefits: Readers should be given an understanding of measures that could be taken to generate needed revenues. These may include property tax increases, increased development charges or levies, public-private partnerships, or transportation user fees. Such information would set the stage for an ongoing dialogue about the desirability and effectiveness of certain actions.

Challenges: None

Option: Identify balanced spending principles.

Importance: Moderate

Benefits: As an adjunct to knowing the expected costs associated with the recommended implementation program, the provision of more strategic advice in the form of balanced spending principles can help to provide ongoing guidance. Such principles could specify (for example) that funding for infrastructure renewal is to be given priority over funding for infrastructure expansion, or that the division of capital spending on transit and roads should adhere to a 60:40 ratio.

Challenges: Principles such as these run the risk of being seen as arbitrary, although as guidelines that do not require absolute adherence they can provide a constant “navigation” function (much the same as the needle on a compass, which shows the way north even when you’re off course).

4.2.4 PRINCIPLE 10: PERFORMANCE MEASUREMENT

The Canadian plans reviewed range from a complete avoidance of discussion of performance measures to a detailed listing of indicators and follow-up monitoring. Experts suggested that significant improvement is required in how cities track progress on both the identification of performance measures related to sustainable transportation as well as the frequency of reporting on how the recommendations of plans are being implemented. Options for achieving this are discussed below.

Option: Highlight the need for a performance measurement strategy to monitor the plan’s progress as well as outputs, outcomes and external circumstances.

Importance: High

Benefits: Monitoring of progress toward the plan’s objectives and of changing conditions is a prerequisite to “staying the course” and eventually achieving overall goals. Effective monitoring would address *outputs* (e.g. actions taken and resources used), *outcomes* (e.g. travel behaviours, fuel consumption, environmental impacts, network connectivity, congestion levels, public opinions) and *external circumstances* (e.g. fuel prices, economic activity, development statistics, automobile ownership) that provide a context for both actions and results.

Challenges: None

Option: Establish a performance measurement framework that links to the plan's strategic framework.

Importance: High

Benefits: Linking the elements of the performance strategy directly to the plan's strategic framework is the best way to ensure that monitoring is focusing on the right things (i.e. indicators that reflect achievement of the plan's vision and goals). The framework should identify indicators to be measured, how data will be gathered, who will gather it and how frequently, how much influence the municipality has on the indicator and what targets (if any) reflect a desirable end-state?

Challenges: Identifying measurable indicators to reflect progress towards sometimes "fuzzy" goals and objectives can be a challenge. Indicators are often influenced by many factors other than actions taken to implement the plan, and the true impact of those actions may be difficult to gauge.

Option: Establish a reporting strategy.

Importance: Moderate

Benefits: Effective reporting on the results of performance measurement can have several benefits: (1) it maintains a general perception of the plan as relevant and (hopefully) effective; (2) it stimulates an ongoing dialogue over the plan's policies, programs and priorities that can enrich plan updates or renewals. A reporting strategy will be more effective if it addresses the frequency and format of reports, and identifies the key target audiences.

Challenges: None

4.2.5 PRINCIPLE 11: PUBLIC INVOLVEMENT

As Canadians, we have a strong tradition of public involvement and this was evident in the review of transportation plans. Most plans appear to have been diligent in consultations during the development of the plan, but consultation during the implementation and follow-up of a plan is less formal or lacking in many cases. Both practitioners and experts struggled on advising how much public consultation there should be on a transportation plan, and whether or this helped or hindered progress on sustainable transportation issues.

Option: Integrate an effective public involvement program into the planning process.

Importance: High

Benefits: Effective public involvement during plan development will have lasting benefit by creating a sense of "buy-in" that can mitigate resistance to specific projects at the plan implementation stage. Within the "public" realm, key stakeholders to involve include individuals, businesses and business groups, community and interest groups, transportation carriers and service providers, infrastructure builders, and other governments.

Challenges: None

Option: Address ways for public involvement to enhance the implementation of planned programs and projects.

Importance: High

Benefits: A plan should be something that the public supports and wants to see implemented. If it is perceived as “big brother pushing unwanted change” then it may not gain public or political buy-in and could be doomed to failure. Through its discussion and recommendations, a plan can create an understanding of the need to involve the public in the pursuit of sustainability. This involvement includes three key elements: (1) partnerships with businesses, groups and institutions to deliver programs and services; (2) public support for decisions that must be made and actions that must be taken; and (3) travel behaviours and decisions of individuals and groups.

Challenges: None

4.2.6 PRINCIPLE 12: PLAN MAINTENANCE

No Canadian plans reviewed provide detailed guidance on how to maintain currency of plan. Yet, practitioners stressed the need to create “living plans” to ensure that recommendations pertaining to sustainable transportation are followed-up on and are enhanced over time. As a result, options for plan maintenance are fairly prescriptive.

Option: Identify a minimum frequency for updating the plan, or for reviewing it to identify any need for amendments or updates (both may occur in tandem with parallel community plan processes). Also identify an interim process and criteria for identifying the need to review or update the plan (likely based on results of the performance measurement program).

Importance: High

Benefits: Readers should be aware of the intent to keep the plan current. It makes good sense to review or update a plan whenever key assumptions are challenged – and in the case of land use projections, this would certainly include community plan reviews. However, plans may also benefit from a review when the performance measurement process indicates that actions, outcomes or external conditions are not following their expected courses. If the goal is to maintain a truly “living plan,” then processes should be in place to ensure that the plan can be adjusted to reflect changing conditions in a timely manner.

Challenges: None

Option: Identify a process for regular implementation program updates, as an extension of the plan.

Importance: High

Benefits: A plan’s overall vision, objectives and policies are unlikely to shift greatly due to the passage of a few years. Much more likely to change are the specifics of growth, corridor/facility demand and congestion levels that influence the priority or scope of individual projects. The plan’s implementation program therefore requires a regular review process. This could take the form of an annual capital budget, but in larger cities it may be more efficient to maintain an implementation program with both short

and mid-term horizons (say, three and ten years) that is revised regularly (but not necessarily each year). Regardless of how this review proceeds, explicitly linking it to the principles and policies of the plan will keep the plan as a “living document” without having to “re-open” the plan itself, as well as maintaining public and political focus on the plan’s goals and progress being made towards them.

Challenges: None

***Option:* Identify other subsequent processes that will represent extensions or updates to the plan (area plans, modal plans) and if/how they will be integrated into the plan through future updates.**

Importance: Moderate

Benefits: When the plan calls for subsequent planning work (e.g. mode- or area-specific plans, management strategies), it should note whether the results of that work would constitute an extension of the plan itself. If so, it should also note whether future plan updates would incorporate the results of that work. This approach will lend credibility to the results of subsequent planning processes, and create the impression of the transportation plan as an ongoing process rather than a static document.

Challenges: None

REFERENCES

Federal Highway Administration and Federal Transit Administration, The Metropolitan Transportation Planning Process: Key Issues, A Briefing Notebook for Transportation Decision Makers, Officials, and Staff, FHWA-EP-03-041 (2004)

ANNEX A

CONDENSED OPTIONS LIST

PRINCIPLE 1: INTEGRATION WITH LAND USE PLANNING

- Options:**
- a) Conduct transportation planning concurrently with land use planning, so that the results reflect the implications of land use on transportation demand and supply, as well as the implications of transportation systems on the demand for, and patterns of, land development. (H)
 - b) Encourage desirable land use form and design (e.g. compact, mixed-use, pedestrian-friendly) through transportation plan policies. (M)
 - c) Highlight the importance of supportive land use policies to the achievement of transportation objectives (e.g. modal shifts, trip length reductions). (M)

PRINCIPLE 2: ENVIRONMENTAL HEALTH

- Options:**
- a) Include environmental impacts (e.g. emissions of greenhouse gases and other air pollutants, consumption of non-renewable resources) as criteria in the strategic evaluation of alternative land use or transportation scenarios. (H)
 - b) Adopt a “leadership by example” position by identifying actions to reduce the environmental impacts of municipal fleets, contractor operations, business travel and staff commuting. (M)
 - c) Identify strategies to mitigate the air impacts of transportation activities. (H)
 - d) Identify strategies to mitigate water and land impacts of transportation activities. (M)
 - e) Identify strategies to mitigate noise impacts of transportation activities. (M)

PRINCIPLE 3: ECONOMIC AND SOCIAL OBJECTIVES

- Options:**
- a) Identify ways that transportation systems influence the achievement of the community’s economic or social objectives. Provide support in the plan’s strategic directions. (H)
 - b) Recognize the importance of ensuring access to opportunity for disabled and low-income persons, recent immigrants, youth and the elderly. Set goals and objectives for reducing the need to travel, improving transit mobility, and preserving minimum levels of service on roadways. Identify related strategies. (H)
 - c) Address the transportation needs of persons with disabilities, notably with regard to public transit service and barrier-free design practices in public rights-of-way. (H)
 - d) Recognize the impacts of freight movement on quality of life (e.g. noise, emissions). Identify effective strategies for prevention or mitigation (e.g. routing alternatives, criteria for making trade-offs between business and community needs). (M)
 - e) Recognize the public health impacts of transportation activity arising through road safety, pollution and physical activity levels. Identify effective strategies to strengthen positive impacts and lessen negative ones. (H)
 - f) Recognize the impact of transportation-related death and injury on quality of life and the economy. Set goals and objectives for multimodal road safety. Identify effective road safety strategies. (H)

PRINCIPLE 4: MODAL SUSTAINABILITY

- Options:**
- a) Identify strategies, policies, facilities and services to increase walking, cycling, transit, ridesharing and teleworking. (H)
 - b) Recognize synergies and tensions among different modes (e.g. potential for multimodal cycling-transit trips, potential for modal shift from transit to ridesharing). Address possible implications for transportation objectives. (M)
 - c) Include objectives, strategies, policies, facilities and services to make transit operations more sustainable. (M)
 - d) Include objectives, strategies, policies, facilities and services to achieve transportation goals through parking management. (H)
 - e) Acknowledge the potential to make automobile use more sustainable through more efficient roadway operations. Identify relevant strategies (e.g. incident management, signal optimization, etc.) (H)
 - f) Identify linkages between urban and intercity passenger transportation systems (e.g. terminal accesses, at-grade crossings). Identify strategies to make linkages more effective and efficient (e.g. better transit service to terminals, grade separations). (M)
 - g) Identify objectives, strategies, policies, facilities and services to support effective and efficient goods movement (e.g. by minimizing congestion in key corridors) (H)
 - h) Identify objectives, strategies, policies, facilities and services to make freight activity more sustainable (e.g. shift from road to rail, improve routing practices) (M)

PRINCIPLE 5: TRANSPORTATION DEMAND MANAGEMENT

- Options:**
- a) Place strategic priority on TDM as a necessary complement to the management of transportation supply (H)
 - b) Recognize the full range of TDM approaches (land use, pricing, incentives, outreach) and identify relevant strategies, policies and services for each (H)
 - c) Identify key stakeholders in TDM implementation, the nature of their roles and resource requirements (M)

PRINCIPLE 6: TRANSPORTATION SUPPLY MANAGEMENT

- Options:**
- a) Acknowledge the implications of various minimum standards for roadway level of service, and select a preferred standard. (H)
 - b) Include objectives, strategies, policies, facilities and services to maximize the multimodal capacity of current infrastructure. (H)
 - c) Include objectives, strategies, policies, facilities and services to manage recurring and non-recurring congestion. (H)
 - d) Include objectives, strategies and policies to manage transportation assets (e.g. maintenance, repair, rehabilitation, renewal). (H)

PRINCIPLE 7: STRATEGIC APPROACH

- Options:**
- a) Establish a comprehensive strategic framework consisting of a vision, goals and other elements. Illustrate linkages to other community visions or goals. (H)
 - b) Consider alternative futures for land use and transportation systems, and evaluate their requirements and implications. (H)

- c) Set quantitative objectives in a deliberate and realistic manner. Identify conditions required for their achievement, and the implications of the failure to achieve them. (H)

PRINCIPLE 8: IMPLEMENTATION GUIDANCE

- Options:**
- a) Address recommended implementation program in great detail
Or: Address recommended implementation program at a strategic level (H)
 - b) Address facilities, services, programs and policy actions to be implemented (H)
 - c) Identify a short-term priority action plan that prescribes important “first steps” to build momentum and lay the foundation for long-term changes (M)
 - d) Specify subsequent planning efforts that are needed to develop additional implementation details (e.g. area or modal plans, facility plans, management strategies) (H)
 - e) Describe criteria for ongoing implementation decisions (e.g. setting or revising project priorities and schedules) (H)

PRINCIPLE 9: FINANCIAL GUIDANCE

- Options:**
- a) Identify an estimate of expected future revenues and capital and operating costs (including costs for facility construction, operation and maintenance, fleets, programs and services) associated with the plan. Identify expected funding gaps. (H)
 - b) Illustrate the implications of funding gaps by comparing “fiscally constrained” and “fiscally unconstrained” implementation scenarios. (H)
 - c) Identify options for overcoming funding gaps. (M)
 - d) Identify balanced spending principles (M)

PRINCIPLE 10: PERFORMANCE MEASUREMENT

- Options:**
- a) Highlight the need for a performance measurement strategy to monitor the plan’s progress as well as outputs, outcomes and external circumstances. (H)
 - b) Establish a performance measurement framework that links to the plan’s strategic framework (H)
 - c) Establish a reporting strategy (M)

PRINCIPLE 11: PUBLIC INVOLVEMENT

- Options:**
- a) Integrate an effective public involvement program into the planning process (H)
 - b) Address ways for public involvement to enhance the implementation of planned programs and projects (H)

PRINCIPLE 12: PLAN MAINTENANCE

- Options:**
- a) Identify a minimum frequency for updating the plan, or for reviewing it to identify any need for amendments or updates (both may occur in tandem with parallel community plan processes). Also identify an interim process and criteria for identifying the need to review or update the plan (likely based on results of the performance measurement program). (H)
 - b) Identify a process for regular implementation program updates, as an extension of the plan. (H)
 - c) Identify other subsequent processes that will represent extensions or updates to the plan (area plans, modal plans) and if/how they will be integrated into the plan through future updates. (M)

Importance: (H) High
(M) Moderate