Plain Transit

FOR PLANNERS

Ontario Professional Planners Institute
Institut des planificateurs professionnels de l'Ontario

Ontario Planners: Vision • Leadership • Great Communities

Plain Transit for Planners

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Overview

In Ontario's large and small communities, there is shift towards a future less dependent upon the automobile and a movement towards public transit. This is important as planning for transit is essential. It has far-reaching health and economic implications and can directly impact the quality of life in communities.

The Ontario Professional Planners Institute believes that all planners should have a good understanding of these issues and how public transit impacts communities across the province. This paper is meant to inspire and build a dialogue around public transit 'made plain' for planners, with a focus on the key factors in planning that impact the success of transit service.

Chapter 1 – Introducing the Benefits of Good Transit

The cost of living is rising and Ontarians are seeking ways to curb spending – one of these areas being transportation costs. A survey by the Federation of Canadian Municipalities indicated that rising gasoline prices were prompting more and more people to take public transit. Despite this interest, however, the lack of transit options and infrastructure in many communities remains a barrier.[1] Considering the increasing costs of owning and maintaining a vehicle, it can be predicted that a smaller proportion of the population will be able to afford to drive or to own two or three vehicles. Therefore, it is an opportune time to be planning ahead for communities that are less dependent upon the automobile. Municipal governments are facing economic challenges and changing demographics, as well as a growing public awareness of the need for environmental sustainability, a desire to reduce commuting times and decrease traffic congestion. There is also a need to deal with rising health costs and to address the effects of climate change.[2]

Transit planning does not exist in a vacuum. In most communities in Canada, the primary means of transport is the personal automobile, a fact which presents great challenges to professional planners. These challenges can include an automobile-centric built form, making it difficult for all but automobile owners to get around; increased pollution and toxins; and traffic congestion on city roads and highways, costing the economy billions of dollars in wasted fuels and time per year. Much of our work as professional planners is concentrated on attempts to counteract the impacts of a nearly single-mode transportation system. Transit planners, however, must plan and work in conjunction with automobiles as they are an undeniable

[1] Federation of Canadian Municipalities (2008). Survey Shows Gas Prices Pushing Canadians to Public Transit But Missing Capacity. Retrieved from: http://www.fcm.ca/english/View.asp?mp=560&x=955

[2] Oregon Metro (2009). Transit-Oriented Development Program. Retrieved from: http://library.oregonmetro.gov/files/tod_brochure_aug_2010.pdf

reality of life in Canada. Every transport modality has a function to serve and public transit routes and systems must be thoughtfully and carefully integrated within existing transportation networks.

There is a general consensus amongst professional planners that land use planning and denser urban forms are essential in fostering and supporting sustainable transportation modes within our communities. This is true across the province. While larger urban centres may have bus or rail rapid transit networks, the same basic principles in providing good public transit are applicable to smaller and medium-sized communities in Ontario. Although higher densities can encourage better use of resources, the design and development of communities themselves is also important. Mixed-use communities, urban centres, downtowns and main streets typically concentrate work, living and recreation which make it more convenient for the public to access public transit services. From a municipal and transit agency perspective, it is easier to provide for services and a more effective use of resources where land uses are mixed at higher densities and support reasonable walking and cycling distances to transit.

Performance measures and benchmarks may offer an indication of a possible means to better integrate active transportation, including public transit use, into people's daily routines. This can be as simple as advertising sustainable travel options ranging through to infrastructure improvements that induce a change in behaviour e.g. re-thinking street functions and block layout. The recent interest in Complete Streets, for example, takes an approach to policy, design and operational outcomes that consider a balanced transportation system that includes pedestrians, cyclists and public transit users. The approach includes people of all ages and abilities and serves to effectively meet the needs of the local community.

Greater efforts could be made towards marketing transit accessible locations to employers, which may benefit employees and customers. Some success has been achieved through Transportation Demand Management (TDM) associations, such as the Smart Commute program in the Greater Toronto and Hamilton Area that encourages sustainable transportation modes in the workplace in partnership with transit agencies, local business communities and municipal governments. TDM works on the premise of changing travel behaviour to increase transportation system efficiency and achieve planning objectives. In general, the steps involved in TDM implementation include making policy and planning reforms; changing travel options and introducing incentives; influencing travel behaviour; and identifying outcomes.[3] Marketing the potential benefits of public transit is an important aspect in influencing travel behaviour.

There are two elements that make transit successful in a community: the transit service that is provided and the environment that the service operates in. Key considerations for transit service include frequency of service, customer service, affordability and safety. The environment, which incorporates street design, transit

[3] Victoria Transport Policy Institute (2010). TDM Encyclopedia. Retrieved from: http://www.vtpi.org/tdm/tdm12.htm

access points, and neighbourhood design, must be supportive of transit service. The success of the transit provided is otherwise limited.

Transit-supportive land use planning is a widely-used term, but understanding this term and how it applies to new communities has been elusive in most parts of Ontario. Established communities that were built prior to World War II may have higher densities and greater opportunities for intensification, but transit planners have faced ridership and routing challenges in low density, post-war suburbs. Past lessons can hold the key to a better relationship between land use and transportation in the future. The grid street pattern, for example, can more easily adapt to pedestrian and transit access, as well as diversity in the built form.

Street Design: At some point in their journey, every transit passenger is a pedestrian, so access to and from the transit stop has to be direct, fast, and as safe as the transit trip. Streets that have wide and continuous sidewalks are important. These must be safe in all weather, with adequate lighting, and proper snow removal in the winter. Consideration should be given to amenities such as benches, street furniture and landscaping to make the experience more safe, comfortable and enjoyable.

Cyclists are also accessing transit for some of their journeys in greater numbers. Streets need to be able to accommodate cyclists through bike paths**,** bike lanes, and other infrastructure to facilitate the use of transit.

For accommodating transit vehicles, streets with high ridership transit routes benefit from using Transit Priority Measures to speed up transit service, and make it time-competitive with the automobile. Effective examples of transit priority include signal priority at major intersections and queue jump lanes.

Transit access points: Well-designed access points are almost as important as the transit ride itself. Customers will likely have to wait for the transit service to come to them, so that wait should be in a clearly defined area that is safe and that allows for the operator of the transit vehicle to clearly see them and stop safely to board them. Appropriate wayfinding mechanisms, e.g. direction/platform signage, should be integrated with the street design and surrounding neighbourhood to encourage higher transit usage. Here are key notes for access points by type:

- Bus stop: Stops should allow for access from all directions along a sidewalk at key intersections and major points along the route. They should be well-marked with modern, reflective signage. Concrete pads should be at all stops, with shelters at major stops and transfer points. Stops that are part of a Bus Rapid Transit (BRT) network should also include enhanced lighting, customer information, and Intelligent Transportation Systems (ITS) infrastructure such as LED signage that denotes when the next two or three buses are coming, and have ticket vending machines (TVM's).

- Subway Station: The station must be a focal point of the surrounding community, with large pedestrian pathways leading to it, and well-defined,

segregated areas for connecting transit services (bus and rail). Facilities for automobiles (Kiss and Ride, as well as Park and Ride) should be provided at terminus stations.

- Commuter Rail Station: In general, commuter rail station buildings and platforms are set back from the nearest street, as above-ground rail corridors are ideally separated from streets for safety. These stations would require longer paths to connect to streets, well-lit and brightly-marked crosswalks, and connections to bus-loops in the station or on adjacent major streets.

Chapter 2 – Understanding the Transit Needs of the Community

When understanding the basic relationship between land use and transportation, it is essential to define the *role* of public transit in this relationship. This can be a very cumbersome exercise, as public transit serves many roles within the community, including the role of reducing energy consumption, decreasing auto-dependence, lessening environmental impacts[4, 5] and enhancing mobility in congested urban areas.[6] Public transit has returned as a crucial transportation option when considering community growth and resident needs after decades of auto-centric dominance.

While all of the previously mentioned roles for public transit in the community have merit, it must be recognized that the *fundamental* purpose of public transit in communities is to provide mobility for those who do not use personal automobiles and/or who otherwise cannot travel by other means. Travel by public transit becomes absolutely essential for an individual who does not have the option to travel by other modes, and cannot afford to purchase and maintain an automobile for commuting purposes. The increasing cost of housing has meant people are living in smaller communities, often beyond their place of employment. Inter-regional transit connections have not, however, expanded at the same rate. This is especially important for seniors who are physically unable to travel by other means or do not have the legal capacity to do so (i.e. driver's license suspension or forfeit).

Understanding the Needs of the Community and Servicing Accordingly: While the development of minimum standards for public transit service provision can be designed to attempt to service the entire community, it is important to be realistic that the entire population does not necessarily intend to use the service, therefore, it is important to understand the needs of those who do require public transit.

[4] American Public Transportation Association (2008). Public Transportation Reduces Greenhouse Gases and Conserves Energy. Retrieved from : http://www.apta.com/resources/reportsandpublications/Documents/greenhouse_brochure.pdf

[5] Shapiro, R.J.; Hassett, K.A.; Arnold, F.S. (2002). Conserving energy and preserving the environment: the role of public transportation. Retrieved from http://www.publictransportation.org/pdf/reports/shapiro_report.pdf.

[6] Newman, P.; Kenworthy, J.R. (1999). Sustainability and cities: overcoming automobile dependence. Washington D.C., Island Press.

Designing routes and schedules in order to establish maximum walking distances to bus stops is one means of achieving "equal" mobility options to all citizens within a community. A more efficient way of designing service is to address desired travel patterns and attempt to facilitate more direct connections for those who use the service on a regular basis due to dependency. This can be accomplished through a review of trips taken on the transit system to adequately address demand, as well as a continued monitoring of customer feedback on service provision. As fare collection slowly migrates towards smart cards, trip data can be collected automatically by tracking the precise locations and times of passenger movement.

Where ridership patterns are low but necessary to service, the use of paratransit may be more appropriate. Paratransit is an alternative mode of flexible passenger transportation that does not follow fixed routes or schedules such as dial-a-bus. This can reduce unnecessary mileage, thus significantly reducing operational costs. If demand is low and/or sporadic across the community, it may be possible to provide community-wise paratransit service with as little as one bus.

Transit serves more than just the typical 9 to 5 business crowd. Destinations can include schools, recreational facilities and serve the need for those who cannot afford or choose not to own a vehicle. Transit also serves as an emergency outlet for employees of organizations who work on shift schedules where mainstream transit is not available to them because of lower ridership figures. As the generation of baby boomers age, transit agencies may have to deal with an influx of passengers throughout the day. In essence there will be a greater dependence on public transit within our communities that will create a greater strain on public transit budgets. In the United States, these issues have been addressed with a separate subsidy program provided to assist transit agencies with the additional costs called Job Access/Reverse Commute (JARC) and New Freedom. Funding is given based on transportation coordination efforts with businesses and non-profit agencies to deliver transportation services to those who are in need, such as handicapped, seniors and those who reverse commute (travel against the usual rush hour flow) to get to their employment. New funding mechanisms should be developed within Canada to address to fund transit. Recent examples include congestion pricing, Federal gas tax transfers to local municipalities, land value capture and public private partnerships (P3s).[7]

<u>Providing for the Good Design to Access Transit Stop Facilities:</u> The design of a transit stop should be considered as important as the provision of the transit service itself. As every trip to a transit stop will be begin and end by walking, the shortest distance and most direct route is desired. In general, the stop location and distances in between will be dependent on the location context, e.g. urban vs. rural conditions. As a point of reference, the Ontario Transit-Supportive Land Use Planning Guidelines notes that 400m is generally the maximum distance transit users will walk to a bus stop and 800m for rapid transit services. In making the most efficient use of road infrastructure and avoiding overlapping transit service,

[7] Canadian Urban Transit Association (2011). CUTA Issue Paper 39: Building Sustainable Mobility: Federal Transit Investments Across Canada.

transit routes should be spaced at a maximum of 1,000m intervals, with local bus stops spaced at 200m to 250m intervals.[8] Where arterial and collector roads are situated further apart, such as in rural areas, the Guidelines still recommend a 400m walking distance to the transit stop, where possible.[9]

On a larger scale, Metrolinx, the regional transportation planning agency for the Greater Toronto and Hamilton Area (GTHA), together with the provincial Growth Plan for the Greater Golden Horseshoe (GGH) have density targets to focus people and jobs within 800m of a major transit station area or "mobility hub."[10] In terms of catchment areas for transit ridership, this represents approximately a 10 to 15 minute walk for individual users. An example from another municipality is the Tri-Met which is a transit agency operating in Portland, Oregon. Its Bus Stop Guidelines (2010) classify building/development densities to correspond with transit stop intervals: high representing 22 or more units/acre with 238m spacing; medium to low representing 4 to 22 units/acre with 305m spacing; and low to rural densities representing below 4 units/acre with no more frequent than 305 m spacing. Further, in recognizing the significance of transit provision in mixed-use areas, transit stop intervals are also based on identifying the number of people per acre. Implementation can be based on the number of employees for employment areas and number of residents for residential areas.[11] In calculating the density of an area, adjustments are made for right-of-way space, etc. to determine the projected number of transit riders that can be captured in a given area. Service planning guidelines typically provide advice on elements to consider in transit stop placement in conjunction with the local context e.g. frequency of service, destinations, etc.

Providing easily accessible transit stops through better design, such as ramps and railings, is beneficial for young and old alike, as well as those with reduced mobility. Where transit service is less regular or frequent, the location of transit stops would benefit from nearby buildings with services and amenities such as a convenience store. All buildings served by transit should be orientated towards the transit route and provide easy pedestrian access through sidewalks. Bus stops themselves often have minimal amenities in offering protection and comfort from the weather elements; a significant consideration in Canada. Structures provide shelter from the elements but also need to be user-friendly through design and any amenities that can be provided. Those who choose to cycle to and from transit stops would greatly benefit from secure and convenient bicycle parking facilities e.g. bike racks, post-and-rings, and bike lockers. Such elements could be considered a deciding factor for individuals in wanting to take the bus. Mapping of each bus stop should be done with a radius drawn to determine adequate walking distances, as well as interface with surrounding destinations, services and amenities.

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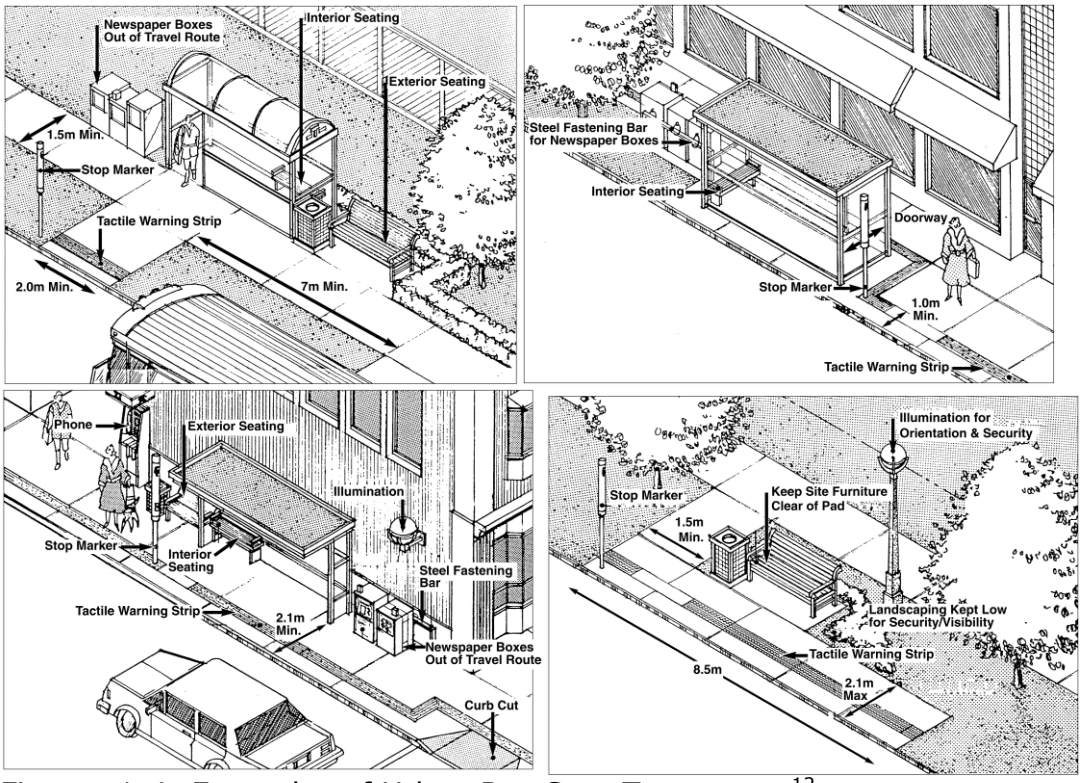
[8] Ontario Ministry of Transportation, Ministry of Municipal Affairs (1992). Transit-Supportive Land Use Planning Guidelines. p. 57

[9] Ontario Ministry of Transportation, Ministry of Municipal Affairs (1992). Transit-Supportive Land Use Planning Guidelines. p. 37

[10] Metrolinx (2008). Backgrounder: Mobility Hubs. Retrieved from: http://www.metrolinx.com/Docs/big_move/RTP_Backgrounder_Mobility_Hubs.pdf

[11] TriMet (2010). Bus Stops Guidelines. p. 4-5 (converted measurements are approximate)

Examples of bus stop designs areas from BC Transit Municipal Systems Program – Design Guidelines for Accessible Bus Stops.



Figures 1-4: Examples of Urban Bus Stop Treatments[12]

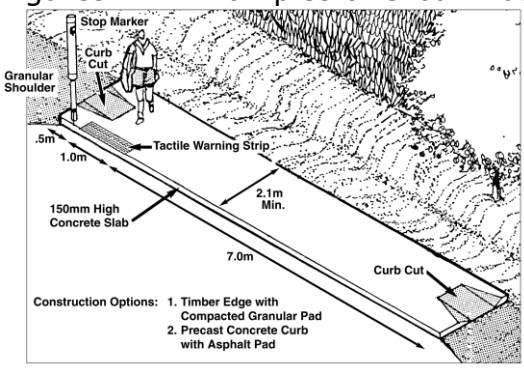


Figure 5: Example of Rural Bus Stop Treatment[13]

Figure 6: Examples of transit amenities and infrastructure to encourage more walking and cycling.

[12] B.C. Transit, Design Guidelines for Accessible Bus Stops, p. 14-17
[13] B.C. Transit, Design Guidelines for Accessible Bus Stops, p. 19

Chapter 3 - Integrating Public Transit Infrastructure in Private Development and Making it Effective

Transit supportive land use design begins with the planning process. A number of tools such as the Planning Act, regional and municipal official plans, urban design guidelines, and site plan guidelines offer passing references to accommodating public transit but often fail to effectively prescribe specific policy implementation or infrastructure elements within a given context. Zoning by-laws, site plan control, bonusing (increases to height and density), plan of subdivision, community improvement plans and development permit systems are relied upon to provide physical attributes in connection to public transit service.[14]

It should be noted that private sector development can play a much greater role. If private sector developers are expected to contribute towards transit-oriented development or even consider transit provision, such as infrastructure improvements; then serious consideration needs to be given to incentives or other mechanisms at all levels of government. Failing to regulate or provide clear guidance will allow the 'status quo' to remain. Above all, municipalities and regions need to be explicit and request that developers address the issue of transit accessibility. Transit agencies and municipalities themselves can offer transit infrastructure and amenities to meet future needs within a development area. As municipalities update their Zoning By-laws, consideration should be given to incorporating transit supportive development standards and technological advances. Certainly, some planning successes exist that can be called upon as examples as applicable in practice, as well as in regulations. In speaking to incentives, as an example, the Leadership in Energy and Environmental Design (LEED) Green Building Rating System provides for a point for site selection with public transit access in neighbourhood development projects.[15] In giving back benchmarks to the development community, there is value placed upon good design and what could be considered good planning.

Integrating public transit access to private developments, e.g. office buildings, shopping centres, neighbourhood centres, etc. will require collaboration amongst stakeholders to reach an agreement on matters such as detailed specifications, maintenance arrangements, operating conditions, signage and materials. Allowing for public transit access onto private property could involve the negotiation of incentives by the subject municipality, such as, reduced parking requirements, decreased costs and allowance for greater density.[16] In terms of placement of transit facilities on private property, easements and lease agreements are typical outcomes; this allows the landowner to retain the size or area of their land. Along with the preservation of land area, density rights are exercised and bolstered by allowances for future transit-oriented development. As a result, this provides a

[14] Ministry of Municipal Affairs (2009). Transit–Supportive Land Use Planning

[15] U.S. Green Building Council (2008). Retrieved November 4, 2010 from http://www.usgbc.org/ShowFile.aspx?DocumentID=4109

[16] Transit Cooperative Research Program (2008). Legal Digest 24 – Transit Bus Stops: Ownership, Liability, and Access; Retrieved from: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_lrd_24.pdf

direct positive effect on the property value and the potential for increased building density, if permitted. A number of transit agencies enter into lease agreements with private property management for access and use of their property, such as terminal facilities at shopping centres.[17] This avoids the need to purchase property outright by the transit agency or municipality. The lease agreements set out the terms, conditions, responsibilities and necessary insurance, in most cases for transit facilities the liability is borne by the municipality. Increased and more convenient access by the public and employees to a major development can enhance the overall property values and positively impact the bottom lines of tenants and landlords.

The benefits of public transit serving private property are apparent. A shopping centre, for example, will attract more customers while a transit service can attract increased ridership. Such an arrangement could also potentially result in cost-savings for a transit agency and result in decreasing capital costs for infrastructure construction and ongoing maintenance through cost-sharing with a private landowner in comparison to the costs associated for a standalone facility under full control of the transit agency. The private development can also provide amenities for the travelling public, such as, coffee shops, dry-cleaners, newspaper stands and access to washrooms.

Some benefits of transit-friendly communities include better use of land resources, improved environmental quality, sustainability, marketability, enhanced community image, provision of transportation options, and in many cases, decreased capital and maintenance expenditures.[18]

Chapter 4 - Transit Planning and Transit for Good Measure

As agents of change, planners can have a definitive role in bringing disciplines together in a holistic approach. Land use planners are required to interpret planning policies and regulations regarding height, setback and density, as well as form and function. This should also include the relationship with transportation and related infrastructure. Policies and methodologies that promote greater use of transit and decreased use of automobiles should be promoted from the outset. The positive relationship between building density and transit ridership is quite well documented and for smaller to medium sized communities, focusing on transit corridors would be advantageous.[19]

Transportation planners should include transit routes within their traffic impact studies and, of course, the role of public transit in transportation master plans. Levels of ridership, both existing and potential are often left out of the equation in planning new developments. Site plans from the outset need to reflect transit-friendly objectives. Costs and efforts are often oriented towards the automobile with the provision of parking being an example. As land uses require different

[17] York Region. Report No. 9 of the Transit Committee, Regional Council Meeting of December 18, 2008.
[18] York Region. Report No. 9 of the Transit Committee, Regional Council Meeting of December 18, 2008.
[19] B.C. Transit (1993). Transit and Land Use Planning, p. 5

parking standards, planners and decision-makers often overcompensate for parking and attempt to make up for existing deficiencies which leaves less focus and space for a balance of public transit provision.[20] General transportation planning analysis tools, such as trip generation and level of service, systematically overlook public transit in the evaluation and balancing the needs of pedestrians, cyclists and transit riders. The Institute of Transportation Engineers' (ITE) Trip Generation Handbook, 2nd Edition, is a widely accepted document in preparing traffic and transportation studies. In some instances, however, the data does not necessarily reflect Canadian public transportation realities. Some concerns of transportation professionals are that surveys are conducted at a national level in mainly suburban settings that often have dissimilar urban environments, reflecting vehicle trip generation rates rather than person trip generation rates, therefore, the data does not adequately present local modal split characteristics.[21] There are instances where alternative trip generation rates can more closely reflect actual conditions, including the use of proxy sites, modification of ITE rates based on known modal split data from travel surveys, etc. As an example, the City of Toronto requests that alternative trip generation rates be used based on proxy sites. Further, secondary plan areas, such as North York (Yonge-Sheppard area), have special trip generation rates that need to be applied for developments within the specified area.

In determining the mode of movement, planners and engineers alike typically use a field modal split analysis. Models incorporate the estimated share of transit trips based on a set amount of traffic from an origin to a destination: trip-end and trip interchange models. While these models exist, they do not necessarily promise details of trips, for example, the purpose or behaviour in modal choice.[22] The way transit usage is forecasted has a bearing on policy direction and ultimately funding mechanisms. For example, smaller buses which can be operated at a lower cost could be used where there is less ridership. Building upon better methodologies could more effectively and efficiently determine types of equipment and service frequencies. As public transit becomes increasingly significant in providing transportation efficiency, more methods and approaches are needed that can be compared and contrasted.

Chapter 5 - Physical and Neighbourhood Design to Accommodate Transit

Determining Appropriate Locations of Transit Terminals in Smaller Communities:
The scientific approach to the design of transit terminals caters to the maximized utility of the transit network of routes (i.e., a central location to serve as a hub for the majority of the transit network)[23], or one that maximizes walkability[24]. Little or no literature, however, acknowledges the phenomenon of commercial activity

[20] Leung, Hok-Lin (2003). Land Use Planning Made Plain, p. 131
[21] Rizavi, Yeung (2010). Urban Commuting Trends – Comparing Trip Generation Practices, presented at Vancouver 2010 ITE Annual Meeting and Exhibit.
[22] Black, William R. (2003). Transportation – A Geographic Analysis, p. 187
[23] Ceder, A. (2007). Public transit planning and operation: Theory, modelling and practice. Oxford, Butterworth-Heinemann.
[24] Wibowo, S.S., Olszewski, P. (2005). Modeling walking accessibility to public transport terminals: case study of Singapore mass rapid transit. *Journal of the Eastern Asia Society for Transportation Studies*, 6(1), 147-156.

decentralization away from traditional downtown cores, and the need for the transit system to catch up to true transit-dependent passenger demand.

Traditionally, transit terminals are located in the downtown of the respective small community. This is often facilitated by low infrastructure requirements, such as, redesignating locations with existing street parking for bus bays, depending on the number of buses servicing the terminal at one given time.

The benefits of having transit terminals in downtowns of smaller communities were once very obvious. Downtowns were often the final destination of passengers because they were the focal point of shopping activity within smaller communities. The external benefit associated with downtown transit terminals was that, given low service headways of 30 to 60 minutes, the terminal is meant to facilitate connections between most or all system fixed-route service at the designated time of arrival and departure. This allows the passenger to travel from one end of the transit system service coverage area to the other while only incurring travel time after boarding the first bus, rather than also having to wait for the following bus at the designated transfer point. As market forces have transformed commercial land use, particularly for shopping uses, demand for transit service may be shifting accordingly. As downtowns of smaller communities become less of a final destination for the majority of transit users (particularly due to a lower incidence of shops selling goods purchased on a regular basis, e.g. supermarket, department store), the location of a central transit terminal may need to be re-examined such that it is located within the community's greatest trip generator (e.g. large shopping centre, local "big-box" store). Demand for transit service by dependent/captive riders should be assessed in this instance to ensure the most efficient service provision system-wide.

The role of appropriate transit terminal design is not solely that of the respective transit agency. Municipalities play a very important role in ensuring that, where transit hubs already exist, transit-supportive land uses are created to make areas around transit terminals centres that would attract enhanced transit services. While many examples can be cited, comprehensive guidelines on how to achieve this can be found in the Transit Supportive Guidelines 2011 Draft from the Province of Ontario[25], as well as the respective transit-oriented development guidelines for the City of Ottawa[26], York Region[27] and the Okanagan Region[28].

<u>Determining Appropriate Locations of Transit Terminals in Larger Established Communities and along Busways:</u> Maximizing the utility of the transit network of routes is not only a principle for transit terminals in smaller communities, but especially important in larger communities. This is especially true in areas of

[25] Government of Ontario. (2011). Transit supportive guidelines (DRAFT). Ministry of Transportation.
[26] City of Ottawa. (2007). Transit-oriented development guidelines. City of Ottawa Planning, Transit and the Environment Department.
[27] York Region. (2006). City-building and supporting transit through good design: transit-oriented development guidelines. York Region Planning & Development Services Department.
[28] IBI Group. (2008). Central Okanagan smart transit plan: transit-supportive guidelines.

significant road congestion where a transit terminal's location can either optimize or hinder the transit route's effectiveness in serving the community at large.

In most larger urban areas in Ontario, key transit terminals are often found at the most obvious locations – the centre of activity in the downtown area, a rail terminal (commuter or subway), as well as larger shopping malls. Often, the land uses around such nodes are intensive enough so that these terminals can not only facilitate connections between bus routes, but also walk-in and pass-by traffic making their locations self-sustaining.

Recently, bus rapid transit (BRT) has emerged as a cost-effective alternative to higher-order transit by rail-based modes. Most BRT projects have started off as better-marketed express routes, such as Viva[29] or Züm[30], while others are in the stages of being constructed into full-fledged "busways", such as the Ottawa Transitway[31]. Recent examples currently under review are the Mississauga Bus Rapid Transit project[32] and the 407 Transitway[33], both of which are meant to serve suburban commuter trips within the Greater Toronto Area.

Traditionally in Ontario, busways have been planned within corridors that do not necessarily contain the land uses to support higher order transit. Consequently, with the exception of the few major nodes that exist along these corridors, such as shopping centres or existing major transit terminals, stations are often proposed at locations where a major bus route crosses – typically along a major arterial road. Such stations are usually only capable of facilitating connections between transit and with the provision of parking, those who drive to/from these stations, while walking to/from these stations is not well supported, given the incompatible surrounding land uses. This is particularly the case along hydro corridors and freeway corridors where wide strips of land are available to implement a high-speed bus-only corridor and, at the same time, where it is physically possible to build transit-oriented development within a reasonable proximity without creating an unfriendly environment for pedestrians. Unfortunately, such terminals are designed to enhance the operation of the route along the corridor and maximize the route efficiency of those routes using the corridor, rather than adhere to maximizing efficiency of the entire transit network, as well as walkability.

Good Neighbourhood Design for Transit: Communities are typically planned first, with transit service being an afterthought. To prioritize transit into subdivision plans, land use planners, transportation planners and engineers need to understand how to design neighbourhoods with transit in mind.

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[29] York Region Transit/Viva. (2011). "York Region Transit/Viva". Retrieved February 2, 2011 from www.yorkregiontransit.com.

[30] Brampton Transit. (2011). "Züm". Retrieved February 2, 2011 from http://www.brampton.ca/en/residents/transit/zum/Pages/welcome.aspx.

[31] OC Transpo. (2011). "Transitway Map". Retrieved February 2, 2011 from http://www.octranspo1.com/images/files/maps/rtn_map.pdf.

[32] City of Mississauga. (2011). "Mississauga Bus Rapid Transit (BRT) Project". Retrieved February 2, 2011 from http://www.mississauga.ca/portal/miway/brt.

[33] LGL Limited. (2011). "407 Transitway". Retrieved February 2, 2011 from http://www.lgl.ca/407Transitway/.

Neighbourhood Design: In order for transit to be effective, it must be easy to get to and from. Ultimately, an efficient grid pattern of streets is ideal, as it allows for direct access to transit stops from any part of a neighbourhood, but this is not the norm. Many neighbourhoods are bounded by grids of arterial roads but the interior collector and local roads are curved, and have numerous cul-de-sacs. Some curved streets are necessary, as they may follow natural features etc., but they provide a longer route for pedestrians and cyclists who access transit. Ideally, any barriers in providing the most direct route and shortest distance by street should be minimized, but if they cannot, a network of pedestrian pathways must be implemented to link pedestrians to the nearest transit route. These pathways must be kept clean and clear all year, and well-lit to create a safe environment for pedestrians to use these pathways. In the past, the provision of pedestrian connections was a challenge due to economic considerations and lack of obligation on the part of developers. Under Bill 31 provisions, however, municipalities are enabled to require the installation of walkways as appropriate.

When developing new communities, planners must be cognizant of the existing transit services in the area, and work with transit agencies in the early development stages (i.e. before plans are approved) to identify how existing routes can be modified to serve new neighbourhoods. This early consultation should include a review of road classifications (arterial, major collector, minor collector, local, etc.) to ensure that transit vehicles can navigate these neighbourhoods if desired. Locations of major and minor stops, including shelter locations, should be identified. If the transit service has developed service standards regarding route design, and customer access within a reasonable walking distance (with five minutes being the general standard), these standards must be applied to the development. If the development does not meet the standard, then the neighbourhood design must be modified to ensure that residents receive priority access. Modifications could include changes to road widths, additional pedestrian pathways, additional sidewalks, and other changes that would facilitate increased transit use.

Safety: When using any mode of transportation, users will generally rate safety as a key consideration. As applied to neighbourhood design, a transit rider must feel safe walking to and from their transit stop at both ends of their trip. Using CPTED (Crime Prevention Through Environmental Design) principles, such as those found in the City of Ottawa Transit-Oriented Development Guidelines, the physical location of buildings in relation to public sidewalks and laneways, and the separation of pedestrians and vehicles etc., will enhance the environment for pedestrians, and support their use of transit.[34]

[34] City of Ottawa (2007). Transit-Supportive Guidelines. Retrieved from: http://www.ottawa.ca/residents/planning/design_plan_guidelines/completed/transit/tod_en.pdf

Conclusion

Public transit can be used to induce new high-density development; reinvigorate declining neighbourhoods; change the travel behaviours of residents; and support health and environmental objectives. These objectives are part of a more progressive approach to community planning. This is important as successful public transit has a positive impact on the economic, social and physical development of communities.

There is no easy solution to the challenges that transit professionals encounter when implementing public transit programs and systems. There are many ways, however, by which transit systems can be made more successful. Transit systems should be designed to be accessible to as many residents as possible. This can be achieved by purchasing 100% low-floor vehicles, ensuring shelters and platforms are designed with the disabled in mind, and integrating transit into the urban fabric. While these measures are just a few examples, together they can contribute to making a transit system more comfortable and accessible to residents. For growing communities, it is crucial to develop new neighbourhoods with public transit at the forefront. This may require an enhancement of the existing planning process. Providing the transit commission, for example, with the opportunity to review an application and giving priority to their inputs or to simplify the permitting and approval process for developers building transit-oriented developments would be welcome improvements.

Transit planning—similar to any other area of planning—does not occur in a political vacuum. It is therefore crucial to understand the political element to transit planning. Planners must have the policy and legislative tools available to them to be able to ensure that private sector developers meet community-wide objectives. Communities should take a fresh approach to their relationship with developers to work more collaboratively and create a dialogue to yield better transit systems and urban form. In addition, planners should take an active role in developing transportation methodologies that fit the realities of the Canadian urban context and positively build upon existing standards.

There is a great need for better public transit in every Canadian community, large or small. Each community has a different economic, political, social and physical environment that affects the planning and implementation of an effective transit system. There is no easy solution to the challenges that transit professionals encounter when implementing public transit programs and systems. For growing communities, it is crucial to develop new neighbourhoods with public transit at the forefront. The power of public transit is its ability to be customized to meet a community's needs. By recognizing the impact that design, politics, and process can have on the success of a transit system, planning professionals will be able to create more effective public transit systems, and in turn, more desirable communities in which to live.

Plain Transit for Planners

Glossary

Accessibility - (1) The extent to which facilities are barrier-free and useable by disabled persons, including wheelchair users. (2) A measure of the ability or ease of all people to travel among various origins and destinations.

Active transportation - Human-powered transportation, including walking, jogging and running; cycling; in-line skating; skateboarding; use of a non-mechanized wheelchair and snowshoeing or skiing.

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

Bus Rapid Transit (BRT) - Buses on grade-separated roadways or dedicated lanes to transport passengers without interference from other traffic. Such systems usually include dedicated bus lanes, signal priority at intersections, off-bus fare collection to speed up boarding, level boarding (low-floor buses or high-level platforms) to enhance accessibility and enclosed stations.

Busway - A roadway reserved for buses only.

Collector - A street or highway that provides for traffic movement between major streets and local street. It is a road intended to collect traffic from local streets and land-access roads.

Complete Streets - Streets planned to balance the needs of different travel modes: walking, cycling, transit, private vehicles and others.

Compact Urban Form - A land-use pattern that encourages efficient use of land, walkable neighbourhoods, mixed land uses (residential, retail, workplace and institutional all within a neighbourhood), proximity to transit and reduced need for infrastructure. Compact urban form can include detached and semi-detached houses on small lots as well as townhouses and walk-up apartments, multi-storey commercial developments, and apartments or offices above retail.

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

Crime Prevention Through Environmental Design (CPTED) - A multi-disciplinary approach to deterring criminal behavior through environmental design.

CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts.

Demand – An amount and type of travel people would choose under specific price and quality conditions.

Density Bonusing - A density bonus is an incentive-based tool that allows developers to increase the maximum allowable development on a property in exchange for public policy goals.

Intelligent Transportation Systems (ITS) - The application of information and communication technologies to transportation infrastructure and vehicles for the purposes of traffic management.

Job Access and Reverse Commute (JARC) - The section of the Federal Transit Act that authorizes Job Access grants to provide new transportation services to welfare recipients and other low-income individuals for the purposes of attaining jobs, training and childcare. JARC grants help provide transit systems to transport workers to suburban job sites.

Leadership in Energy and Environmental Design (**LEED)** - LEED is a third-party certification program and an internationally accepted benchmark for the design, construction and operation of high performance green buildings. It provides building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance.

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

Low Floor Transit Vehicle - Public transportation vehicles that do not restrict access, are usable, and provide allocated space and / or priority seating for individuals who use wheelchairs, and which are accessible using ramps.

Light Rail Transit (LRT) - Electric rail cars in grade-separated rights-of-way. They have lower capacity and speed than heavy rail and metro systems, but higher capacity and speed than traditional street-running tram systems. While LRT rails are usually separated from other traffic, they may also run in mixed traffic. LRT vehicles are usually given signal priority at intersections.

Mobility - The movement of people and good

Modal Share - The percentage of person-trips or of freight movements made by one travel mode, relative to the total number of such trips made by all modes.

Modal Split - The number of trips or percentage of travellers using a particular type of transportation.

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

Multi-modal - The availability or use of more than one form of transportation, such as automobiles, walking, cycling, buses, rapid transit, rail (such as commuter and freight), trucks, air and marine.

New Freedom - A new program designed to support improvements to services and facilities for the transportation needs of people with disabilities that exceed those required by the *Americans with Disabilities Act*.

Pass-by trips - Trips that are made as an intermediate stop. Upon exit, trips will continue to travel in the same direction they were traveling before stopping at the Site.

Pedestrian - Refers to all people on foot or moving at walking speed, including those who use mobility aids (wheelchairs, scooters etc.), persons with strollers and buggies, and frail elderly persons.

Right-of-Way - Land that is reserved, usually through legal designation, for transportation and/or utility purposes, such as for a trail, hydro corridor, rail line, street or highway. A right-of-way is often reserved for the maintenance or expansion of existing services. A permit or legal permission is generally required for any work or encroachment on a right-of-way.

Transit - Transit includes public buses, streetcars, subways, and commuter rail lines. In this document transit also encompasses public trains; ferries; buses (including intercity buses) operated by private companies and available to the public; Board of Education transportation systems; private sector company/ institutional vans made available to employees, customers, or residents; taxis; and related pedestrian activities, as well as specialized transit services.

Transit-Oriented/Supportive Development - A compact mix of housing, shops, restaurants, offices, civic buildings, and open space. Transit supportive planning and development re-orients land use and development patterns from conventional community design to achieve a balanced transportation system where walking, bicycling, and riding transit are used to a greater degree.

Transit Priority Measures - Gives transit vehicles priority, such as at traffic signals by adjusting signal duration to minimize the transit vehicle delay. Signal priority may be manually activated by the driver with a switch, or automatically through the use of an Automatic Vehicle Location system.

Transportation Demand Management (TDM) - Various strategies that change travel behavior (how, when and where people travel) in order to increase transport system efficiency and achieve specific objectives such as reduced traffic congestion, road and parking cost-savings, increased safety, improved mobility for non-drivers, energy conservation and pollution emission reductions. This is also called *Mobility Management.*

Trip Generation Analysis - Involves development of relationships between vehicle trips and land use characteristics.

Wayfinding - Wayfinding encompasses all of the ways in which people and animals orient themselves in physical space and navigate from place to place.

Sources: The glossary was complied and adapted from the following sources, and should be interpreted with discretion.

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