IMPROVING BUS SERVICE

MODEST INVESTMENTS TO INCREASE TRANSIT RIDERSHIP

Canada

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Improving Bus Service – Modest Investments to increase Transit Ridership is a resource tool intended to help transportation planners, urban practitioners and related professionals to improve urban and suburban bus services in small to medium-sized communities in Canada.

This guide provides guidance to individual communities to assess the status of their current transportation system, determine their future needs, and decide between the potential measures and methods to be implemented in order to offer residents and customers a bus service of higher quality that meets their current and future mobility needs.

IS THIS GUIDE FOR YOU?

This guide addresses the practical concerns of decision-makers (i.e. elected officials, senior managers) who provide staff with strategic direction and authorize resources, as well as managers in municipal staff groups with direct or indirect responsibilities for TDM and practitioners involved in designing, planning, and delivering TDM measures.

More specifically, this guide seeks to inspire and provide guidance to the following groups of urban transportation practitioners and related professionals.

Transportation Agencies and Authorities

This guide is primarily addressed to municipal and regional transportation agencies of small to medium-sized communities responsible for designing, planning and operating transit services. These include transportation planning departments, transit authorities, transportation management associations, among others.

Employers and Real Estate Developers

This guide is also of interest to employers who intend to encourage their employees and clients to use bus services and active modes of transportation for their commuting trips.

In addition, it provides valuable information for real estate developers and owners of commercial and residential properties as they may benefit from the implementation of a bus station in the vicinity of their property. Transit-supportive land development strategies have the potential to generate greater accessibility to a range of activities, increasing property values and contributing to create more livable places.

Educational institutions

Universities and educational institutions may also refer to this guide to accommodate and encourage students, faculty, and staff to use public transportation services. They provide a significant ridership base, which is why it is important to provide a high quality bus service to these areas.

Non-Governmental Organizations and Community Groups

Finally, non-governmental and local advocacy organizations as well as community groups with an interest in urban sustainability and public transportation may also find this guide pertinent when designing and undertaking actions or activities to raise people's awareness about the benefits of sustainable transportation and encourage them to use bus services.

WHAT'S INSIDE?

This guide provides information on the implementation of public transportation initiatives. The document contains a non-exhaustive list of measures to improve bus service. The approach developed in this guide is flexible and adaptable to local conditions and circumstances, allowing for adjustments and variations.

Section 1 introduces the **purpose of the guide** by explaining the rationale behind transportation projects aimed at improving bus services, and defining the main attributes of an improved bus system. Furthermore, the guide elaborates on the key motives for improving bus service as well as the potential payoffs that could result from such improvements.

Section 2 provides information on the steps to plan and implement improved bus services.

Section 3 lists a series of **potential initiatives and measures** aimed at improving bus service. The first two themes, "network planning and services" and "branding & marketing", are discussed in a qualitative manner. The last three themes – "right of way & transit priority", "bus stop and bus station" and "vehicle" – are described in a standardized format, i.e. on index cards including a brief description of the measure, its potential benefits and issues, as well as average costs, examples and additional resources.

Section 4 contains direction on the monitoring and evaluation of improved bus services initiatives.

A bibliography is provided at the end of the document. All documents and websites consulted for the use and completion of this guide are also listed.

1.1. SUSTAINABLE TRANSPORTATION AND TRANSPORTATION DEMAND MANAGEMENT (TDM)

Many Canadian communities have taken actions to improve the sustainability of their urban systems and reshape their transportation systems to address congestion issues, respond to their community needs and provide travelers and commuters with convenient, reliable, clean, safe, and sustainable transportation options.

In this attempt, Transportation Demand Management (TDM) strategies have gained momentum over the past decades. TDM is based on the idea that there is an increasing need to manage mobility and not just providing more mobility options. Travel activity is primarily shaped by three elements: Transportation Demand, Transportation Supply, and Land Use. This guide focuses on the transportation demand aspect of a community's transportation system. TDM encompasses a variety of policies, programs and services that seek to address transportation issues influencing whether, why, when, and where people travel. It is important to mention that TDM measures do not replace transportation supply and land use measures but they complement these measures in a significant and cost-effective manner.

Major elements of a community's transportation and land use system

ECONOMIC FACTORS | SOCIAL FACTORS | PHYSICAL FACTORS

TRANSPORTATION DEMAND

TRANSPORTATION SUPPLY

LAND USE
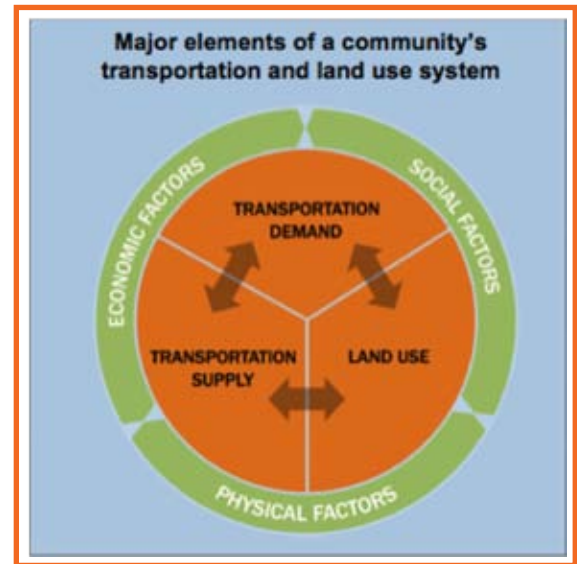
ATTRIBUTES AND BENEFITS OF TDM

✓ **Flexibility:** TDM measures are readily customized for specific user groups (e.g. seniors, youth, cyclists, transit riders), travel purposes (e.g. work or non-work travel), travel destinations (neighborhood, single public or private institution), or timeframes (peak or non-peak period, weekdays, season).

✓ **Speed:** TDM tools can be gradually planned and implemented in days, weeks, or months.

✓ **Cost-Effectiveness:** TDM measures can be scoped and scaled to match available resources. While the most effective approaches to TDM are not inexpensive, municipalities can tailor a TDM program to make effective and creative use of existing staff and budget. Even costly TDM measures tend to be far less expensive than most transportation infrastructure projects.

For More Information: The guide *Transportation Demand Management for Canadian Communities, A guide to understanding, planning, and delivering TDM programs* produced by Transport Canada provides a summary of lessons learned and offers advice to municipalities to implement TDM strategies.

http://www.tc.gc.ca/media/documents/programs/tdme.pdf

This guide takes into account the role of transportation planners and TDM practitioners who seek to manage transportation demand by improving the quality of public transportation systems. All measures and initiatives presented in this guide are intended to foster the competitiveness of transit services and attract new bus riders by providing an efficient, reliable and comfortable bus service.

"The strategy to attract people to transit is always based on increasing convenience, affordability and the promise of performance. The strategy to retain riders is based on reliability and on the many other aspects of a customer's experience that influence feelings of safety, trust and ease-of-use"(OC Transpo, 2011).

1.2. WHAT IS IMPROVED BUS SERVICE?

Improving bus service means providing a reliable and convenient alternative to driving to a wide array of people, travelers, commuters, etc. Some investments will generate more new riders per dollar spent than others; while some may not increase ridership but may improve their experience or diminish operating costs.

PLANNING TIP… Key attributes of a transportation system			
• Reliability • Frequency	• Accessibility • Capacity	• Speed • Comfort	• Visibility • Identity

This guide has identified five "categories of action", each of these containing more specific and detailed measures or initiatives to achieve bus service improvements:
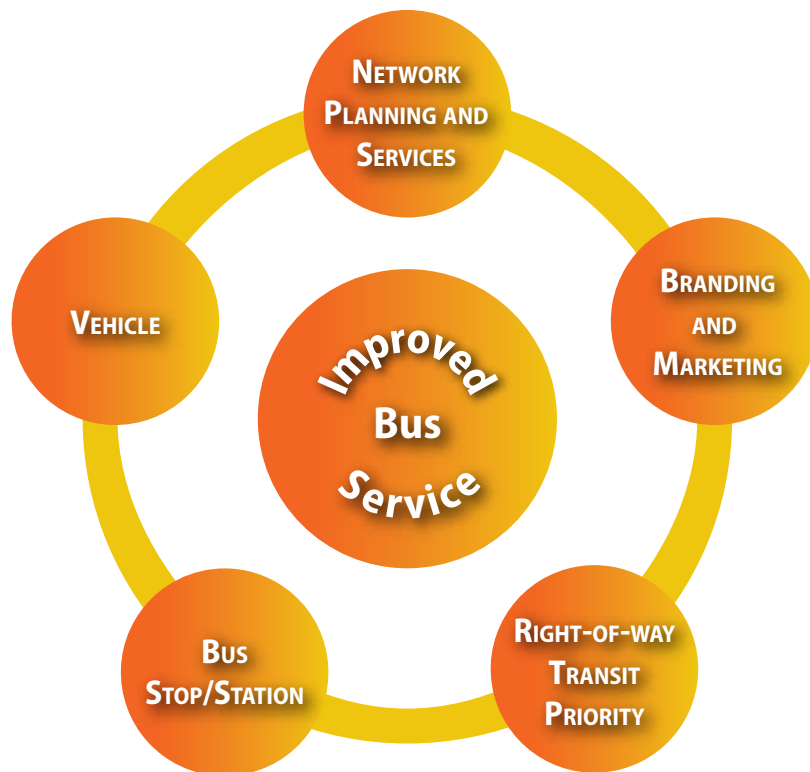
1.2.1. Network Planning and Services

These strategies aim to improve the transportation planning process. Planning for bus service is more effective when it relies on a comprehensive and strategic approach. The primary purpose is to form an integrated and efficient network of transit services, combining bus service with other modes of transportation (both public and private) and urban development policies.

1.2.2. Branding and Marketing

Branding and marketing strategies have become a critical component of transit improvement projects. These strategies are intended to build a distinct brand identity for a bus service by emphasizing its distinctive features and benefits, and presenting it as a "premium" transportation alternative. Branding, market research activities and social marketing are among the list of possibilities.

HELPFUL RESOURCE:
Changing Transportation Behaviours, A Social Marketing Planning Guide
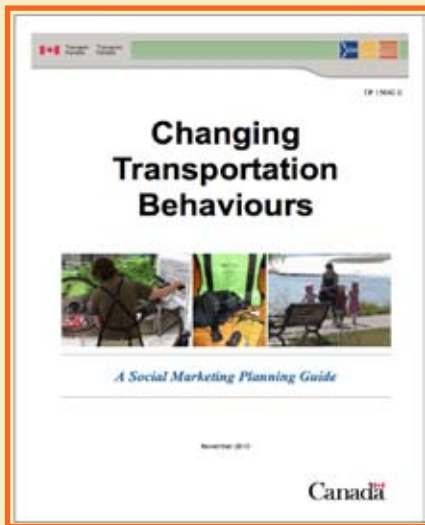
This guide is intended to help transportation planners, TDM specialists, or project managers understand and influence transportation choices. The guide uses a community-based social marketing approach (CBSM) and provides a planning framework broken down into eight steps. The guide also includes numerous worksheets to walk through each step with examples of key questions and further recommendations, as well as five Canadian transportation case studies highlighting the social marketing planning process.

The guide is available online:
http://www.tc.gc.ca/media/documents/programs/ctb.pdf

1.2.3. Right-of-Way and Transit Priority

A bus service can significantly benefit from the introduction of right-of-way and other measures that reallocate road space by giving priority to transit vehicles and increase the competitiveness of buses. By allowing buses to bypass traffic congestion, the service gains in speed and reliability. There exists a variety of transit priority measures and right-of-ways along which the bus can operate, such as dedicated right-of-ways, bus lanes and transit priority systems.

1.2.4. Bus Stop and Bus Station

Bus stops and stations should be carefully designed because of their impacts on both the convenience and the attractiveness of using a bus service. Various key elements should be considered, such as the visibility of the bus stop/station, its accessibility and available commodities, the linkages to other transportation modes, enhanced traveler information as well as the location of the bus stops/stations (transit-supportive development). Choosing a bus stop location that maximizes surveillance may also contribute to reduce opportunities for crime. For more information on Crime Prevention through Environmental Design, visit: *http://www.rcmp-grc.gc.ca/pubs/ccaps-spcca/safecomm-seccollect-eng.htm*.

1.2.5. Vehicle

Vehicles should be carefully selected because of their impacts on travel time, service reliability, and operating or maintenance costs.

1.3. BENEFITS OF IMPROVED BUS SERVICE

Under a TDM strategy, improved bus service can bring about significant benefits to the community as a whole by introducing a cost-effective, reliable and affordable transportation system.

1.3.1. System Benefits

In terms of transportation and system benefits, enhanced bus services combine the advantages of rail system such as "network flexibility" with the advantages of bus systems in terms of lower operation and maintenance costs. The main benefits concern travel time, reliability and punctuality, as well as perceptions of improvement in safety, image and identity (FTA, 2009).

When running along exclusive right-of-ways or benefiting from priority signalization, enhanced bus services operate at a higher average speed than conventional local bus routes and demonstrate a better adherence to scheduling. Travel time savings are strengthened when the system allows for pre-paid fare collection and all-door boarding (FTA, 2009).

The most significant effect of these improvements is an increase in transit ridership. Transit authorities surveys indicate that additional ridership has mostly come from passengers that are new to transit (FTA, 2009).

1.3.2. Community Benefits

Transit-Supportive land development

Significant positive development effects can result from the development of a new bus service or the improvement of an existing one. Transit infrastructures and facilities such as bus stations have the potential to shape urban development by fostering accessibility to employment and economic centers, increasing property values and creating more livable places (FTA, 2009). These new developments will feature higher densities and intensity of uses, emphasizing a greater mix of activities including housing, employment, retail, and leisure activities.

Environmental Quality

In terms of environmental impacts, additional ridership suggests that some people have given up their cars to opt for public transit, contributing to reduce traffic congestion and automobile emissions.

The overwhelming success of MetroLink, Halifax, Nova Scotia.

Four years after the implementation of the MetroLink service in Halifax, numerous areas of success were observed:

- Increased Ridership: 5,537 new transit riders since 2004
- Travel Time Savings: 17% travel time savings on Route 159; 45% on Route 165; and 55% on Route 185
- Service Effectiveness on sample route 185, 60%, 70% and 86% reduction of variability of arrival time for the morning peak, mid-day, and evening peak periods respectively
- Increased Passenger Safety: 64% reduction in traffic collision rate between 2005 and 2006 on MetroLink routes and 50% between 2006 and 2007
- Cost efficiency: $5 per rider capital costs – second lowest among North American bus rapid transit systems
- Increased Mode Share: 30% of users walk to MetroLink terminals; 30% of riders use Park and Ride lots; 22% of users take conventional transit to access MetroLink terminals
- Increased Quality of the Environment: 51% greenhouse gas emission (GHG) savings

For more Information: *http://www.tc.gc.ca/eng/programs/environment-utsp-halifax-882.htm*

1.4. TYPOLOGIES OF URBAN TRANSPORT NETWORKS

This guide acknowledges the fact that each city or community is unique, featuring diverse urban configurations and facing different transportation challenges. All initiatives and measures described in the present guide must then be adapted according to the local conditions (needs, values, and constraints) of the city, community or region that intends to improve bus service.

This section presents and describes three categories of urban transport networks within which improvements to bus services can be introduced: large cities, small and medium-sized cities, as well as suburban cities. These are differentiated given the following criteria:

- The size and the complexity of the city structure[1] ;
- The current level of transit services available;
- The potential to expand the current network of transit services.

The following table presents a brief description of the objectives of transit initiatives for each category as well as a list of examples and links to additional sources of information. A brief description of some of the key attributes of transportation networks mentioned in the table can be found throughout the document.

1. LARGE CITIES	
Objectives	✓ **Improve** the overall quality of the public transportation system ✓ **Build** an integrated network of transit services combining express and major bus routes with local and feeder routes to ensure the greatest coverage possible. ✓ **Increase** transit ridership ✓ **Prepare** for potential upgrading to LRT
Examples and Links	Ottawa, Ontario: The Transitway. *http://www.octranspo1.com/*

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1 Considering the population of the Metropolitan Area (Census 2006), large cities have a population greater than 900,000 inhabitants ; medium-sized cities have a population between 200,000 and 900,000 inhabitants and small cities have a population less than 200,000 inhabitants.

2. SMALL TO MEDIUM-SIZED CITIES	
Objectives	✓ **Increase** "amount" and attractiveness of transit services ✓ **Raise** awareness about the availability of transit services ✓ **Provide** reliable transportation options for residents, workers and visitors
Examples and Links	Halifax, Nova Scotia: The MetroLink *http://www.tc.gc.ca/eng/programs/environment-utsp-halifax-882.htm* *http://halifax.ca/metrotransit/MetroLinkMainPage.html* Waterloo Region, Ontario: The iXpress *http://www.grt.ca/en/routesschedules/ixpress.asp* Quebec City, Quebec: The Metrobus *http://www.tc.gc.ca/eng/programs/environment-utsp-metrobus-965.htm* Saint John, New-Brunswick: Comex *http://www.saintjohntransit.com/* Kelowna, British-Columbia: RapidBus *http://www.transitbc.com/regions/kel/* *http://www.bctransit.com/transitfuture/rapidbus.cfm* Banff, Alberta: Banff Roam *http://www.banff.ca/locals-residents/public-transit-buses/roam.htm* Whistler, British-Columbia *http://www.whistler.ca/residents/transportation* *http://bctransit.com/regions/whi/* Sherbrooke, Quebec *http://www.sts.qc.ca/* Guelph, Ontario *http://guelph.ca/living.cfm?subCatID=1179&smocid=1764*
3. SUBURBAN CITIES	
Objectives	✓ **Increase** the modal competitiveness of bus services for commuting purposes ✓ **Ensure** the connection between residential areas located on the outer areas and employment sites located in central areas ✓ **Address** primarily the mobility needs of workers / commuters
Examples and Links	Brampton, Ontario: Züm *http://www.brampton.ca/en/residents/transit/zum/Pages/welcome.aspx* York Region, Ontario: Viva *http://www.yrt.ca/en/index.asp*

Section 2 - Planning Process

When developing a business plan for improved bus services, a number of elements must be taken into consideration. The first step is to assess the current transit system to better understand the customer demand along the corridors. An inventory of existing lines and their performance, human resources and equipment (buses, bus stops, garages, etc.) will provide an overview of the current situation and may highlight potential for improvement.

2.1. STAKEHOLDERS AND PARTICIPATION

A collaborative and participatory planning approach requires a preliminary identification of key stakeholders who can provide valuable input into the definition of options to improve bus services. Engaging these stakeholders is crucial to the success of the potential initiatives, considering that they imply a number of changes pertaining to the local economy, the quality of the urban form, and the structure of transit operations and employment.

Strategies should be designed to address potential concerns and issues that could be expressed by each stakeholder group. Their early involvement in the planning process will build support and pave the way for a smooth implementation as they usually act as important messengers or ambassadors of the project.

The following table presents the different stakeholders in bus improvement projects as well as their responsibilities:

Transit Operator
• Plan and operate the bus system; • Create an integrated network of bus and transit services; • Ensure integration of bus services with other modes of transportation and public facilities if existing; • Undertake marketing and awareness campaigns to promote the use of bus services to current riders and potential customers; • Provide financial incentives (reduced fares, price concessions, partnerships, etc.).
Urban Practitioners and Related Professionals
• Ensure the integration of the bus system with public facilities; • Ensure integration between transit, buses in particular and land-use strategies; • Promote transit-supportive development strategies • Provide support for determining adequate bus stop location.
Policy-makers / Decision-Makers (all levels: municipal, regional and provincial)
• Enact allocation of required resources • Enact regulatory changes, if necessary • Adjust legal and regulatory framework, if necessary • Ensure cooperation between municipal agencies and departments.
Parking Authority
• Ensure coordination of parking and transit strategies at key locations; • Provide space for park and ride lots near bus stations and bus stops.

Traffic and Roads Department

- Coordinate construction of bus stations
- Make change to road infrastructure, signage and signaling to support increased bus ridership

Community Groups and NGOs

- Build support among citizens and residents
- Provide bus safety education
- Promote the use of buses and other modes of sustainable transportation

Transportation Management Associations (TMA)

- Create conditions for an efficient stakeholder environment
- Ensure equitable participation of stakeholders in the project implementation
- Promote bus services as a viable, sustainable and reliable transportation option

Educational Institutions (Universities, Schools, etc.) - Other Public Institutions (Hospitals, etc.)

- Encourage bus use among students, faculty and staff
- Develop U-Pass programs with transit authorities

Employers and Unions

- Encourage bus use among employees
- Develop Employer travel plans

Merchant associations, Chamber of Commerce, Board of Trade

- Build support among merchants for bus service improvement projects and during construction periods
- Mitigate opposition to removal of parking spaces

Landowners and Developers

- Coordinate and Inform about current development projects
- Integrate transportation activities with residential development project

News Media

- Outreach, Communications, Public Education, Awareness raising, etc.

Police

- Maintain a safe environment for transit riders
- Protect the system from vandalism

2.2. RIDERSHIP AND DEMAND ANALYSIS

Prior to the introduction of a new bus service or improvements to an existing one, the level of ridership is the first critical component of the transportation system to be assessed.

Step 1 - Evaluate current ridership: Using detailed and up-to-date data, measure and evaluate the ridership level of all routes in the transportation network. Identify roads and corridors with higher levels of automobile and/or transit traffic. The level of ridership should be read in conjunction with the level of road capacity to identify corridors with the greatest potential for upgrading and expanding bus services.

Step 2 - Estimate potential ridership and forecasting travel: Estimate and anticipate the level of ridership due to the introduction of new or improved bus services. Such projections are also based on population and employment growth previsions.

Numerous assessment methods and tools can be used to assess whether there is a latent demand for improved bus services or additional transit services along selected corridors. In particular, surveys are useful to gauge the general public's interest in and support for an additional bus service, as well as to evaluate the potential willingness of residents and riders to pay for this type of service. Different types of surveys can be employed: Household travel surveys (i.e. Origin/Destination surveys), customer satisfaction surveys of transit services, employer surveys, etc

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HELPFUL RESOURCE: Guide on Sustainable Transportation Surveying, TDM Solutions for Canadian Municipalities and Employers.

The purpose of this guide is to provide a user-friendly methodological framework for helping urban practitioners, government officials and associations gather necessary information to evaluate the performance of a TDM initiative. The guide identifies and explains the most common data collection techniques and provides users with sample surveys for each evaluation method. These data collection techniques include: Behaviour and Attitude Survey; Origin-Destination studies; Open houses; Focus groups; and automated or manual traffic counts.

For More Information:
http://www.tc.gc.ca/media/documents/programs/gsts.pdf
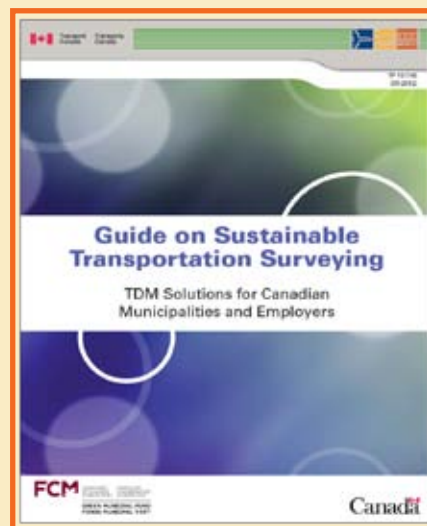
The transportation system assessment involves a thorough analysis of the state of the current fleet to determine whether current vehicles in operation can support the addition of services and respond to an increased level of demand.

Finally, some elements are particularly relevant to consider when improving bus services:

- **Traffic lights and road structure at intersections:** select key intersections where signal priority systems or queue jump lanes would bring about significant travel time savings.
- **Sidewalks and pathways:** create an environment that is amenable and accessible to pedestrians, with high quality and safe sidewalks, pathways and crosswalks.
- **Pedestrian infrastructure and amenities** such as benches, trees, lighting, public restrooms, garbage cans, etc.
- **Cycling infrastructure and amenities**, such as parking, lockers, shelters, changing rooms, but also bike lanes and paths on the street network.

In order to improve the synergy between transportation modes and allow for significant cost savings, bus improvement projects should be designed in conjunction with the Master's City Plan, which comprises land-use planning strategies as well as alternative transportation policies.

2.3. CREATING A VISION FOR IMPROVED BUS SERVICES

A vision which clearly identifies the core concepts, the rationale and the objectives of the bus service improvement initiative can be developed once the initial assessment of the key opportunities, challenges and stakeholders has been finalized. A vision is usually defined along a time horizon, and detailed objectives are assigned to short-term, mid-term and long-term timeframe.

The **project's purpose** corresponds to the immediate objective of the project and is the key anchor of the project. The purpose is defined based on previous system assessment, and the identification of the central issue to be addressed. The project's purpose needs to be measurable and monitored through tangible indicators.

Examples of project's purpose include: to increase the capacity to respond to an increasing demand along specific bus routes; to increase frequency along certain bus routes at peak-hours; to improve accessibility, etc.

The **project's goals** are expected on a wider scope and are also influenced by many other factors. While there may only be one immediate project objective, the project can identify several long-term objectives, or goals.

For a bus improvement initiative, the project's goals can be: reduced pollution, increased quality of life, reduced congestion, increased transit ridership, reduced travel time, etc.

2.4. ACTION PLAN

The elaboration of a clear vision is completed by the elaboration of an action plan. This plan is intended to establish a reliable structure and an organizational framework for the implementation of the project. This document is crucial as it will remain the primary and reference document for all stakeholders throughout the entire project. The detailed plan includes the following documents:

- **Business and institutional Plan:** This plan establishes the structural and contractual nature of the relationship between the private and public sectors in order to ensure an equitable participation of both sectors in the implementation, operation and evolution of the bus service.

- **Engineering Plan:** This plan details the design of each physical aspect of the project.

- **Financing Plan:** This plan lists all project-associated resources and expenses. Previous cost analyses are included in this plan, anticipating the amount of capital required for the construction, operation and evaluation of the improved bus service.

- **Marketing Plan:** This plan details the marketing, branding and promotional strategies developed to advertise the improved service.

- **Impact Analyses:** The detailed plan also includes all previous analyses and assessments aimed at measuring the impacts of bus service improvements on: (i) traffic levels, (ii) the economy, (iii) the environment, (iv) urban development and (v) social equity. A more accurate set of impact projections may be required once all design and planning components are completed.

Section 3 - Potential Measures and Initiatives

This section presents a series of measure and initiatives for improving bus service. For the purposes of this guide, these are organized into five main categories:

✓ Network planning and services
✓ Branding and marketing
✓ Right-of-way and transit priority
✓ Bus stop & bus station
✓ Vehicle

The following table summarizes the requirements and the costs of the measures as well as their "quick start" potential.

TOOLS	Data Research Requirements	Technical Requirements	Potential Time Requirements	Potential Capital Costs	Potential Quick "Start"
1. NETWORK PLANNING & SERVICES					
Shared Accountability System	••	••	•••	$	NO
Network Reliability	•••	•••	••	$	NO
Quality Performance	•••	•••	•••	$$	NO
Route & Network Coordination	••	•••	••	$	NO
Customized Transportation Services	•	••	••	$$	YES
2. BRANDING AND MARKETING					
Comprehensive Marketing Strategy	••	•	•	$	NO
Branding Devices	••	•	••	$	YES
Market Research	•••	••	••	$$$	NO
Social Marketing	•••	••	••	$$	NO
Advertising	••	••	•	$	NO
Strategic Partnerships	•	•	••	$	YES
Pricing Strategies	•	•	•	$	YES
3. RIGHT OF WAY AND TRANSIT PRIORITY					
Dedicated ROW	••	•••	•••	$$$	NO
HOV Lanes	••	•••	••	$$$	NO
Express Bus Routes	••	•••	••	$$$	NO
Queue Jump Lane	•	•••	••	$$	YES
Priority Signalization	•	•••	••	$	YES

4. BUS STOP/STATION					
Amenities	•	•	••	$$	YES
Between Stop Service	•	•	•	$	YES
Enhanced Traveler Information Systems	••	••	••	$$	YES
Park-and-Ride Facilities	••	••	••	$$	NO
Bike-and-Ride Facilities	••	••	••	$$	NO
Intermodality	••	••	••	$$	NO
5. VEHICLE					
Style and Design	•	••	••	$$	YES
Bicycle Rack	•	••	•	$	YES
WiFi	•	•	•	$	YES
Universal Accessibility	•••	•••	•••	$	NO

KEY	
• Low Requirement	$ Low level of Investment
•• Medium Requirement	$$ Medium Level of Investment
••• High Requirement	$$$ High Level of Investment

3.1. NETWORK PLANNING AND SERVICES

Planning for improved bus service is more effective when it relies on a comprehensive and strategic approach. A successful planning strategy is based on:

✓ Coordination   ✓ Integration

✓ Collaboration   ✓ Cooperation

Transit services in general and bus service in particular can be enhanced, completed, reinforced and modernized through a wide range of initiatives. The challenge is to create an attractive and dynamic bus system and foster the competitiveness of the bus / transit services.

An adequate system of network planning manages transportation demand rather than to react to it.

NETWORK PLANNING & SERVICES

- SHARED ACCOUNTABILITY SYSTEM
- NETWORK RELIABILITY
- QUALITY PERFORMANCE
- ROUTE & NETWORK COORDINATION
- PROVIDE CUSTOMIZED TRANSPORTATION SERVICES
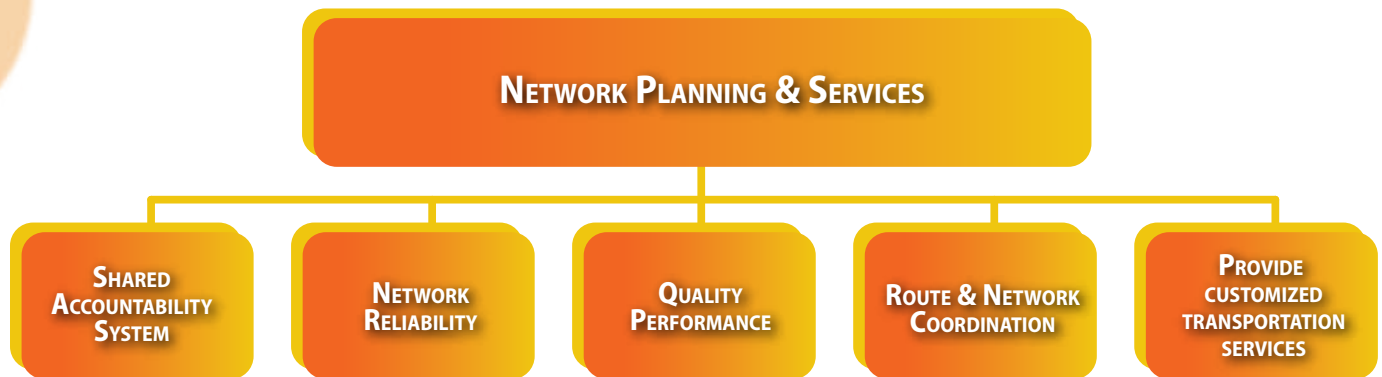
3.1.1. Shared Accountability System

Transit systems are an integral part of the regional transportation network. Public transportation planning requires the participation of a great diversity of actors and contributors, at different decision levels. Developing a shared accountability system is a key factor to ensure the coordination among transit authorities, public and private agencies, and the compatibility between transit networks.

Harmonizing provincial, regional and local governments' transportation plans, strategies and budgets is crucial to create a supportive framework to improve the general functioning of transit systems. Land-use planning, road construction and regulation, major private and public events are intricately linked to transit use. Employers and various agencies can also mutually benefit from transit use by capitalizing on programs that seek to broaden transportation services from the workplace such as car-pooling, park-and-ride or bike-and-ride facilities, financial incentives, etc.

For transit authorities in particular, this collaboration translates into intermodal coordination where transit vehicles from different networks synchronize their scheduling or ticketing methods to provide complementary services.

Integrated Ticketing Systems: OC Transpo (Ottawa) and STO (Gatineau)

OC Transpo (Ottawa) and the Société de Transport de l'Outaouais (STO) have engaged in a partnership to allow their users to use one another's network seamlessly using regular passes without any additional fees.

For more information:

http://www.sto.ca/tarification/sto_reseau_octranspo_e.html

http://www.octranspo1.com/tickets-and-passes/transfers_to_and_from_sto

3.1.2. Network Reliability

The reliability of a service refers to its dependability, safety and "user-friendliness".

Reliability. Increased reliability refers to greater schedule adherence, an increased number of routes ensuring an equitable city coverage, higher service frequency during both peak hours and non peak hours, extended hours of operation at night, etc. As bus service reliability highly relies on traffic conditions and road quality, road space can be reallocated to allow buses to circulate on a dedicated right-of-way.

More affordable measures consist in installing transit priority systems and queue jump lanes at given intersections. It is also possible to provide bus drivers with alternative routes or send back-up transit vehicles to meet emergency or unexpected circumstances.

In addition, enhanced traveler information system can complement and further improve the reliability of the bus service. Information tools announcing real-time schedule information, delays and service interruptions significantly help riders to react accordingly.

Go Times, MetroLink, Halifax

Since 1984, Halifax's Metro Transit has been using GoTimes, a radio communication that operates by tracking bus movements to keep "individual drivers and controllers continually aware of schedule adherence" (Transport Canada). Commuters can access this information at any stop or station through an automated phone call, video display or audio announcements. It is estimated that 6,000 to 10,000 calls are made daily for GoTimes bus information.

Source: *http://halifax.ca/metrotransit/news/archives-go_times.html*

WEB WATCH, London Transit Commission, Ontario

Web Watch Real-Time bus monitor is a service recently implemented in London, Ontario, that allows to track London transit bus service information live through the installation of GPS, providing real-tine maps and up to date estimated arrival times.

For More Information: *http://www.ltconline.ca/WebWatch/*

Safety. Bus service reliability is also measured in terms of safety. It is important to identify and eliminate any potential threats in transit vehicles and stations/stops, such as sharp edges, lack of lighting, slippery floors, broken glass or dark corners. In addition, it is useful to elaborate an emergency management plan that includes general responses to emergency situations and "how to" guides for both transit staff and users.

Usability. The clarity and user-friendliness of a bus service refer to the use of enhanced navigation and information tools that can optimize commuters' sense of safety and comfort. When developing those tools, it is important to keep in mind that most people should understand all symbols, navigation tools and alerts presented in the network system. Therefore, they should be as clear and simple as possible.

Société de Transport de Sherbrooke (STS) Website

The STS has developed a user-friendly website, presenting the variety of services available to customers. The website allows visitors and regular users to register and create their own customized page, saving their favorite itinerary (origins and destinations), bus routes, and point of interests. Registered users can receive alerts through email or SMS when service delays or interruptions occur along the route(s) specified in their profile.

The Website also gives access to an interactive map. Additional services for trip planning and scheduling are currently being developed.

For More Information: *http://www.sts.qc.ca/* (in French only)

3.1.3. Quality Performance

Bus network planning can be improved through regular monitoring activities and quality performance checks.

For detailed information about monitoring activities and how to build a monitoring framework, refer to section 4 of this Guide.

The importance of assessing bus systems on a regular basis stems from ever-changing and ever-growing commuters' needs. The service performance of certain bus routes can fluctuate on a seasonal basis or at certain times of the day, thus increasing the need for the bus systems to adapt and accommodate their services accordingly.

3.1.4. Route and Network Coordination

Improved route coordination between transit networks facilitates transfer and connection between the networks.

Bus route connections. Bus routes should connect at strategic locations and intersections in order to form an integrated and comprehensive network of transit services.

Schedule coordination should be put in place at these key locations to reduce waiting time at transferring points on the network.

Plan métropolitain d'aménagement et de développement 2011, Communauté métropolitaine de Montréal.

The Réseau de transport de Longueuil serves a number of municipalities:
Longueuil (Vieux-Longueuil, Greenfieldpark and Saint-Hubert), Brossard, Boucherville, Saint-Lambert and Saint-Bruno-de-Montarville. Some of these have terminals that connect the RTL to CIT Roussillon (Sainte-Catherine, Delson, Ville de Saint-Jean-sur-Richelieu, Saint-Constant); CIT le Richelain (Candiac, LaPrairie); CIT Chambly-Richelieu-Carignan; CIT Sorel-Varennes; CIT VR (Saint-Hyacinthe Corridor); and STM (Island of Montreal). The Société de transport de Montreal (STM) also connects to the Société de transport de Laval (STL) network; the Agence métropolitaine de transport (AMT)'s suburban light rail networks reaches the suburban and exurban municipalities of Blainville, Saint-Jérôme, Deux-Montagnes, Vaudreuil-Hudson, Candiac, Mont-Saint-Hilaire and Mascouche. The Central Train Station, the Gare d'autocars de Montréal and the Pierre-Elliot-Trudeau International Airport all have direct access through AMT's network, offering travellers a far-reaching transit system.

Source: Projet de Plan Métropolitain d'Aménagement et de Développement 2011

3.1.5. Provide customized transportation services

Managing bus demand is an integral part of network planning: buses should adapt to their environment to best suit commuters' needs. Simple considerations are sometimes significantly relevant:

- **Number of stops.** If a route has too many stops, it is recommended to create two or more routes that serve the same area;
- **Overcrowded buses.** Consider increasing the vehicle capacity by operating articulated or double-decker buses;
- **Noise levels.** if the serviced zone is a quiet residential area, it is suggested to avoid loud buses.

Shuttle services can be an option for small municipalities or areas with particular restraints to conventional transit systems. They are intended to provide a direct connection between strategic locations and trip generators, either on a regular basis (airport, university, etc.), seasonally or during special events.

747 Express Bus, Montreal, Quebec

The 747 Express Bus was introduced in 2010 to connect the downtown bus terminal with the International Airport P.-E.-Trudeau. The service has nine stops in each direction, some of which are connected to the Metro system. The service runs year round, 24 hours a day. All buses have a blue chevron logo with an aircraft pictogram.

Photo Credit: Gris Orange Consultant Inc.

Lunch Express, Smart Commute 404-7. Markham-Richmond Hill, Ontario.

The Lunch Express is a free bus shuttle service that carries office workers from their workplaces to nearby restaurants and shops during the lunch hour on Fridays. The shuttle serves two large business parks in the Markham-Richmond Hill area north of Toronto. The service was launched in 2006 as an initiative of a Transportation Management Association and is coordinated by Smart Commute 404-7.

For More Information:
http://www.tc.gc.ca/eng/programs/environment-utsp-lunchexpress-963.htm

Free Village Shuttle Service, Whistler, BC

The Resort Transit System of Whistler operates a free shuttle service from Village hotels, resorts and condos to ski lifts every 6-12 minutes in Winter and 15-30 minutes during the off-season.

For More Information:
http://www.whistler.ca/residents/transportation/transit-overview

Taxi services can be an economical and effective complement to the transit system in low-density and underserved areas. They provide equity of access to the transit system and may benefit vulnerable transit users. They have been put in place in municipalities with insufficient ridership to justify a transit system (Thetford Mines, Quebec), serving neighborhoods of the city with an insufficient number of riders (Rimouski, Quebec), for the times of day when transit ridership is too low for a bus service (Burlington, Ontario) or to link low density neighborhoods to mass transit nodes such as transit stations or commuter rail stations (Montréal and Longueuil, Quebec).

Trans Cab Service, City of Greater Sudbury, Ontario

The City of Greater Sudbury offers a Trans Cab service to residents living and commuting to and from areas that are not served by conventional transit services.

The service is easy to use is offered for the price of a regular bus fare. The user has to call the designated phone number for the taxi in their area to be picked up or dropped off at a transfer point that will allow transfer to the regular bus service. Trans Cab services are available in 8 areas.

For More Information:
http://www.city.greatersudbury.on.ca/cms/index.cfm?app=div_transit&lang=en&currID=9628

« Taxis Collectifs », Conseil intermunicipal de transport des Laurentides (CITL), Quebec

The Conseil intermunicipal de transport des Laurentides (CITL) has implemented a service of 'collective taxis' to provide transportation to residents of 14 municipalities living too far from transit stations. The service is offered for the same price as a local transit pass. Four "taxi routes" are available to residents, offering them various options: The user can call the taxi to be picked up or dropped off at a transfer point (train station, bus stop) or the taxi follows a fixed route and has a specific schedule.

For More Information:
http://www.citl.amt.qc.ca/infogen/taxicoll.asp (in French only)

3.2. BRANDING AND MARKETING

Branding and marketing strategies have become a critical component of transit improvement projects to attract new customers and retain current riders. Public transit is now researched, marketed and "sold" as a consumer product. Branding strategies seek to emphasize the distinctive features and characteristics of the service such as speed, reliability, comfort, service frequency and span. This section details some of the strategies and methods available for transit authorities when designing their marketing strategy.

```
                        BRANDING & MARKETING

COMPREHENSIVE   BRANDING   MARKET    SOCIAL      ADVERTISING   STRATEGIC     PRICING
MARKETING       DEVICES    RESEARCH  MARKETING                 PARTNERSHIPS  STRATEGIES
STRATEGY
```

3.2.1. Comprehensive Marketing Strategy

Developing an overarching marketing and branding strategy is essential to ensure the successful implementation of structural changes in the provision of transit services in the community.

OC Transpo 2011 Marketing Plan

The 2011 OC Transpo Marketing Plan is intended to revitalize the OC Transpo brand, develop a service identity framework and define a consistent and comprehensive brand hierarchy. The plan is intended to "create sustainable and affordable growth in transit usage over the long run". It also seeks to restore ridership and "reinforce the essential nature of transit in everyday life".

Major themes of action were identified in the Marketing Plan:

- Brand revitalization
- Safety
- Reliability
- Wayfinding
- Optimized Service Design
- E-Transpo
- Affordability
- Advertising Revenue
- Community Partners and Sponsorships
- Market research

More Information at:
http://www.octranspo1.com/images/files/about_oc/transit_planning/marketing_plan2011.pdf

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3.2.2. Branding

Branding includes a set of tools developed to characterize and reinforce the special brand of a bus service. It is primarily intended to help communicate the distinct features of the bus service and increase visibility on all roads. A distinctive name, a logo, and a certain color scheme are applied to vehicles, stations, stops, signage, as well as promotional materials and any other additional features (e.g. a website).

- **Brand Names** can take the form of a word or a short sentence that helps distinguish the bus service from other regular transit services operating in the same region or area.
- A **logo** is a visual image that will communicate the distinct nature of a specific bus service. A logo usually uses distinct and lively colors and can be combined with the brand names, either under the form of an ideogram (icon, sign, emblem) or a logotype (written form of the brand name).
- **Designated Colors:** the use of lively and designated color schemes helps differentiate and set apart the bus service by providing visual references for passengers.

3.2.3. Market Research

The primary purpose of a market analysis is to have a general picture of the clientele and develop a better understanding of the key factors that influence people's decisions in terms of modal choice. More specifically, market research tools are intended to reveal:

- ✓ WHO currently uses the bus service
- ✓ WHO will potentially use the proposed service
- ✓ WHAT are the barriers faced by the non-users
- ✓ WHEN and WHERE the service needs improvements
- ✓ WHAT people value and expect from a bus service

Following the introduction of significant improvements to a bus service, market research activities remain essential to measure and assess customers' satisfaction and appreciation of the service.

Market research tools mostly include:

- **Surveys** (both attitude and usage surveys): Telephone surveys, web-surveys, mail surveys, on-site (either onboard or at a bus stop/station) surveys
- **Focus groups**

The iXpress (Waterloo,ON) Service Marketing and Outreach Campaign

Prior to the introduction of the iXpress service, a marketing and outreach program was developed to raise awareness and inform residents of the Waterloo region about the new transit option and encourage its use. Marketing activities included:

- Multi-Media Marketing Campaign
- Community-based social marketing campaign
- Personal contact with community members through focus groups with target user groups in order to identify barriers and obstacles and what would need to be done to address these issues and encourage them to use the service
- Consumer attitude surveys with the general public

In 2008, three years after the service was introduced, two on-board intercept surveys have been conducted, reaching 1,500 riders. These surveys covered socio-demographic questions and questions about riders' transportation habits such as trip purpose, trip frequency, mode used prior to iXpress.

Source:
http://www.grt.ca/en/routesschedules/ixpress.asp

3.2.4. Social Marketing

Social marketing is "a process that applies marketing principles and techniques to create, communicate, and deliver value in order to influence target audience behaviours that benefit society (public health, safety, the environment, and communities) as well as the target audience."[2] Social marketing is not just about education and awareness campaigns. Its goal is to identify the current and desired behaviours of a target audience, determine the barriers to the adoption of the desired behaviour and implement measures to incite individuals to change their behaviour.

A 8-step process to plan, implement and measure the success of social marketing campaigns is presented in Transport Canada's Changing Transportation Behaviours – A Social Marketing Planning Guide, available at http://www.tc.gc.ca/media/documents/programs/ctb.pdf.

One approach of social marketing that has proven effective is targeted or individualized marketing strategies. These are designed to reach and meet the specific needs of a limited user group (e.g. employees in one work place or students of one university faculty). Their aim is to segment the population of the target audience into three categories: "regular user", "interested" and "not interested" and to provide the interested individuals with personalized information on their transportation options for their main trips. The resulting individualized travel plan may include maps, timetables, coupons, trial transit passes or prizes to encourage trial use of the service.

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2   Kotler, P., Lee, N. & Rothschild, M. in Kotler, P. & Lee, N.R. (2008). Social marketing: Influencing behaviours for good (p.7). Sage.

3.2.5. Advertising

Traditional advertising activities can complement, on the long-term, special and temporary marketing activities for improved bus services:

- Static display advertising can be placed on the interior and exterior of buses, as well as on the related infrastructure and amenities such as shelters and benches.
- Print and radio advertising can be presented in the local media to promote new services. Additionally, local papers and radio stations are often looking for stories and may be willing to promote the services, free of charge.
- Applications for mobile smart phones are another way of attracting attention to the new services.
- Information products such as pocket timetables, maps and brochures with the associated brand and logo are also a cheap way of promoting improved bus services. However, they are more passive in nature, and may be less effective as a stand-alone promotional tool than the other options mentioned above.

An effective and interactive website is crucial to provide general information about new bus services, as well as information about fares, passes, real time travel information, itinerary and maps, etc. The benefits of advertising investments will be greater if potential customers are directed to an attractive and user-friendly website.

Viva Website, York Region, Ontario

In order to enhance the quality of their service, the York Region Transit authority developed a specific website dedicated to the Viva Service. This website provides key information for travelers such as schedules & maps, fares & passes, service updates, special events, recent reports about the current service and information about Viva further development.

For More Information:
http://www.yrt.ca/en/

3.2.6. Strategic Partnerships

The promotion of a new transit service also requires a thorough collaboration between all parties involved in the project and those who could also benefit from the service. Partnership arrangements between transit authorities and local partners and organizations should be leveraged and used for marketing and communications purposes.

Partnership arrangements in Banff, Alberta

The Banff transit authority has recently launched the ROAM service, an all-hybrid electric fleet. The marketing strategy was developed based on a close collaboration with a variety of groups and stakeholders that market the Bow Valley Region as a tourist destination to domestic and international markets. In fact, there were many opportunities to collaborate with local community partners and participants in the tourism industry such as Parks Canada, magazines and travel guides publishers, ski resort and tour operators, travel agents, Banff airport, actors in the accommodation sector, the Banff-Lake Louise tourism association, etc.

For More Information:
http://www.banff.ca/locals-residents/public-transit-buses/roam.htm

In addition, partnerships between transit authorities and transportation agencies can be used to offer transit users a discount on the cost of a regular monthly pass or for the use of complementary and sustainable transportation services such as public bicycle systems or car sharing services.

Price Concessions through Partnership Programs, Quebec.

In the province of Quebec, the Ministère des Transports has established a partnership program with certain public transit authorities (Agence métropolitaine de Montréal (AMT); Société de transport de Laval (STL); Réseau de transport de Longueuil, (RTL); and other intercity and city transit organizations (CIT, CRT and cities) to offer current transit riders a one-month discount on a regular annual public transit pass. Under certain conditions, this special offer allows transit users who have already purchased their annual pass to have their 12th month for free. Furthermore, customers can also benefit from complementary advantages offered by local transit authorities. For instance, in addition to the 12th month free program, STM customers benefit from a $59 discount on a Bixi subscription or have access to Communauto for a $5 monthly fee.

For More Information:
http://www.mtq.gouv.qc.ca/portal/page/portal/grand_public/transport_collectif/montreal_mesure_incitative
(in French only)

3.2.7. Pricing Strategies

Pricing strategies are usually part of broader marketing initiatives designed by transit authorities that offer reduced fares and price concessions for certain user groups or on special days.

In Ottawa, the 2010 OC Transpo Usage and Attitude Survey indicated that cost is the second most important consideration in people's modal choice assessment. Therefore, major efforts are made to offer frequent users, non-frequent users and non-users the opportunity to use an efficient and reliable bus service at "low cost". "Strategically, period passes are positioned and priced to retain riders, encourage more transit use, and simplify the decision to choose transit" (OC Transpo, 2011).

The Pricing Strategy at OC Transpo, Ottawa

✓ **Student U-Pass:** A pilot project of student U-Pass was launched in 2010 for students of the University of Ottawa and the Carleton University. The U-Pass was mandatory for all full-time students and was included in tuition fees. Survey results indicate that overall, student U-Pass holders have increased their transit modal choice by about 17.5%.

For More Information:
http://www.octranspo1.com/tickets-and-passes/u-pass

✓ **Seniors and Veterans:** Seniors and Veterans also benefit from important price concessions such as a 60% discount on the purchase of a monthly pass. In addition, in order to encourage non-pass holders to use transit without having to pay full adult cash or ticket price, transit service is free for all senior riders on Wednesdays. Also, veterans are offered free transit service each year during Veteran's week.

Free Transit Days

✓ Many Canadian Cities offer free transit on New Year's Eve: Vancouver, Calgary, Edmonton, Regina, Saskatoon, Winnipeg, Ottawa, Toronto, Montreal, Halifax, Whistler.

✓ Mississauga and Brampton, Ontario, offer free transit on Canada Day.

✓ Whistler, BC, offers free transit on Earth Day.

✓ Windsor, Ontario: As a pilot project, the city of Windsor provided free transit on smog days during the summer of 2003

## Corporate Value Pass, Windsor, Ontario

The Corporate Value Pass program offers up to 15% discount on a regular monthly pass through payroll deduction program with the employer. At least 50 employees must commit to purchase a minimum of 6 consecutive monthly transit passes for the employer to meet the program's qualifications.

EcoPass, Saskatoon, Saskatchewan

The EcoPass program provides a monthly discount of at least 40% of the cost of a regular adult monthly pass for employees of Saskatoon businesses enrolled in the program. In order to qualify, there must be at least 3 participants at each employer site, who accept to participate for a minimum of 12 consecutive months.

3.3. RIGHT-OF-WAY AND TRANSIT PRIORITY

Transportation Demand Management (TDM) strategies include measures to control and regulate urban traffic by dedicating road space or giving priority to buses on the road. By implementing right-of-way or transit signal priority systems at key intersections, buses are allowed to bypass traffic congestion, hence increasing the speed and the reliability of the bus service and fostering the competitiveness of transit vehicles. Buses can then be advertised and promoted as a reliable alternative to cars to attract new riders. There exists a variety of transit priority tools and right-of-ways: busways, bus lanes, transit priority signalization systems, and queue jump lanes.

RIGHT-OF-WAY

| DEDICATED RIGHT-OF-WAY | HOV LANES | EXPRESS BUS ROUTES | QUEUE JUMP LANES | PRIORITY SIGNALIZATION |
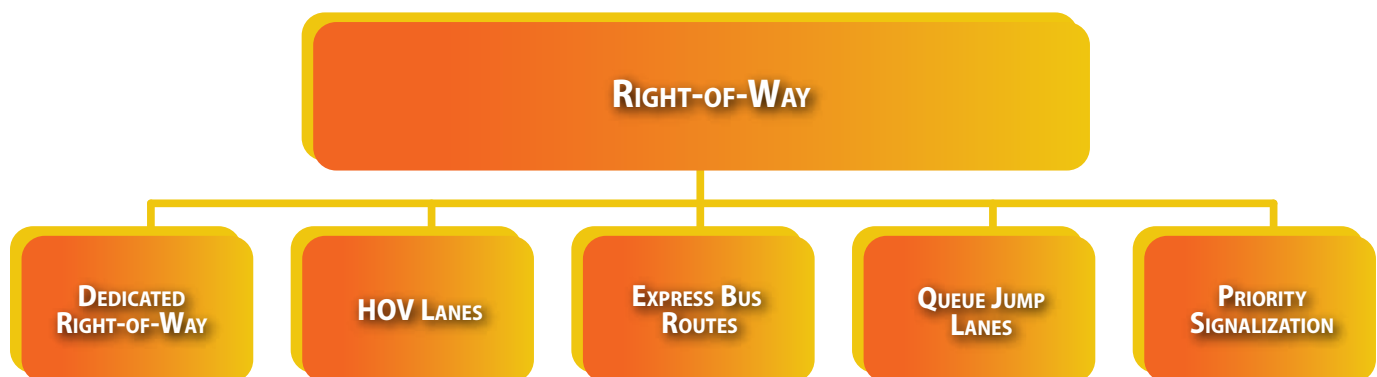
3.3.1. Dedicated Right-of-Way

Description

Dedicated right-of-way lanes are exclusively and permanently reserved lanes for the use of transit vehicles. They are segregated from regular routes by curbs or physical barriers, allowing transit vehicles to remain independent from regular traffic. Dedicated right-of-way lanes can be at the surface level, elevated or underground.

Benefits	Potential Issues
✓ **Speed:** Faster travel time for commuters. ✓ **Reliability:** Better adherence to scheduling (fewer or no delays), leading to a significantly more reliable bus service. ✓ **Reduced Traffic Congestion:** Separation of traffic lanes can lead to a better traffic flow for all road users. ✓ **Potential for other usage:** Infrastructure can be reallocated for different usage if the need for road space disappears (ex. Light rail, carpooling lane, truck lanes, etc)	✓ **Land Use:** available space is required to integrate dedicated right of ways and road space available for cars or bike lanes will be reduced ✓ Requires major **infrastructure changes** and growth, which can have a negative impact on the existing environment ✓ **Funding:** High associated costs in construction and maintenance

Costs / Budget

- Low: $ 5 million/km (approximate)
- High: $200 million/km

Example: Champlain Bridge, Montreal

A system of dedicated right of way bus lanes as well as a dedicated contraflow bus lane vehicle structure on Champlain bridge (Montreal, Quebec) helps connect commuters from the South Shore of Montreal to the downtown area. This intricate system of interconnected reserved bus lanes and dedicated right of ways are found on Taschereau Boulevard (reserved bus lane, and ROW ramp) and Lapinière Boulevard, continuing on a two-way structure parallel to Autoroute 10 dedicated solely to buses (RTL and CIT).

During peak hours, this structure is connected to a reserved contraflow bus lane on the bridge, separated from regular traffic with traffic cones.

To further encourage transit ridership, Panama (Longueuil) and Chevrier (Brossard) terminals have park-&-ride facilities of over 2,000 spaces along with two express buses offering frequent and direct service to and from downtown.

Additional Resources and Information

AMT. "Travaux d'aménagement au terminus Panama: Faciliter les déplacements des usagers et des autobus" *Communiqués Salle de Presse. Agence métropolitaine de transport.* 8 Aug. 2011.
http://www.amt.qc.ca/corp_template.aspx?id=1086&communiqueid=145&AspxAutoDetectCookieSupport=1.
(in French only)

RTL. "Voies Réservées" *Réseau de transport de Longueuil.* 7 Nov. 2005. 28 Sept. 2011.
http://www.rtl-longueuil.qc.ca/images/voie_reservees.pdf. (in French only)

3.3.2. High Occupancy Vehicle (HOV) Lanes

Description

Photo Credit: Gris Orange Consultant Inc.

Bus Lanes are integrated lanes on surface street where buses have preferential treatment and may share the road with other High Occupancy Vehicles (HOV), taxis, and hybrid cars (occasionally). The lane may be separated by a line or special signalization. These lanes are likely to be reserved for a limited time during peak hours. Buses using this lane can be expected to follow regular traffic at crossings or can benefit from transit priority signalization at traffic lights.

Benefits

✓ **Speed:** Faster travel time for commuters when buses are allowed to bypass traffic congestion at key intersections

✓ **Limited changes:** Little to no infrastructure modifications required as bus lanes are generally integrated into an existing system

✓ **Adaptability:** The absence of elaborate infrastructural changes or traffic obstacles allows for a high adaptability to demand, where reserved bus lanes can be shared with private vehicles at certain hours of the day, or reallocated to different modes of transportation or uses such as carpooling lanes, high occupancy vehicle (HOV) lanes, or parking.

Potential Issues

✓ **Parking restrictions:** the reserved bus lane will limit access to an entire side of the road, hence reducing available parking spaces in a temporary or permanent manner.

✓ **Space:** the reserved bus lane can diminish road space available or generally reserved for private vehicles, sometimes when space is most needed during peak hours.

✓ **Intersections:** reserved bus lanes allow buses to speed through private vehicle queues but transit vehicles are still bound by the same delays at intersections, stops and red lights.

Costs / Budget

- HOV Low: $50,000
- HOV High: $20,000,000 (reversible central HOV lane on Champlain bridge in Ottawa, Gatineau)

Exemple: Société de transport de l'Outaouais (STO)

The Société de transport de l'Outaouais (STO) has 9 reserved bus lanes spanning over 25 km in the Gatineau, Hull and Aylmer sectors in Quebec, used particularly during peak hours. Each lane, sectioned off by a double broken line, is distinguishable by distinct diamond shapes marked on the pavement in the center of the lane. Road signs indicating the types of vehicles allowed on the lane as well as the allocated days and times provide additional information to drivers. Unauthorized vehicles or individuals are forbidden to use, stop, park, cycle or walk in the reserved lane during the time frame indicated on the road sign. Some reserved bus lanes are complemented by priority signals at key intersections.

Additional Resources and Information

STO. "Reserved Lanes." *Société de transport de l'Outaouais*. May 2010. 28 Sept. 2011. *http://www.sto.ca/pdf/voies_reservees_e.pdf*.

Vuchic, R. Vukan. *Urban Transit: Systems and Technology*. Hoboken, New Jersey: Wiley and Sons, Inc. 2007

Transport Canada. "High Occupancy Vehicles Lanes in Canada." *Transport Canada*. Aug. 2010. 7 Oct. 2011. *http://www.tc.gc.ca/eng/programs/environment-utsp-hovlanescanada-886.htm*.

3.3.3. Express Bus Routes

Description

Express buses carry commuters from one major trip generator to another and make very few stops. They generally drive directly to a given destination and benefit from their own dedicated road space, maximizing travel speed and service reliability.

Benefits	Potential Issues
✓ **Speed:** Little to no boarding time since express routes have a restricted number of stops ✓ **Limited changes:** No infrastructural changes are required to implement an express bus or route, unless dedicated road space is allocated to the bus route	✓ **Limited use:** Express buses are often limited to main routes due to their size or speed requirement ✓ **Accessibility:** Commuters must find a way to reach stations since the route serves less stops

Costs / Budget

The primary costs are the expenses of operating the service (VTPI), ranging between $68,000- $94,000 for net costs, excluding market research and surveys (Transport Canada, 2004).

Example: eXpress, Réseau de transport de la Capitale, Quebec City

The eXpress service routes in Quebec City run along highways to provide a direct connection between residential areas and the city center of Quebec City (routes 200 to 299) or the neighborhood of Sainte Foy Sillery (Routes 300 to 391). The service operates on weekdays at a higher frequency during morning and evening peak hours.

Additional Resources and Information

Transport Canada. "GO Shuttle Service." C*ase Studies in Sustainable Transportation. Transport Canada.* Jul. 2004. 8 Oct 2011.
http://www.tc.gc.ca/media/documents/programs/cs12e_goshuttleservice.pdf.

Transport Canada. "IXpress: Central Transit Corridor Express Bus Project".
Transport Canada. Feb 2010. 29 Sept 2011.
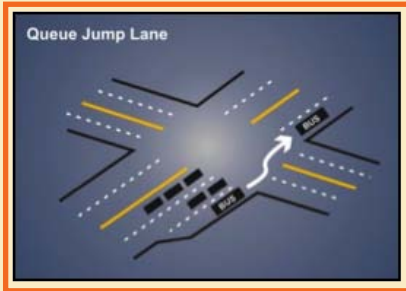*http://www.tc.gc.ca/eng/programs/environment-utsp-waterloo-1093.htm.*

Victoria Transport Policy Institute. "Shuttle Services: Buses, Jitneys and Free Transit Zones."
TDM Encyclopedia. VTPI. 13 Dec. 2010. 7 Oct. 2011.
http://www.vtpi.org/tdm/tdm39.htm.

3.3.4. Queue Jump Lane

Description

Queue Jump Lane

A queue jump lane is a reserved lane on the section of the road closest to the intersection, which allows buses to avoid long queues at intersections. For optimal efficiency, buses on that lane can have their own traffic signal in order for them to jump ahead of private vehicles and subsequently merge back into regular traffic without obstacles or delays. Queue jump lanes can be implemented where buses experience most delays caused by congested intersections, or where it is found to be most difficult merging back into traffic. Queue jump lanes are particularly successful when complemented by priority signalization.

Benefits

✓ **Funding:** Queue jump lane is a cost-effective alternative to increase bus speed and reduce travel time.

✓ **Impact on private vehicles:** They provide transit vehicles right of way while mitigating impacts to motorists.

✓ **Speed:** Queue jump lanes will ultimately increase travel speed and reduce delays in bus service.

✓ **Multi-purpose:** These lanes can further benefit emergency vehicles for example.

Potential Issues

✓ **Land use:** Space is needed for adding or integrating a queue jump lane

Costs / Budget

Capital Costs Only

- Approximately $5,000 where an existing road lane can be reallocated to buses. (Transport Canada)
- Over $100,000 where the project requires road widening, signal pole relocation or other construction work. (Transport Canada)

Example: Züm, Brampton, Ontario

Brampton, Ontario's Züm (AcceleRide) is fully integrated with neighbouring systems (Mississauga, York and GO Transit) through main corridors (Queen St., Main St. and Steeles Ave. amongst others) that include queue jump lanes as well as bus priority signal at all main intersections. Queue Jump lanes were part of a $285 million large-scale BRT project that attempted to gain travel time advantage through the use of far-side bays, transit signal priority, increased service levels, dedicated bus lanes, eco-friendly buses with comfortable interiors, along with heated bus stations/waiting areas.

Additional Resources & Information

Brampton Transit. "Phase 1: Zum and Hurontario/Main St." *City of Brampton*. 2010. 26 Sept. 2011.
http://www.brampton.ca/en/residents/transit/new-at-transit/new-projects/OldZum/Pages/Phase1.aspx

CUTA/ACTU. "Bus Rapid Transit: A Canadian Perspective." *Canadian Urban Transit Association/Association Canadienne du Transport Urbain*. Nov. 2007. 28 Sept. 2011.
http://www.rapibus.sto.ca/fileadmin/user_upload/directionRapibus/Doc_et_etude/issue_paper_25E(1).pdf.

Dhruva Lahon, P.E. "Modeling Transit Signal Priority and Queue Jumpers for BRT." *Kimley-Horn and Associates, Inc*. 10 Aug. 2009. 23 Aug. 2011.
http://www.ite.org/meetcon/2009AM/Session%2015_Dhruva%20Lahon.pdf.

Starr, Ryan. "Back to Brampton prepares to Züm zoom." *The Star*. 24 Jun. 2011. 8 Oct. 2011.
www.thestar.com/printarticle/1014817.

Transport Canada. "Transit Priority Program: Putting Buses First." *Case Studies in Sustainable Transportation. Transport Canada*. Jul. 2004. 26 Sept. 2011.
http://www.tc.gc.ca/media/documents/programs/cs01e_transitpriorityprogramputting.pdf.

3.3.5. Priority Signalization

Description

Photo Credit: Gris Orange Consultant Inc.

Transit priority signalization consists of various techniques and control strategies giving buses preferential treatment by allowing them to override regular traffic signals. The two main types of priority signals are:

- Light controls which extend or shorten the green or red light whenever a transit vehicle is detected in proximity;
- Special lights control signalization by stopping all private vehicles at a special light, offering exclusive priority to buses.

The two main techniques used in the implementation of priority signalization are:

- Real time: controls signalization through unconditional priority to transit vehicles whenever a bus is detected;
- Fixed time: controls signalization through conditional priority according to pre-set timing, queue length, bus occupancy or other factors.

Benefits

✓ **Speed:** Reduces delays by giving transit vehicle priority

✓ **Competitiveness:** Promotes transit as a faster and more competitive mode of transportation

✓ **Fuel Consumption:** Can lower fuel consumption and GHG emissions due to less frequent stops

✓ **Adaptability:** Adapts to different needs and situations since it offers a wide variety of priority techniques, which can be used according to needs in time, space, users, types of bus/route, etc.

✓ **Communication and supervision:** Allows accurate real time information and updates if bus movement is tracked

Potential Issues

✓ **Speed:** Overall traffic performance may not be optimal as priority signalization may slow down regular traffic flow

✓ **Limited use:** If used alone, priority signals can limit or eliminate signal delays but have little impact on congestion delays

✓ **Data analysis:** Impacts of implementing such a measure are difficult to analyze and complex to foresee since there are numerous factors to consider from cost efficiency to actual time-savings.

Costs / Budget

- $3,000 to $5,000 when done as part of a new project/intersection/development (City of Ottawa)
- $25,000 to $35,000 to upgrade detector loops and controllers at an existing intersection

Example: OC Transpo, Ottawa, Ontario

In Ottawa, certain bus routes without transit priority have been subject to 20 to 40% delays during peak hours due to factors such as red lights at intersections, congestion and difficulties merging into bumper-to-bumper traffic. Major routes were analyzed and given priority ranking depending on variables such as traffic volumes, bus volumes, transit passenger volumes, transit travel time variability, and travel speed versus the posted speed limit.

Among other transit priority measures, Ottawa has implemented the following:

- Loop detectors at intersections to identify an approaching bus. The signal controller then either extends a green light or shortens a red light to help the bus get through the intersection without stopping.
- Transit priority signal indicators: Special traffic lights to let buses jump traffic queues and enter intersections first.
- Bus-only interchange connections: At freeway interchanges, bus-only ramps or links let buses avoid queues as they quickly leave and re-enter the freeway to drop off or pick up passengers.
- "Demand for service" indicators: Passengers waiting at freeway interchanges can inform an approaching bus of their presence by activating a remote signal light. This lets high-speed bus routes continue without interruption unless a pick-up is needed.

Additional Resources & Information

Chada, Shireen and Robert Newland. "Effectiveness of Bus Signal Priority: Final Report." *U.S. Department of Transportation.* Jan. 2002. 27 Sept. 2011.
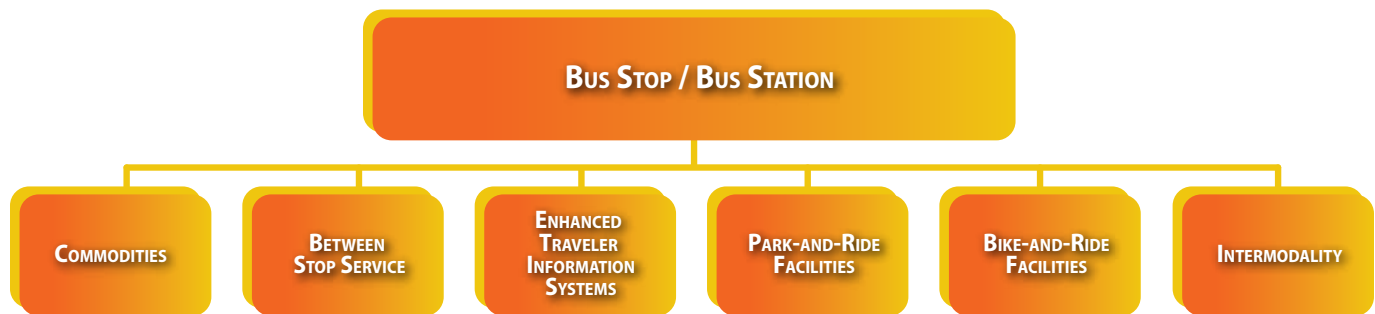*http://www.nctr.usf.edu/Bus%20Signal%20Priority.htm*.

Transport Canada. "Transit Priority Program: Putting Buses First." *Case Studies in Sustainable Transportation. Transport Canada.* Jul. 2004. 26 Sept 2011.
http://www.tc.gc.ca/media/documents/programs/cs01e_transitpriorityprogramputting.pdf.

3.4. BUS STOP AND BUS STATION

In an attempt to improve bus service, careful consideration should be given to the design and location of bus stops and bus stations. As these two elements have an impact on the convenience and the attractiveness of using a bus service, various elements should be considered:

- Comfort, Design and Security
- Wayfinding and Navigation Tools / Traveler Information
- Bus Stop/ Bus Station surrounding environment and potential for intermodality
- Park-and-Ride and Bike-and-Ride Facilities

```
                        ┌──────────────────────────┐
                        │   Bus Stop / Bus Station │
                        └──────────────────────────┘
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Commodities	Between Stop Service	Enhanced Traveler Information Systems	Park-and-Ride Facilities	Bike-and-Ride Facilities	Intermodality

3.4.1. Amenities

Description

Amenities at bus stations include but are not limited to: shelter, seating, washrooms (facilities), water fountains, trash and recycling cans, vending machines, adequate lighting, newsstands, air conditioning, shops and boutiques. Some of these commodities can be offered at bus stops as well, often at a smaller scale, particularly seating, (small) shelter, lighting and garbage disposals.

Benefits

✓ **Comfort:** Seating, shelter and washrooms answer the clientele's most basic needs, making waiting for the bus a more agreeable experience.

✓ **Adaptability:** Types of bus stops and stations (shapes, sizes, models, types of commodities) can change from one area to another, so each station/stop can acquire commodities according to the needs of its location and users.

✓ **Identity:** Bus stations/stops can become landmarks or meeting points, giving the users of the bus station/stop a sense of place.

✓ **Visibility:** If shops and boutiques are made available around bus stations, they would increase the prominence of the station, its size and significance.

Potential Issues

✓ **Maintenance:** Regular Maintenance is required to keep facilities clean and functional

✓ **Funding:** Associated costs with implementation and upkeep

Costs / Budget

Costs vary greatly in accordance with the type of commodity offered (Shelters, lavatories/facilities, water Fountain, trash and recycling cans, lighting, shops and boutiques, etc). In the example below, Halifax Regional Municipality, the province of Nova Scotia and the Ecology Action Center have anticipated to spend $1.6 million on a total of nine retrofitted stations, and two brand new terminals (Transport Canada).

Example: MetroLink, Halifax, Nova Scotia

Halifax's MetroLink now offers BRT service on 20 of its routes along two busy corridors. Bus stations, marketed in a uniform manner specific to the new service, offer seating, shelter, garbage disposables and real-time bus arrival information displays. Additionally, "Stations (…) also permit comfortable and convenient passenger transfers between transit and various access modes, as well as the innovative integration of specialized transit services for persons with disabilities" (Transport Canada).

Additional Resources & Information

Transport Canada, MetroLink: "Innovation Towards Integrated Bus Rapid Transit, Halifax Regional Municipality." *Transport Canada*. 2004-2007 (updates incl.). 7 Oct. 2011.
http://www.tc.gc.ca/eng/programs/environment-utsp-halifax-882.htm.

3.4.2. Between Stop Service

Description

"Between stop" is a service available to passengers who, after a certain time at night, feel that their safety may be at risk and are given the opportunity to ask the driver to get off the bus between regular bus stops.

Benefits	Potential Issues
✓ **Safety:** Passengers can feel safer using public transit at night	✓ **Speed:** May slow down service by increasing the number of stops ✓ **Safety:** May cause traffic confusion, although bus drivers are expected to gauge whether there are any traffic-related risks before stopping

Costs / Budget

There is no direct cost associated with this service.

Example: "Entre Deux Arrêts / Between Stops", STM, Montréal

In 1996, the STM (Montreal, Quebec) has implemented the *Between Two Stops* initiative to provide women traveling on their own at night the opportunity to ask the bus driver to stop between two regular stops. The woman must ask the driver one stop in advance, then the driver determines if it is safe to bring the vehicle to a halt at the requested stop.

This service is also available in Whistler, British-Columbia ("Request A Stop") and Sherbrooke, Quebec ("Entre Deux Arrêts")

Additional Resources & Information

UITP. "Entre deux arrêts - Between two stops (Montreal, Canada)." *UITP Public Transport and Social Inclusion - Good Practices.* Oct. 2008. Sept 27.
http://www.uitp.org/public-transport/urban/PDF/D_Entredeuxarrets_new.pdf.

3.4.3. Enhanced Traveler Information Systems

Description

A variety of information and navigation tools have recently been developed by transit authorities to provide transit users with real-time information, allowing them to plan their trip in advance and react to service delays or interruptions. These tools include:

- Web based trip planning systems
- Automated telephone and text messaging system
- Automated electronic signs and announcement at bus stations and onboard
- Printed information (maps, guidebooks, posters, brochures, etc.)

Benefits	Potential Issues

Benefits

✓ **Convenience and Reliability:** Travelers can plan and react according to the level of service.

✓ **Comfort and safety:** When people know what to expect, where to go and how long to wait they will feel more comfortable and safer

✓ **Sense of cohesion:** well-marketed and consistent navigation tools create a sense of cohesion throughout the transit network, which eases the use of public transit

Potential Issues

✓ **Durability:** Limited life cycle of navigation tools unless they are digital/updatable.

✓ **Accessibility:** Smartphone applications and websites are not accessible to everyone, more so if there is no WiFi available (or some form of internet access).

Costs / Budget

Costs can vary significantly according to the type of navigation system proposed and the size of the bus network. The Waterloo Region's iXpress in Ontario has implemented EasyGo Traveler information system including an online trip planner, schedule text messaging service, next-bus automated phone line, in-vehicle announcements (visual led signs and audible voice announcements), real-time departure displays at every station and schedule information for all routes at the terminals. Initial costs totaled $3.2 million in capital upgrades and improvements, with an additional $200 000 used for computer upgrades and electrical infrastructure. Specific cost estimates for some components of the EasyGO system include (Transport Canada):

- Online trip planner: $200,000
- IVR phone system: $137,000
- Flat panel displays: $250,000
- Real time displays: $250,000

Example: Winnipeg Transit, TransitTOOLS.

Winnipeg Transit provides bus users with a variety of tools to help them plan their trip using real-time information. These TransitTOOLS include:

- Navigo: Online trip planner.
- TeleBUS: automated schedule information system. Each bus stop has been assigned a five-digit number. Travelers can call the TeleBUS phone number and enter the given code to obtain current and future schedules.
- BUStxt: Short Message Service that allows travelers to obtain real time transit information (bus departure times at specific stops, level of service of a certain bus route) and to find the nearest bus stop from their geographic location.
- BUSguide: a website designed for smartphones and other mobile devices allowing passengers to get real-time information and have access to most of the features available on the Winnipeg Transit website.
- BUSwatch: a program using electronic signs to provide real-time departure information to passengers at bus stops throughout the city. GPS devices were installed on all transit buses and are used to inform the driver where they are in relation to their schedule. If a bus is running off schedule, the bus sends a signal to the transit real-time schedule server that updates the expected arrival time for all subsequent bus stops along the route.
- BUSgadget: a desktop version of BUSwatch, allowing users to create their own customized monitors to watch for buses at any bus stop.
- Winnipeg Transit on Twitter displays the latest transit news, upcoming events and special service.
- QR Codes: Winnipeg Transit is also testing the Quick Response (QR) codes at several locations around the city to provide passengers with as many options as possible to get real time schedule information.

Similar services can be found in Sherbrooke, Quebec (STS.Direct); Guelph, Ontario (NextBus); London, Ontario (WebWatch, MyBusInfo); Saskatoon, Saskatchewan (Click&GO, Phone&Go); Ottawa, Ontario. (OC Transpo Mobile); Edmonton, Alberta (ETS Online Tools); Halifax, Nova Scotia (GoTimes); St John, New Brunswick (NextBus); Thunder Bay, Ontario (NextBus); Waterloo, Ontario (EasyGO); etc.

Additional Resources & Information

Winnipeg Transit.
http://winnipegtransit.com/en/transittools/.

Transport Canada. "EasyGO Traveler Information System." *Case Studies in Sustainable Transportation. Transport Canada.* Jun. 2008. 7 Oct. 2011.
http://www.tc.gc.ca/media/documents/programs/cs68e-easygo.pdf

3.4.4. Park-and-Ride Facilities

Description

Park and ride facilities offer commuters the possibility to park their cars at key stations to embark into the transit system. Park and ride facilities can also attract passengers from a wider area than the direct catchment area of the transit network. This type of facility can thus link transit service with existing parking lots, potentially reducing capital investment costs.

Benefits

✓ **Intermodality:** Promotes intermodal commuting between private cars and buses, reducing auto travel as buses are used for portions of the overall trip

✓ **Marketing:** Offers incentive to riders, particularly if the parking is free of charge

Potential Issues

✓ **Land Use:** Requires space and sometimes changes to infrastructure

✓ **Capacity:** Quickly gets filled during morning peak hours.

Costs / Budget

Variable, depends if existing lot or new land, also depends on location and return on capital (if available)

To lower costs, underused parking lots can be made available to transit users at little to no costs. Agreements can also be established with businesses that are located near bus stops/stations to allow transit users to use their parking space, using the argument that this will yield additional business to them.

Example: STO (Société de transport de l'Outaouais), Gatineau, Quebec

The STO transit authority offers 19 park-and-ride facilities throughout the Gatineau area. These parking facilities are free to use and connect with major bus routes, allowing travelers to use transit services for portions of their overall trip. These facilities offer between 15 and 500 spaces available but some may be reserved for holders of a free parking permit issued to FIDELITE program members. Some parking spaces may also be reserved to members of the carsharing service *Communauto*. Park-and-ride lots may also include facilities such as bicycle racks, pedestrian crossings, bus shelters, benches, public telephone and STO customer service center.

Additional Resources & Information

Société de transport de l'Outaouais, "Park and Ride – Combine your modes of travel!" STO, Jan. 2012. *http://www.sto.ca/autres_services/parc_e.html.*

3.4.5. Bike-and-Ride Facilities

Description

Photo Credit: Gris Orange Consultant Inc.

Bike parking facilities can be located at bus stops, transit centres and terminals, or at park-and-ride lots to allow for convenient intermodal transfers between public and active modes of transportation. Parking equipment can include a variety of options:

- Short-term parking facilities: Mostly outdoor bicycle racks or stands that are free of charge;
- Long-term parking facilities (Bicycle stations): individual and/or enclosed bicycle lockers or racks that usually requires a user fee or registration to a program.

Benefits

✓ **Intermodality:** Promotes intermodal commuting by combining bicycle and transit use

✓ **Health and environment:** Promotes active modes of transportation hence encouraging personal health (i.e. physical activity) and environmental benefits (i.e. reduced GHG emissions)

✓ **Safety:** Keeps bicycles in a safe and organized manner by preventing bicycles from being locked to and damaging traffic signs, fences or trees;

✓ **Marketing:** Has positive impacts on the "image" or "branding" of the municipality or transit provider

✓ **Funding:** Some bike-and-ride initiatives have relatively low costs of implementation

Potential Issues

✓ **Land use:** Requires space

✓ **Seasonal use:** May only be used during the warmer months

✓ **Funding:** Can lead to foregone revenues if bike-and-ride facilities replace paid automobile parking; can also lead to various ongoing costs for operation and maintenance

Costs / Budget

Variable costs depend on type, size and model of bike and ride facility.

- Short-Term bicycle parking (Racks or stands- capital cost only): $50-$150 per bicycle
- Long-Term bicycle parking (Covered hooks, racks, wall-mounted supports, two-tier bicycle racks): $20-$400 per bicycle
- Long-Term bicycle parking (shelters): $5,000-$15,000 per shelter ($250-$750 per bicycle)
- Long-Term bicycle parking (Individual lockers): $1,000-$2,500 per locker

Source: Transport Canada, Bicycle End-of-Trip Facilities.

Example: Toronto Union Bike Station

The Toronto Union Bike Station is a secure bicycle facility built in 2009 into an existing structure in the CBD. This bicycle station, the first of its kind in Canada, was part of the City of Toronto's plans to revitalize Union Station, an intermodal transit node. It provides 180 bike parking spaces using two-tier (stacked) bicycle racks; washrooms; changing rooms; and a repair stand, including tools and an air pump. The station is accessible to members 24 hours a day, 7 days a week. User fees are approximately $2/day for casual users, $20/month or $60/4 months with a membership, which requires a $25 onetime registration fee. Users are expected to bring their own locks, as they are not provided by the facility. Two additional bicycle stations are planned to be built in the near future.

Additional Resources & Information

City of Toronto, "Bicycle Parking Stations, City of Toronto, Jan. 2012.
http://www.toronto.ca/cycling/bicycle-station/index.htm.

Transport Canada, "Bicycle End-of-Trip Facilities: A Guide for Canadian Municipalities and Employers."
Transport Canada. Apr. 2011.
www.tc.gc.ca/media/documents/programs/betf.pdf.

Transport Canada, "Bike Sharing Guide: Final Report" 2010.
www.tc.gc.ca/media/documents/programs/bsg.pdf.

3.4.6. Intermodality

Description

Intermodality refers to a better integration of the various modes of transportation available, i.e. public transit, walking, bicycling, and driving.

- To encourage walking-transit intermodal trips, bus stop location must be sensitive to the ease of pedestrian movement. Direct and safe pedestrian paths and linkages between bus stops and transit users' origins and destinations are needed. Improvements to walkability and bus stop accessibility include landing pads, paved connections to sidewalks, snow clearing, etc.
- To encourage bicycle-transit intermodal trips, it is important to provide safe and convenient bicycle parking at the bus station. Public bicycle sharing systems can also be offered.
- To encourage transit-to-transit trips, the key objective is to make the transfer between two bus routes or between a bus route and another public transit mode as rapid, safe, and convenient as possible. In addition to the bus stop layout, signs and wayfinding devices are useful to riders to efficiently transfer between transit lines.

Benefits

✓ **Safety:** Increased safety for all road users (particularly pedestrians and cyclists), reducing the risk of road accidents

✓ **Convenience and Comfort:** Commuters should not have to walk long distances to reach their bus stop

✓ **Travel Time savings:** Improved intermodality reduces waiting time or transferring time at a bus station.

✓ **Network Integration:** Increased connectivity and priority for commuters and pedestrians

Potential Issues

✓ **Speed:** Slows down regular traffic amongst motorists

✓ **Data collection and analysis:** Requires large-scale analysis of road network

Costs / Budget

- The costs of specific walkability measures such as sidewalk widening, landscaping, traffic calming measures (speed bumps, stop signs, crosswalks, etc), pedestrian paths, etc. vary considerably in relation with the scope of the proposed planning project.

3.5. VEHICLE

The selection of vehicles is important to improve bus service as the overall quality and design will have an impact on travel time, service reliability, service identity, operating and maintenance costs.
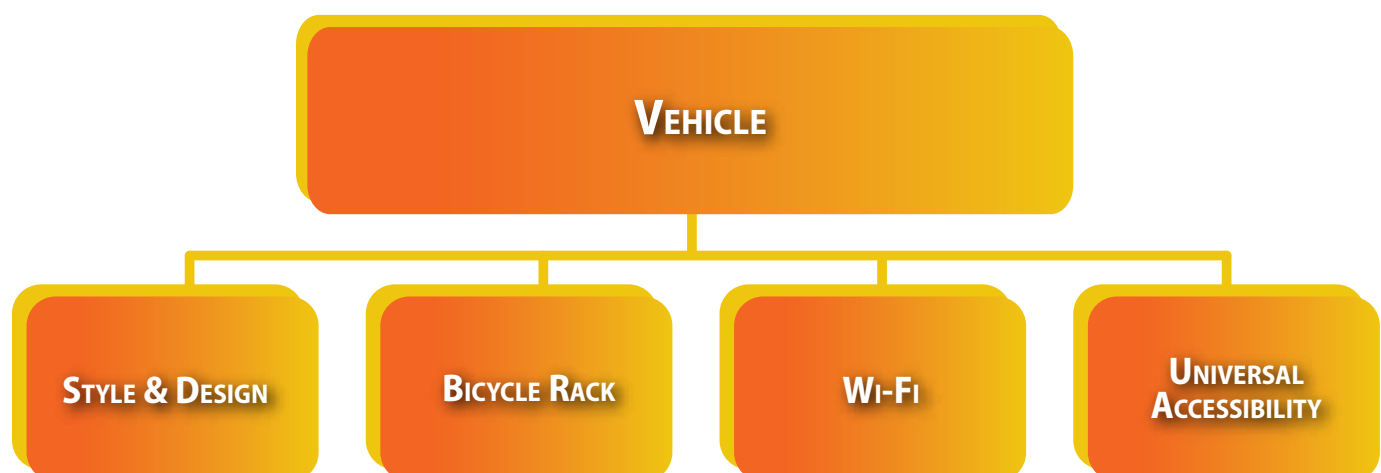
3.5.1. Vehicle Style & Design

Description

Buses can appeal to passengers in terms of aesthetics and comfort. Some coveted features are air conditioning, appropriate lighting, panoramic windows, reading lights, 120V outlets, low-floor and wide circulation zone, storage space and quality seating (cushioned or upholstered), etc.

Buses can also offer an exterior modern and dynamic look. A bus fleet should be designed using a uniform, identifiable theme. The design and style of the bus should have a distinctive identity and image to optimize marketing potential.

Benefits	Potential Issues
✓ Increased **comfort** for passengers ✓ Increased aesthetic appeal/image and **branding**	✓ Associated **costs** with maintenance and upgrades

Costs / Budget

N/A

Example: Nova Bus

Nova Bus has presented its newest fully electric bus prototype. The vehicle is customizable so transit networks can decide which operational and esthetic features can best suit their network needs. The modern and bright interior is designed to improve "passenger environment and streamline bus maintenance" (Nova Bus). The bus is equipped with ITS4Mobility. This Intelligent Transport System tracks real-time information about arrivals and departures (an advantage for passengers), as well as data on fuel consumption, average speed, environmental performance and operating cost per bus or per route.

Additional Resources & Information

AB Volvo. "Choosing the Intelligent Solution." Volvo Buses. 2011. 28 Sept. 2011.
http://www.volvobuses.com/bus/global/en-gb/partservice/its4mobility/Pages/vehicle%20and%20transport%20management.aspx.

Nova Bus Inc. "Nova Bus Shows Innovation and Technologies at Apta Expo".
Volvo. St-Eustache 3 Oct. 2011. 27 Sept 2011.
http://www.novabus.com/press/news-list/nova-bus-shows-innovation-and-technologies.html.

3.5.2. Bicycle Rack

Description

Bicycle racks are affixed to the front of the bus to hold two bicycles of standard size (no tandems, three-wheels, electric-assisted bikes, baskets, etc). Transit websites commonly offer instructional videos and pictorials coaching users on how to secure their bicycles to the bike rack.

Photo Credit: Gris Orange Consultant Inc.

Benefits

✓ **Intermodality:** Encourages multimodal transit and active modes of transportation

✓ **Distance:** Increases the reach and catchment area of transit systems by allowing commuters to travel further and faster to and from bus stations/stops with their bicycles rather than walking or driving

✓ **Funding:** Is often inexpensive and easy to install on most transit vehicles

Potential Issues

✓ **Speed:** May increase boarding time or delays

✓ **Safety:** Is associated with a multitude of instructions in order to avoid hazardous installation or reduced visibility for the driver

✓ **Garage Space:** They increase the amount of space required for each bus in transit garages

Costs / Budget

• Capital Cost of approximately $900/Bicycle rack (STM)

Example: Guelph Transit, Ontario: "Rack, Ride'n'Roll"

Guelph Transit Conventional buses are all equipped with an easy-to-use bike rack installed at the front of the bus, allowing bus riders to take their bike to school, to work, to recreational sites, or any other location along the bus route. These bicycle racks are offered to everyone and are free of charge. A "Quick Tips Reference Guide" as well as a video showing how to load and unload the bike are available on the City of Guelph website.

The Bike & Rack service is also offered in many Canadian cities: London, Ontario; Ottawa, Ontario; Windsor, Ontario. (from March 15 to Dec. 15); Saskatoon, Saskatchewan; Vancouver, British-Columbia; Victoria, British-Columbia; Thunder Bay, Ontario; Moncton, New-Brunswick; Saint-Jerôme, Quebec; Sherbrooke, Quebec (in summer season only); Sudbury, Ontario; Kingston, Ontario; Red Deer, Alberta; etc.

The Resort Municipality of Whistler, British-Columbia, allows bikes on board as well as skis and snowbards

Additional Resources & Information

STM. "La STM présente l'amélioration de son offre vélo et procède au lancement d'un projet pilote de supports à vélos sur bus." *Société des Transports de Montréal.* 27 Jun. 2011. 26 Sept. 2011. *http://www.stm.info/info/comm-11/co110627.htm.* (in French only)

City of Guelph. "Rack, Ride'n'Roll". *City of Guelph, Public transit.* 2011. *http://guelph.ca/living.cfm?smocid=2756.*

3.5.3. WiFi

Description

With the ever-growing popularity and reliance on smart phones and laptops, many commuters would make use of wireless internet service for professional and social reasons while on the bus, thus conveniently accomplishing more during their commute than they would in their car. Wireless service also provides commuters with real time information and access to applications or websites managed by the transit authority. This can be applicable to bus stations and transit vehicles alike.

Benefits	Potential Issues
✓ **Marketing:** Free WiFi is a factor in attracting people to specific locations ✓ **Speed of access:** WiFi offers ease and speed of access to transit alerts, schedules and routes via the Internet ✓ **Entertainment:** Possibility to browse emails and social networks while commuting ✓ **Productivity:** Possibility to get some work done while commuting	✓ **Funding:** Raises questions such as: should private corporations invest on WiFi services in exchange for advertising? should service be free, limited or conditional upon age or credit card information? ✓ **Usage:** limited to onboard commuters only or offered at bus stations and stops as well? ✓ **Speed:** Internet connection varies exponentially according to providers, equipment, amount of users, type of use, type of connection, etc. It is difficult to determine the optimal Internet speed to offer in terms of cost and quality. ✓ **Security:** Wireless security is often questionable as fraud and access to private information (online banking, email hacking, etc) become easier.

Costs / Budget

$200,000 for a suite of real-time information system tools and WiFi access on 60 buses (Saint John Transit)

Example: Codia Transit, Moncton, NB

Moncton's Codiac Transit, in collaboration with the City of Moncton, offers free WiFi on its entire bus fleet (40 buses). This initiative followed the success of a pilot project started in August 2007, where 4 Express Routes were provided with wireless internet access. This service is free of charge and available to all commuters who carry smartphones, laptops or electronic tablets with enabled WiFi. In 2009, Codiac Transit added a real-time information service available on its WiFi system that indicates the exact location of each bus and its estimated time of arrival, making trip planning convenient and efficient.

Additional Resources & Information

Codiac Transpo. "Codiac: Connected to the Web. To your World." Codiac Transpo.
City of Moncton. 2011. 27 Sept. 2011.

3.5.4. Universal Accessibility

Description

The concept of universal accessibility caters to the needs of people with both permanent and temporary reduced mobility: people with disabilities, but also individuals who simply face mobility difficulties due to age, weight, pregnancy, illness, accidents or broken limbs, carrying heavy items such as bags, children or strollers, when travelling. Transit equipment, bus stops and stations, infrastructure and pathways leading to those stations/stops could also be adapted or designed in accordance with universal accessibility principles.

Benefits

✓ **Accessibility:** Increased accessibility for all commuters, not only those with temporary or permanent reduced mobility.

✓ **Safety:** Increased safety for commuters with special needs, and fewer accidents.

✓ **Convenience:** Caters to an aging population.

✓ **Inclusivity:** Improves quality of life for those with reduced mobility through inclusive design.

Potential Issues

✓ **Funding:** Associated costs can be quite significant.

✓ **Data collection and analysis:** Requires large-scale analysis of transit system.

✓ **Infrastructure changes:** Many changes required on infrastructure and equipments.

Costs / Budget

N/A

Example: Codia Transit, Moncton, NB

The Thunder Bay Transit's bus fleet is now 100% accessible. Low-floor buses operate along all bus routes and offer all passengers an easy, safe and equitable access to public transit services. All buses are designed to include features such as easy-to-reach stop request buttons, grab bars, priority seating areas, front door ramp, and special wheelchair areas. These measures contribute to the comfort of all customers, especially those in wheelchairs, the elderly and people with disabilities. In addition and in order to meet the Ontario Human Rights Commission's requirement, an automated call stop announcement has been installed on all buses in Thunder Bay. This system provides both audible and visible announcements. In case of malfunctioning, the Thunder Bay Transit authority ensures the bus is replaced to offer the service to its customers. A video presenting the Thunder Bay Transit Authority's strategy for accessible transit is available online.

Additional Resources & Information

Barrieau, Pierre and Genevieve Richard. *Cadre de référence pour l'accessibilité des modes de transport collectif aux personne à mobilité réduite*. Rapport Final. Montréal: Ministère des Transports du Québec, Mar. 2009. (in French only)

City of Thunder Bay. "Transit Accessibility". City of Thunder Bay, Thunder Bay Transit. Jan. 2012. *http://www.thunderbay.ca/Living/Getting_Around/Thunder_Bay_Transit/Accessibility.htm*.

Section 4 - Project Monitoring and Evaluation

Monitoring and evaluation are crucial activities, when implementing initiatives to improve bus service.

Prior to the introduction of bus service improvements, they are a major component of a solid market research. It is recommended to refer to previous monitoring and evaluation studies of similar projects.

During the operation of the bus service, monitoring activities are conducted to regularly assess the overall efficiency of the service as well as the satisfaction of customers. Constant progress checks are necessary to ensure that service standards are met (schedule adherence, cleanliness of vehicles and bus stops, etc.),

After improvements have been introduced, the evaluation study is intended to identify strengths, weaknesses, and potential areas of improvements. Based on the results of the evaluation, the project team will decide which further developments are necessary to continue improving the service, or determine that the service is not successful enough and cancel it.

MONITORING & EVALUATION

BUILD A MONITORING FRAMEWORK

EVALUATE AND REPORT RESULTS

ADJUST & MODIFY

A PLANNING TIP… What is Monitoring ? What is Evaluation ?	
Monitoring	**Evaluation**
Monitoring is a continuous and ongoing process of observing and collecting information, using indicators to gauge the project and compare it with the expected performance. Regular monitoring assesses progress and allows the timely identification of successes or failures. There are two common forms of monitoring • Compliance monitoring ensures that what was agreed upon is actually done • Impact monitoring gauges the impact of actions in relation to the objectives Monitoring information are most likely to contain: profile information on bus riders; basic project record keeping; statistical information; feedback sheets from surveys, focus groups, community meetings; diaries and other records of events; complaints and compliments from bus users. **Why Monitor?** • To support planning, the process of where you want to go and how we get there • To improve decision-making by providing a clearer understanding of current conditions and trends • To enable benchmarking of conditions and performances • To ensure accountability for actions and results • To provide basis for corrective actions	Evaluation uses information from monitoring to analyze the process, programs and projects to determine if there are opportunities for changes and improvements. Evaluation is a more systematic and objective measurement of the results achieved by the project in order to assess its relevance, its coherence, the efficiency of its implementation, its effectiveness, its impacts, as well as its sustainability. In the implementation stage, evaluation is used to determine if the actions are or are not meeting the strategic objectives efficiently and effectively. **Why Evaluate?** • To promote learning ("lessons learned"): What could we do better next time? Evaluation provides decision-makers with knowledge and information to make informed choices. • To foster policy change. • To ensure accountability • To provide information to funders and other stakeholders • To improve strategic planning

4.1. BUILD A MONITORING FRAMEWORK

Monitoring is a reflective process. The results obtained should be used and fed back into the plan, influencing its future design and direction.

An ideal monitoring framework should reflect a comprehensive hierarchy of transportation goals and objectives, and explicitly define the relationships among them. Each level of hierarchy should define performance measures and indicators. Objectives must be measurable and reflect a desired change in baseline conditions over a specific timeframe. It is important to incorporate and combine quantitative measures (traffic counts, annual collision summaries, park-and-ride counts) with more qualitative techniques (infrastructure condition surveys, public opinion polls, etc).

PLANNING TIP... A successful monitoring framework should be...

- **Simple and user-friendly** monitoring system for everyday activities, allowing for the collection of data
- **Systematic and consistent** monitoring procedures and data collection techniques are essential to allow for further analysis and comparisons between similar projects over time.
- **Linked to objectives:** it is important to be strategic. The monitoring framework must be organized around the objectives and concepts elaborated at the outset of the project.
- **Specific:** each measure or indicator must be clearly related to one objective.

The table below summarizes different categories of indicators and specific measures that could be used to collect data to measure customers' satisfaction and evaluate the performance of the new bus service provided.

System Performance

- Mode shares (public transport, private vehicles, walking, cycling, taxis, motorcycles, etc.).
- Average bus travel times
- Average bus speeds
- Average private vehicle speeds
- Passenger capacity of roadway
- Peak capacity of roadway
- Peak capacity of public transport system and peak capacity of bus system
- Actual peak ridership (passengers per hour per direction)
- Actual non-peak ridership (passengers per hour per direction)
- Average wait times to purchase fares and average wait times at bus stops and bus stations
- Passenger crowding levels at stations and in vehicles during peak and non-peak period (passengers per square metre)
- Percentage of seated passengers and percentage of standing passengers during peak and non-peak periods
- Average number of transfers required per trip
- Frequency of vehicle and station cleaning
- Operating cost per passenger-km provided
- Fare level
- Number of positive (or negative) media reports on system
- Customer Satisfaction

Economic Indicators

- Employment created during the construction phase
- Employment created during the operational phase
- Economic value of travel time savings
- Economic value from the reduction of congestion
- Property values near bus stations and corridor
- Shop sales near bus stations and corridor
- Vacancy rates of properties near bus stations and corridor

Environmental Indicators

- Levels of local air pollutants
- Greenhouse gas and other air emissions
- Noise levels
- Hospital admissions for respiratory illnesses
- Asthma rate in the municipality
- Number of older buses retired from service
- Percentage of hybrid buses in the fleet

Social Indicators
• Percentage of public transport passengers from each socio-economic grouping • Percentage of household income dedicated to transportation • Crime levels along corridor • Crime levels within buses/ near bus stops and bus stations • Vehicle accidents on bus corridors • Pedestrian accidents, injuries, and fatalities
Urban Indicators
• Number of new property developments along corridor • Opinion surveys on quality of public space along corridor

Source: ITDP (2007), "BRT Planning Guide": 716-717

HELPFUL RESOURCES:
Existing Tools & Performance Indicators Strategy Lists

Different transportation associations, organizations, municipal transportation departments or transit authorities have developed projects for the monitoring of sustainable transportation:

- **Urban Transportation Indicators (UTI) Survey, Transportation Association of Canada (TAC):** The purpose of the UTI project is to collect information through surveys in Census Metropolitan Areas in Canada in order to compare the performance and sustainability of their transportation system. The surveys give important indications about key trends pertaining to urban structure, automobile and transit use, transportation expenditures, etc. using a variety of indicators in 6 key areas (land use, transportation supply, transportation demand, transportation system performance, transportation costs and finance, transportation's environmental impacts).

For more information: *www.tac-atc.ca*
Report of the 4th survey (2010):
http://www.tac-atc.ca/english/resourcecentre/readingroom/pdf/uti-survey4.pdf

- **Performance Measurement Strategy, City of Ottawa's Transportation Master Plan:** The strategy is built around 11 groups of performance objectives, each of them containing up to 4 specific objectives and 6 performance indicators per objective. Each indicator in the monitoring framework is associated with a recommended frequency of monitoring (annual, bi-annual), a recommended location (city-wide, central area), as well as a period of measurement (morning/afternoon peak hour)

For more information: Ottawa 2020, Transportation Master Plan, Annex A.
http://www.ottawa.ca/city_services/planningzoning/2020/transpo/pdf/tmp_en.pdf

- **Whistler 2020 Explorer:** The City of Whistler, British Columbia has developed a shared vision for enriching community life and contributing to protecting the environment. "Transportation" is one the 17 strategies identified. The 2020 Explorer provides a set of strategic indicators to assess and evaluate the transportation system with regards to the Task Force Actions developed in the vision.

For more information: *http://www.whistler2020.ca/whistler/site/explorer.acds*

4.2. EVALUATE AND REPORT RESULTS

Unlike monitoring, evaluation is not a continuous process and it is most likely to occur at strategic times during the implementation of the project. The evaluation procedure reveals key information about both short-term and long-term impacts, results, and benefits of the project.

The results of the evaluation studies should be communicated to stakeholders as well as to the community as a whole in order to maintain interest, awareness, and commitment to the service.

An evaluation study usually contains the following information:

- Project Description
- Evaluation Methodology (including questionnaires)
- Data collection (Pre- and post-implementation)
- Evaluation Study (Benefits, system performance, costs, etc.)
- Guidelines for further applications
- Project Achievements (Summary of results per objective).

4.3. ADJUST AND MODIFY

It is important to bear in mind that changes in the community context (transportation infrastructure, physical environment, population and employment growth, etc.) may occur at any time during the process. Therefore, the approach should be flexible enough to react accordingly and to allow for adjustments and modifications. Objectives may be revisited and new priorities defined at all times.

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