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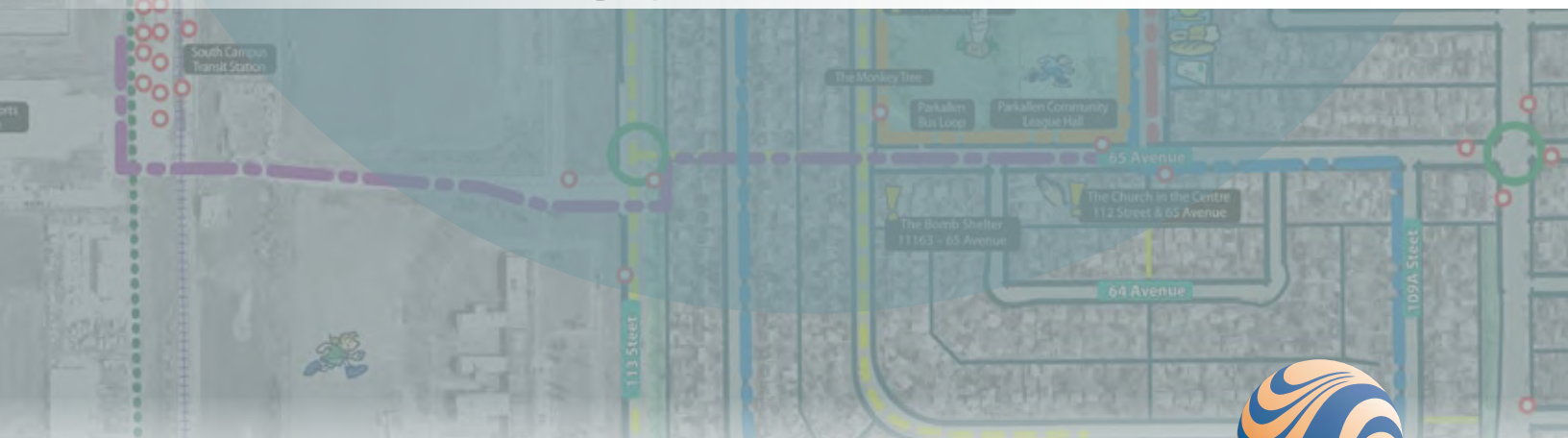
COSMOPOLITAN MUSIC

WATERDALE PLAYHOUSE

TRANSALTA ARTS

YARDBIRD SUITE

Proposed **WALKABILITY** Strategy





**Proposed Walkability Strategy for
Edmonton**

Prepared for:



City of Edmonton



Alberta Health Services

Prepared by:

Stantec Consulting Ltd.

In Association with:

Glattig Jackson Kercher Anglin, Inc.

Project for Public Spaces

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1.1 PROJECT PURPOSE

The overall purpose of the proposed Walkability Strategy for Edmonton is to develop an integrated set of potential actions to address a range of identified barriers to improving walkability in the city of Edmonton. Edmonton has become a fast-paced urban centre with 'big city' advantages, opportunities, and challenges. Like other large centres, the limits of funding, outdated regulatory frameworks, and increasing land mass, as well as the need for sustainable growth and improvements to quality of life, are challenging municipal decision makers to respond with integrated, innovative, and efficient solutions. Initiated by the Walkable Edmonton Committee and funded by Smart Choices and Alberta Health Services, the Walkability Strategy addresses a number of key urban form, infrastructure, and policy and program barriers that are impeding Edmonton from being a more-walkable city.

The Walkability Strategy project included consultation with key City of Edmonton departments, Alberta Health Services, and invited stakeholders from Edmonton organizations. The purpose of the Walkability Strategy report is as follows.

1. Provide a summary of Walkability – what it is, what it achieves, what is needed to support it – to provide an introduction and unified definition for what is meant by walkability.
2. Objectively review City of Edmonton planning, design, education, and funding practices as they relate to and impact the ability of Edmonton's residents to walk for commuting, education, and shopping purposes.
3. Create a recommended Action Plan of programs and initiatives that should be undertaken by City of Edmonton departments to increase the number and proportion of trips that people make by walking.



1.2 PROJECT GOALS

In terms of walkability in Edmonton, this project is certainly not starting from scratch. There is already a substantial body of policy support and numerous plan directions laying the groundwork for walkability, smart growth, and a livable city. Walkable Edmonton, City departments, and external organizations have created a positive environment for development of broad initiatives to health, livability, and walkability. Despite the evolution and emergence of progressive policy context and organizational culture supportive of walkability within the City of Edmonton, and notwithstanding the many external groups and pressures in favour of this direction, the extent of on-the-ground tangible progress has not kept pace with the plans and intentions, leaving room for improvement.



One of the main goals of the Walkability Strategy is an examination of ‘what hasn’t been happening?’ and ‘how can we achieve more?’. The Walkability Strategy will act as a catalyst for moving forward with concrete actions on walkability to achieve greater results toward more tangible progress on walkability and other related Smart Choices initiatives. In particular, the Walkability Strategy focuses on identifying **root causes** behind the barriers that limit Edmonton’s walkability and the **strategic solutions** that will remove these barriers.

1.3 PROJECT FOCUS

The Walkability Strategy focuses on destination-walkability, or active transportation, as opposed to recreational walking. **Destination-walkability** represents walking for purposes other than recreation or exercise, including, for example, walking to work, school, church, stores, the theatre, or to access transit. These are trips that can replace vehicle trips if the urban form, pedestrian infrastructure, quality of the journey, and policies and programs are in place to encourage them, and represent an excellent opportunity to generate health benefits.



Recreational walking refers to walking for leisure or exercise – going for a leisurely stroll around the neighbourhood, walking the dog, or a walk in the river valley. Recreational walking trips do not reduce vehicle trips but are important for resident health and promoting walking as part of people’s exercise.

Edmonton has an extensive sidewalk and trail system that supports recreational walking, whereas destination-walkability is currently lacking adequate incentives, investment, and encouragement to replace vehicle trips.

1.4 WHAT IS WALKABILITY?

Walkability is the measure of the overall walking and living conditions in an area and is defined as *the extent to which the built environment is friendly to the presence of people walking, living, shopping, visiting, enjoying, or spending time in an area.*

Factors at the macro level affecting walkability include mix of land use, high levels of street connectivity, and residential density (residential units per area of residential use). At the micro level, walkability requires street level details that include: plenty of places to go to near the majority of homes and convenient links to transit; general orientation and proximity of homes and buildings to watch over the street; and ‘transparency’ which includes percentage of transparent windows and doors at the street level. Walkability is enhanced with quality placemaking – a combination of well laid out public streets, squares, plazas, and small parks – to increase and support social and commercial activities. Walkable street designs create a human scale and a sense of enclosure to the street, helping keep vehicle speeds low. Walkways preferably are buffered, not located immediately adjacent to moving traffic. Use of planter strips, on-street parking, or bike lanes achieves this while helping create enclosure. Walkability is improved aesthetically as an area takes on its own charm and sense of place, and is further enhanced when walkways are interesting (e.g. many things to see and experience).

Walkability is enhanced with enjoyable routes of sufficient width to be comfortable for two or more people to walk side by side (or a wheelchair or scooter) and wider if volumes of pedestrians are moderate or high. Walkability also calls for ease and frequency of convenient street crossings. Low traffic speeds and volumes allow this to happen naturally, but at higher speeds formalized pedestrian crossings are important.

One of the best ways to quickly determine the walkability of a block, corridor, or neighborhood is to count the number of people walking, lingering, and enjoying a space. The diversity of people, and especially the presence of children, seniors, and people with disabilities, denotes the quality, completeness, and wholesomeness of a walkable/livable space.



Thinking about urban planning and design from a walkability perspective has been shown to provide benefits for residents and the community over a number of diverse indicators.

- Health – improved physical health and reduced risk of diseases through increasing physical activity which can also lower health care costs.
- Transportation – reduced congestion by replacing driving with walking. Roadway improvements to accommodate pedestrians can also enhance traffic safety.
- Environmental / Energy – reduced air pollution and use of nonrenewable energy resources by increasing walking and decreasing automobile use.
- Economic – increased property values and retail sales by increasing activity around property and businesses through providing greater travel choice which creates financial savings for residents (e.g. costs of vehicle ownership) and allows extra money to be spent on other things.
- Quality of Life – increased social interaction, attraction of businesses and workers, and increased tourism in areas that are walkable and active.
- Social Equality – increased transportation equity throughout the community by providing affordable transportation options for lower income and transportation disadvantaged people and designing communities that can be less reliant on automobiles.



(Victoria Transport Policy Institute, 2008c; Pedestrian and Bicycle Information Center, 2008)

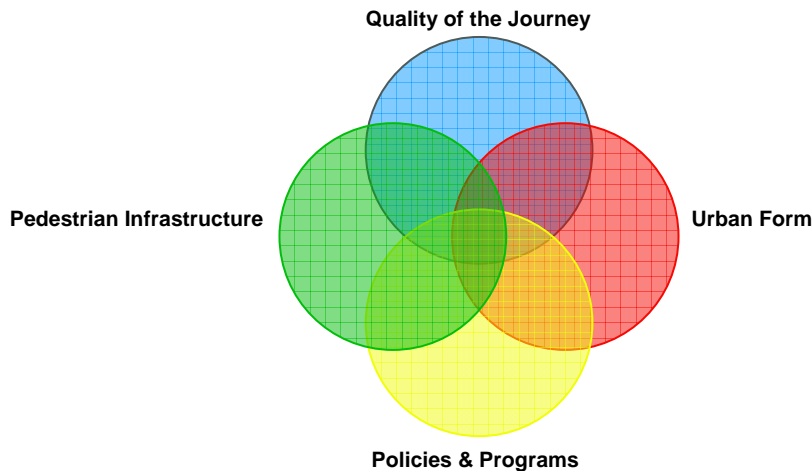
Based on the impacts that walking can have on a city, walkability has a significant role to play in creating a livable city; a city that is sustainable, welcoming, vibrant, human-scaled, safe and secure, equitable, less polluted, home to healthy residents, and attractive to businesses and tourists.

1.5 COMPONENTS OF WALKABILITY

The built environment has a strong influence on whether people choose to walk. For walking to become a competitive or favoured mode in Edmonton, it is necessary to remove many strong disincentives to walking. Auto-centric design has led to high auto dependency. Collaboration, rethinking, and retooling of the key elements that pedestrians encounter everyday are needed for walking to become competitive. This includes the fields of architecture, landscape architecture, engineering, planning, transit, banking, and many others.

This section describes a number of important considerations needed to remove disincentives and create a supportive system for walking. The necessary elements for a walkable community have been grouped into four overarching components as illustrated in Figure 1: quality of the journey, urban form, pedestrian infrastructure, and policies and programs (U.S. Environmental Protection Agency, 2008; Smart Growth Planning, 2006).

Figure 1: Components of Walkability



The elements that make up the four components required to create walkable communities are described below. Analysis of Edmonton with respect to these elements is discussed in Chapter 5.0. Refer to Appendix A for more detailed descriptions of the following elements.

1.5.1 Quality of the Journey

Security – A feeling of security is created through building placement, population density, window transparency, street connectivity, and aesthetics.

Safety – Real and perceived pedestrian safety threats such as tripping or pedestrian-vehicle collisions are influenced by vehicle speeds and volumes, sight lines, distance between pedestrians and automobiles, and lighting for visibility.



Convenience & Efficiency – The placement of multiple complementary destinations within walking distance of a home or office allows pedestrians to perform many errands at once.

Comfort – The provision of seating, temporary wind or sun shelter, and public restrooms are attractive to individuals and families, and are especially important to seniors.

Welcome / Appeal – People are ‘welcomed’ to a street through streetscaping and aesthetics.

Complexity – Color, texture, and building articulation create a high level of complexity which encourages pedestrians to continually return to a place.

1.5.2 Urban Form

Scale – Various land uses concentrated within about 400 metres increases walkability because it is relatively easy to walk this distance and may be easier than other forms of travel.

Block Size – Ideal block size is 350 to 500 metres in circumference.

Connectivity – High connectivity leads to more dispersed motor vehicle traffic, reduced walking distances, and easier access to transit and pedestrian attractions.

Streets – Streets internal to neighbourhoods should be narrow enough to encourage low vehicle speeds and be comfortable and safe for walking.

Destinations – A range of services should be found in close proximity to housing.

Mix of Uses – Mixed-use neighbourhoods have a variety of land uses, such as offices, retail, and a mix of residence types.

Density – High residential and commercial densities increase the number of pedestrians.

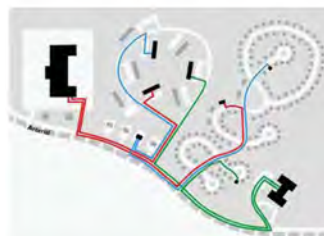
Transit Service – Frequent transit service with well placed stops and shelters provides a reliable alternative to driving.



Conventional Development
 - Sparse road network
 - Separation of uses



Traditional Development
 - Roadway network with multiple connections
 - Proximity of uses
 - Public spaces link community



Congested Traffic Pattern
 - Promotes vehicular travel
 - Long trip lengths
 - Trips concentrated on one major roadway



Dispersed Traffic Pattern
 - Promotes walking and biking
 - Shorter trip lengths
 - Dispersion of trips on multiple roadways



1.5.3 Pedestrian Infrastructure

Sidewalks – A minimum width of 1.5 metres, regular maintenance, and buffers from traffic are important factors in making walking comfortable (with a minimum clear walking width of 1.0 metre).



Accessibility – Sidewalks must provide support for seniors and people with disabilities. This includes the use of curb ramps, level sidewalks, and accessible buildings.

Street Crossings – Factors include intersection geometry and controls, crossing width, and providing pedestrian “refuge” to break up wide crossings.

Transit Amenities – Users are encouraged by comfortable and attractive transit shelters.

Street Amenities – These include benches, garbage receptacles, newspaper racks, outdoor cafes, signs, and other amenities for people to rest, find their way, and otherwise feel invited to the street.



Street Lighting – Adequate lighting is essential for both safety and security and may require additional pedestrian-level lighting to provide adequate illumination of the sidewalk.

Driveways – Frequent, wide driveways can be uncomfortable for pedestrians.

Off-street Parking – Large, unattractive parking lots discourage walking by increasing distances to building entrances.

Parkades – Parkade entrances should be kept to side street or alley locations whenever possible, to minimize the number of pedestrian-vehicle conflicts. Adequate sight lines are also critical for pedestrian safety.

Access to Buildings – Buildings should provide direct access to pedestrians, without forcing them to enter through parking lots.

1.5.4 Policies and Programs

Design Standards and Guidelines – Standards and guidelines should ensure that adequate facilities are provided for pedestrians including sidewalks, curb ramps, and bus shelters.

Roadway Operation Standards – Operation standards (e.g. intersection level of service) should balance the needs of all users (e.g. motorists, transit users, cyclists, and pedestrians).

Zoning Bylaw – Zoning legislation should support land uses and development patterns that encourage walkable communities.



Area and Neighbourhood Plans – Land use and transportation plans should establish the urban form elements that allow walking to be a convenient travel option for residents.

Support / Education / Marketing – Programs that promote walking create awareness of the impacts that walkability has on people’s health, cost of living, and the environment.

Government / Administration Support and Funding – The support of local government and investment in pedestrian-oriented infrastructure is crucial to create more walkable communities.

Implementation – Implementation requires the support of decision makers and stakeholders, as well as funding to execute plans and programs.



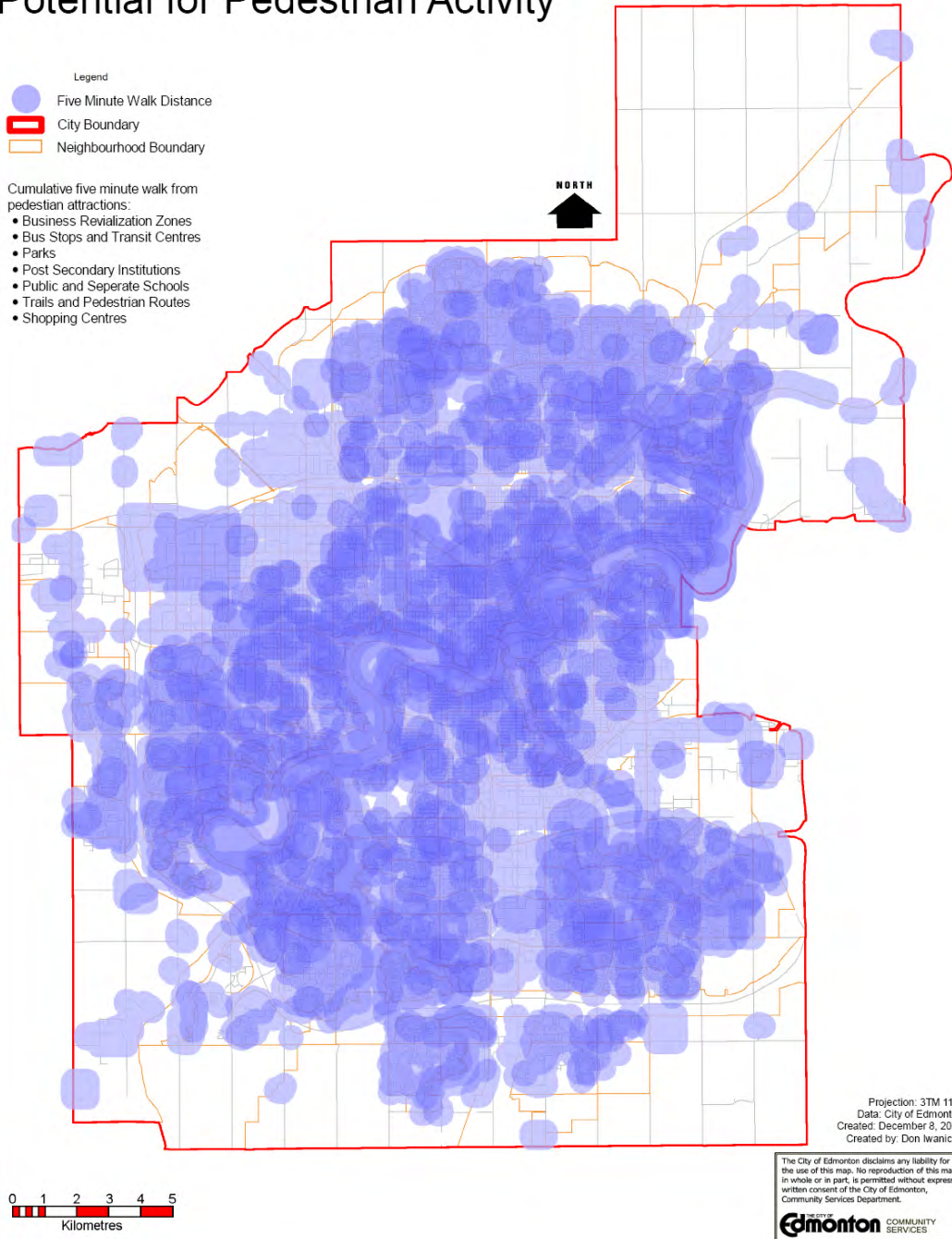
1.6 IMPORTANCE OF PLANNING FOR WALKING IN EDMONTON

Planning for pedestrians is not something that should be isolated to areas with pedestrian activity associated with shopping or post secondary students. Pedestrian activity occurs throughout Edmonton on a daily basis whether for shopping, commuting, or accessing services and transit, in addition to recreational walking for exercise or to walk the dog.

The map in Figure 2 illustrates a five minute walk from major pedestrian attractors such as schools, transit, and shopping centres. Where there is overlap of the five minute walk distance between attractors, a darker shade of blue occurs. The illustration clearly shows that pedestrian activity occurs in all developed areas of Edmonton. Therefore, planning and accommodation of pedestrians must occur throughout the city though the barriers / issues that are impacting walkability may vary across the city. This is discussed in the following sections.

Figure 2: Location of Potential Pedestrian Activity in Edmonton

Potential for Pedestrian Activity

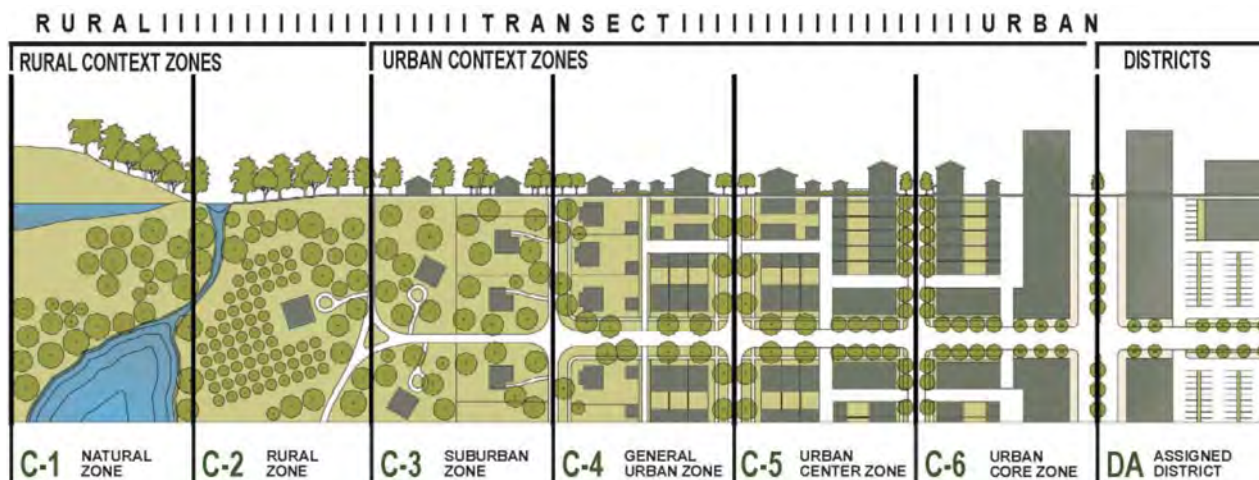


1.6.1 Varying Walkability Characteristics by Location

Though destination-walkability is relevant to all areas of Edmonton, the specific applications and issues to encourage and support walking vary broadly depending on location. Each area of the city is made up of diverse characteristics from the types of destinations that are available, to the

safety and security that individuals perceive, to the distances between destinations, to the layout of the neighbourhood. All these impact the issues that are most important and require the most action in order to increase the numbers and proportion of people that walk. The areas of the city can be grouped and defined as transects. Figure 3 illustrates how the concept of transects is theoretically structured ranging from rural to urban areas. The Walkability Strategy focuses on the Urban Context Zones (suburban through urban core).

Figure 3: Transect Concept (Duany Plater-Zyberk & Company, 2008)



The urban context zones have been refined to define six transects for Edmonton – Downtown, Pedestrian Commercial Area, Mature Stable, Mature Stressed, Inner Suburban, and Outer Suburban.

- Downtown – representing the Downtown Core area. The Downtown area has a grid pattern of streets and land uses are dominated by office, retail, and institutional buildings with some residential.
- Pedestrian Commercial Area – representing the type of area typically defined by the Pedestrian Commercial Shopping Street Overlay. This type of area would reflect pedestrian-oriented commercial streets that are located outside the downtown core such as 124 Street and Whyte Avenue. Revitalizing corridors such as Stony Plain Road and 118 Avenue are transitioning into this transect though they may require additional strategies applicable for the Mature Stressed transect. In addition, proposed town centres in suburban Edmonton, such as in Heritage Valley, could also be considered within this category. The streets within Pedestrian Commercial Areas are typically focused on an arterial corridor and incorporate a mix of uses, ground level retail, and limited off-street parking.
- Mature Stable – representing the mature neighbourhoods, typically located within the inner ring road as defined by the City of Edmonton (Whitemud Drive, 75 Street, Yellowhead Trail, and 170 Street), with the exception of those that have safety and security issues. The Mature Stable areas typically have a grid or modified grid pattern of streets and are typically

residential with commercial land uses concentrated in shopping centres and some neighbourhood commercial strips.

- Mature Stressed – mature neighbourhoods that are experiencing social and security issues such as Boyle Street and McCauley neighbourhoods. The Mature Stressed areas have similar layout and land uses as the Mature Stable areas.
- Inner Suburban – neighbourhoods not defined as Mature Stable or Mature Stressed above, typically located between the inner ring road (Whitemud Drive, 75 Street, Yellowhead Trail, and 170 Street) and Anthony Henday Drive. Inner Suburban areas typically have collector and cul-de-sac street patterns with segregated residential and commercial land uses. Most commercial sites are located along the arterial roads and/or in shopping centres.
- Outer Suburban – suburban neighbourhoods that are located outside Anthony Henday Drive including those that have been planned, are currently undergoing planning, or have not been planned. Outer Suburban areas typically have similar street patterns and land use layouts as Inner Suburban areas. However, as many of these areas are currently undergoing planning, there is the significant potential to provide a more walkable urban form than typically is found in suburban Edmonton.

1.6.2 Existing Walkability by Transect

Edmonton's neighbourhoods, as broadly defined by the above transects, will naturally have different levels of walkability and encounter different types of barriers. The grid design and mixed land uses seen in the Downtown and Pedestrian Commercial Areas usually result in a high level of walkability. Conversely, suburban areas tend to have hierarchical and less-connected streets, long block lengths, large areas of single land uses (i.e. residential), and other features which do not encourage walking as a significant mode of transportation. Mature neighbourhoods may have a mix of more-walkable and less-walkable areas depending on their design and the types of amenities within walking distance. These generalizations are based on observations of the areas and discussions with residents and stakeholders.

A Generalized Walkability Measure: Walk Score

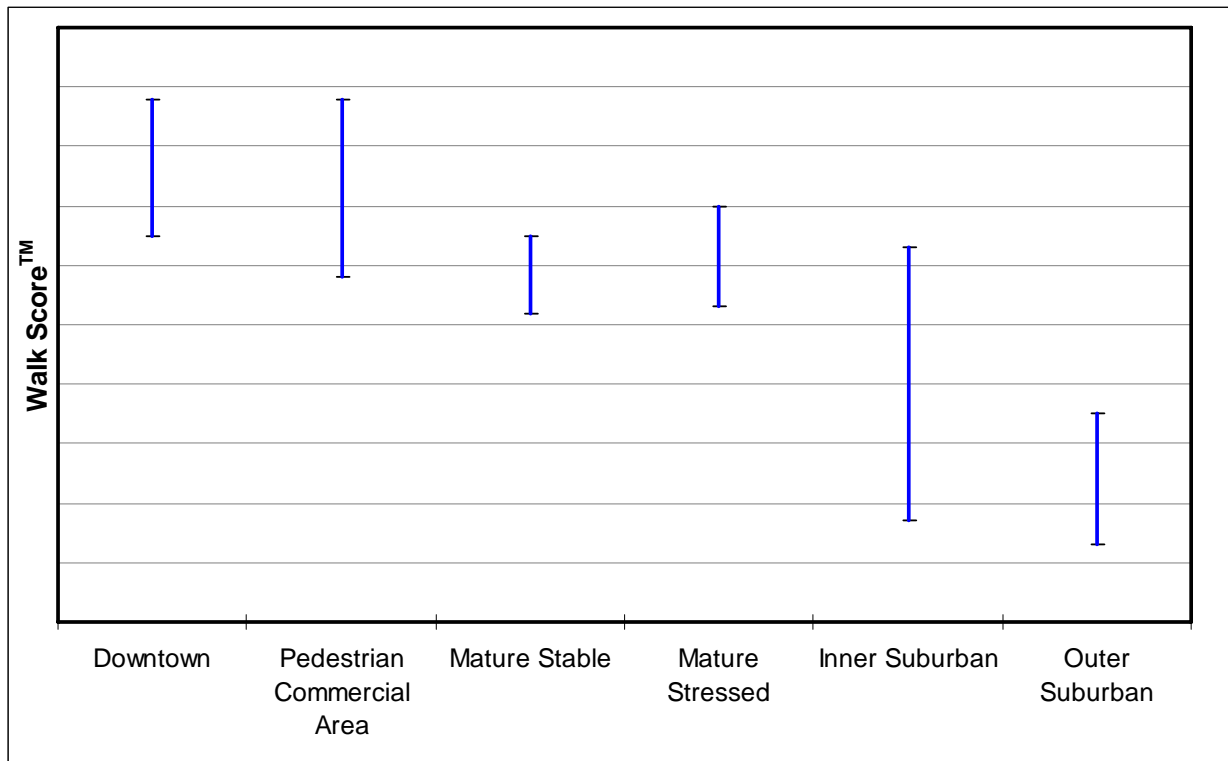
Walk Score is a new and evolving online tool that strives to quantify walkability using Google Maps and an algorithm that awards points for nearby amenities in thirteen categories such as stores, restaurants, and schools. Maximum points are awarded for an amenity closer than 0.4 km, and the points decrease to zero as the distance approaches 1.6 km. The sum of the points yields a score from 0 to 100. A score over 70 indicates a very walkable location, where it would be possible to get by without owning a car, and a score under 50 indicates a car-dependent location.

It is important to note that there are numerous factors that contribute to walkability that are not currently considered by Walk Score (many of which are acknowledged by Walk Score and slated for inclusion with future revisions to the tool). For example, each category is weighted equally, so a location's proximity to a school is not considered any more important than its

proximity to a hardware store. There are also a number of overlooked categories including access to transit, medical facilities, and local cultural / entertainment destinations such as art galleries. The Walk Score of a location is based on the straight line distance to amenities, which means that street design and sidewalk connectivity do not factor into the calculations. Quality of the journey factors such as aesthetics and security are also not incorporated nor are some urban form factors such as the distance to employment centres. Walk Score can present an overall impression of the walkability of a location, but it does not reveal the whole picture.

Applying the Walk Score approach to three sample locations in each representative transect within Edmonton yields the results shown in Figure 4.

Figure 4: Walk Score Measure of Walkability by Transect



Generally, the Walk Score indicators follow the expected patterns for each context zone: Downtown areas have the highest calculated Walk Score range; pedestrian commercial zones are also high scoring but with a larger range of values (with higher Walk Scores for more established zones); mature neighbourhoods tend to fall in a moderate range of walkability whether they are stressed or stable; and suburban areas are indicated as being significantly less walkable than the other transects. The categories consistently beyond walking distance in the suburban areas were schools, libraries, and bars.

Localized Walkability Research

Through online searches and stakeholder project input, it is evident that there are numerous completed and ongoing research projects crossing a variety of topic areas that are related directly or indirectly to walkability in Edmonton. Topics include access to healthy food, citizen activity levels, physical fitness, neighborhood design, and walkability specifically.

Significant research regarding physical activity and neighborhood design (among other things) is being conducted by Dr. John Spence at the University of Alberta, using Edmonton data for some of the analysis. This research has included detailed GIS-based calculations of walkability in Edmonton, based on residential density, street connectivity, and the extent of mixed land use. Additional research is in progress that further stratifies Edmonton neighborhoods by both walkability and socio-economic characteristics. When published, this research will be able to supplement the available assessment of walkability in grid-style neighborhoods as compared to cul-de-sac style neighborhoods.

2.0 Role of the Walkability Strategy

2.1 WALKABILITY IN THE EDMONTON CONTEXT

The following summarizes the existing strategic and broad statutory plans and initiatives that provide support for walkability in Edmonton.

Strategic Plan

The City of Edmonton's Strategic Plan 2009-2018 (The Way Ahead) establishes the City's priorities to assist in making informed decisions that help to focus efforts on improving the quality of life for Edmonton's citizens now and in the future. The Strategic Plan guides and informs planning done by the City of Edmonton for a ten year planning horizon with three-year goals to help focus on priorities that reflect department planning cycles and City Council terms.

The Strategic Plan incorporates and supports walkability by establishing a vision for a city that is safe to walk in, connected by accessible and convenient transit, and filled with events and activity year round. The plan's four principles of integration, sustainability, livability, and innovation support walkability by providing transportation options and providing amenities that encourage activity and social interaction. The Strategic Plan's three-year priority goals include elements for which the Walkability Strategy will direct support including the following examples:



- Reducing greenhouse gas emissions;
- Enhancing the social connectedness for all citizens;
- Reducing and preventing crime in transit, downtown, and communities;
- Improving community engagement and participation;
- Increasing dwelling density (and mixed-use);
- Improving the city's urban architecture and urban form to ensure it meets environmental standards and exemplifies excellence in urban, architectural, and landscape design;
- Increasing transit ridership; and
- Reducing barriers to the use of alternative modes of transportation.

Municipal Development Plan

Prepared to support and achieve Edmonton's Strategic Plan, the Draft Municipal Development Plan (The Way We Grow) provides guidance to Edmonton's growth and continued development by focusing on land use, growth, and development. Specific objectives and policies include managing growth, urban design, supporting prosperity, natural environment, working within the Capital Region, managing land and resources, and providing complete, healthy, and livable communities.

The Draft Municipal Development Plan extensively supports concepts of walkability such as:

- Integrating land use and transportation by locating medium and higher density residential development as well as commercial, entertainment, institutional, and employment uses near premium transit;
- Encouraging and supporting a range of housing through redevelopment and densification in the Downtown and mature neighbourhoods while also enhancing public amenities via the Great Neighbourhoods Program;
- Supporting the creation of placemaking elements such as streetscapes, urban parks, and public art;
- Providing a variety of transportation modes for Edmontonians and supporting strategies for active modes such as the Sidewalk Strategy and the Walkability Strategy;
- Encouraging large scale commercial centres and commercial strips to develop into mixed-use, transit supportive, and walkable urban areas; and
- Identifying and encouraging the creation of key pedestrian streets in each quadrant of the city to provide a focus for a walkable urban lifestyle.



Transportation Master Plan

Prepared in concert with the Draft Municipal Development Plan, the Draft Transportation Master Plan (The Way We Move) supports Edmonton's Strategic Plan through seven strategic transportation goals that will improve transportation mobility and efficiency while supporting growth and the economy: transportation and land use integration, access and mobility, sustainability, health and safety, transportation mode shift, well-maintained infrastructure, and economic vitality. The Draft Transportation Master Plan also extensively supports walkability through a number of objectives and policies such as:

- Integrating transit and land use planning consistent with the Draft Municipal Development Plan to create a more compact and efficient urban form;
- Encouraging and supporting increased use of the transit system through service improvements, enhanced accessibility, and improved active transportation facilities providing access to stations and stops;
- Providing and enhancing pedestrian infrastructure consistent with the Sidewalk Strategy and encouraging planning that is consistent with walkability; and
- Creating a walkable environment and creating an integrated network of multi-use trail facilities that can be used year round to provide transportation choice, improve health, and reduce impacts on the environment.



Great Neighbourhoods

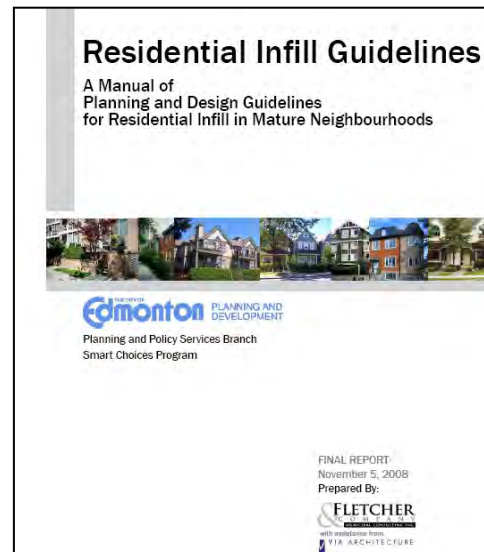
The Office of Great Neighbourhoods will be a focal point for City staff to work with citizens and organizational partners to create and sustain great neighbourhoods in every part of the city. Its purpose is to engage citizens to discover neighbourhood priorities, create an informed interdepartmental response to these issues or opportunities, and synchronize revitalization projects which are already supporting some of Edmonton's distressed communities. This process will help eliminate duplication of City services, reduce costs, reduce resources required, while establishing a comprehensive approach to support neighbourhoods. Strengthening and building relationships with partners, and supporting partners to do the same with each other, is the foundation of Great Neighbourhoods.

Long Term Public Transportation Strategy

Flowing from the Draft Transportation Master Plan, the Long Term Public Transportation Strategy (LTPTS) supports the broader City of Edmonton policy to become a modern, compact, and sustainable city. The LTPTS establishes the role of public transit in meeting these policy objectives and provides the support for transforming the city from a low density, car-oriented city to one with greater ties between sustainable land use and wider transportation choice. The strategy provides recommendations on integration of transit and land use, development of LRT, park-and-ride strategies, transit technologies, fare policy, and supporting measures for transit success.

Residential Infill Guidelines

The Residential Infill Guidelines (2008) set out planning and design guidelines that will assist the City of Edmonton and the development industry in achieving residential infill development that is welcomed by and creates a livable environment for its neighbours. Guidance is provided regarding the location, form, and height of residential infill development in Edmonton’s mature neighbourhoods to achieve three main goals of fiscal sustainability, environmental sustainability, and improved quality of development. In terms of walkability, the Residential Infill Guidelines are supportive by providing guidance regarding land use density, linkages to transit, and providing animated streets.



New Neighbourhood Design Guidelines

The Planning and Development Department is preparing guidelines to achieve more sustainable and livable neighbourhoods and subdivisions. The guidelines are intended to provide design direction to those preparing, reviewing, and approving planning applications in new neighbourhoods. Making these neighbourhoods more walkable than the suburban development of recent decades is an important goal of the project. The guidelines are expected to go to City Council for approval in 2009.



Design and Construction Standards

City of Edmonton Design and Construction Standards provide guidance and direction for design of City infrastructure projects and private developments (including the pedestrian realm), outline responsibilities of developers during the construction phase, and include construction specifications. The Standards consist of eight volumes, addressing roadways, drainage, landscaping, and road / walkway lighting, among other things. The Design and Construction Standards outline the location and design of sidewalks, multi-use trails, walkways, curb ramps, bus stops, street/pedestrian lighting, intersections and the width of roadways, and the location of amenities such as garbage receptacles. All of these elements impact the layout, function, and accessibility of Edmonton’s pedestrian network which directly impacts walkability.

Smart Choices

The Smart Choices Program evolved from City Council’s direction to prepare a strategy for the intensification of land development to increase the City’s sustainability and control the fiscal

impacts of an expanding urban area. The Smart Choices Program, which was approved in March 2004, is composed of eight recommendations including one specifically defining the need for a coordinated approach for walkability as well as other recommendations that support walkability through increased density, mix of uses, infill development to make use of existing infrastructure, and investment in communities. With regard to the Walkable City recommendation, Smart Choices calls for:

- Capital planning for maintenance, upgrading, and installation of pedestrian infrastructure;
- Planning for pedestrian routes and pedestrian design guidelines in new suburban and urban planning documents;
- Streetscape, site design, and architectural design requirements for a pedestrian supportive environment; and
- Public education and programming that communicates the benefits of walking.

Sidewalk Strategy

The Sidewalk Strategy (Ped Connections: A Strategy for Sidewalk Infrastructure in Edmonton, 2008) is a strategy to provide missing pedestrian infrastructure throughout Edmonton including the City's industrial areas. The Strategy establishes a standard and priorities for where missing sidewalks, curb ramps, and pedestrian links to transit should be provided, life cycle cost considerations pertaining to on-going maintenance of the expanding network, and provides recommendations on potential improvements to existing policies or programs that could strengthen the requirements for providing pedestrian facilities in support of walkability.



Multi-Use Trail Corridor Study

The Multi-Use Trail Corridor Study (2002) identified an interconnected, city-wide trail system that would provide a pedestrian and non-motorized transportation network for residents throughout Edmonton that would allow residents to conveniently travel by an active mode of transport to work, for recreation, or other trip purposes. The study established a coordinated trail network that would include a 62 km network of trails and provide connections to the 250 km of existing trails and shared use sidewalks throughout Edmonton and the river valley trail system by 2010.

Urban Parks Management Plan

The Urban Parks Management Plan (2006) guides the acquisition, development, maintenance, preservation, and animation of parks in Edmonton. The Plan impacts walkability by providing destinations and activity areas that are walkable and within walking distance, while also emphasizing active living and health.

2.2 WHERE DOES THE WALKABILITY STRATEGY FIT IN?

The City's Strategic Plan, *The Way Ahead*, is the preeminent plan that provides the long term vision for the City and identifies long term strategic goals and intermediate term priority goals. The four corporate directional plans (including the Draft Transportation Master Plan, *The Way We Move*, and Draft Municipal Development Plan, *The Way We Grow*) support the City's Strategic Plan and provide overall direction to business and operational planning.

The Walkability Strategy represents a medium term strategic plan that provides recommendations and support for walkability-related goals and objectives of the City's Strategic Plan, Municipal Development Plan, and Transportation Master Plan. The Walkability Strategy also identifies additional specific actions that will help to achieve the goals and objectives of the higher level plans. The Walkability Strategy includes recommendations and solutions that provide direction, guidance, and requirements for area and neighbourhood planning, the revision and application of development and design tools, and the formation of other City projects and initiatives.

The Walkability Strategy, Sidewalk Strategy, and Bicycle Transportation Plan provide a basis for active transportation planning in the City of Edmonton. In terms land use planning and development, the Walkability Strategy supports and aligns with the New Neighbourhood Design Guidelines and the Residential Infill Guidelines to improve the walkability and livability of new and existing neighbourhoods.

The Walkability Strategy will help in the development and refinement of the City's business planning and budgeting processes including the development of three-year corporate and departmental business plans and the annual operating and capital budgets. The Walkability Strategy will also help in the development department and branch operational plans and their program and service plans.

2.3 THE WALKABILITY STRATEGY AND HEALTH

Urban form is associated with health. Land-use choices, transportation infrastructure, and building design can all affect health outcomes. Urban form can influence the rate and severity of motor vehicle collisions, improve or harm local air quality, affect physical activity by supporting or hindering walking to daily destinations, and impact mental health. For example:

- Cities in the United States dominated by low-density development oriented around automobile travel have higher motor vehicle collision fatality rates than cities that have

developed more intensively (Ewing et al., 2003) and would correlate with supportive conditions for active transportation such as walking.

- In Canada and the United States, physical activity in the form of daily destination walking is consistently associated with urban form elements such as street connectivity and land-use (e.g. residential, public, retail and commercial) mix, although these elements may affect gender, socioeconomic, or cultural subgroups differently (Frank et al., 2008). As a health risk, physical inactivity is implicated in many chronic diseases (Magnusson et al., 2004) and injuries. Improving population levels of physical activity is expected to positively impact a wide range of chronic diseases and injury types.
- There is an abundance of evidence linking air pollution to increased rates of illness and premature death in populations (Toronto Public Health, 2001; WHO, 2004). Heavy motor vehicle use in urban areas can harm local air quality and pose a threat to health. In particular, motor vehicle emissions such as nitrogen oxides and particulate matter have been associated with respiratory and heart disease, as well as the worsening of chronic conditions such as asthma.
- Social isolation is a well-established risk for mental illness (Sturm and Cohen, 2004), and some urban forms may contribute to social isolation for those without access to an automobile. Contact with nature also seems to be relevant to health; some research suggests that people living in buildings surrounded by green space have a stronger sense of community and better relationships with neighbours, and experience less domestic violence than those not surrounded by greenspace (Kuo and Sullivan, 2001).

Urban form that supports walkability may hold significant untapped potential for improving population health, including reducing rates of chronic disease and injury and equalizing access to some of the features of the built environment that promote health. Key challenges in this area include measuring walkability and demonstrating positive health impacts over time, as well as integrating health knowledge into local planning processes.

3.0 Walkability Barriers, Root Causes, and Solutions

This chapter presents our approach to identifying the barriers that are limiting walkability in Edmonton, identifying the root cause(s) of these barriers, and defining solutions to tackle them. This chapter also defines what is meant by barriers, root causes, and solutions and provides an overview of the types of barriers that impact walkability.

3.1 BARRIERS TO WALKABILITY

3.1.1 What are Barriers?

As stated previously, there are numerous policies, plans, and initiatives already approved in Edmonton that support the concept of walkability and the necessary elements that create walkable communities. However, these existing supportive elements are not resulting in progress toward walkability at a desirable rate.



Barriers are impediments to achieving walkability, and reflect underlying problems that give rise to them. Barriers are the things that are getting in the way of Edmonton being a walkable city and represent the visible symptoms of the problems.

3.1.2 Barrier Types

This section presents a conceptual framework of walking barriers and provides brief definitions for the different types of barriers: physical, social / cultural, comfort, accessibility, institutional, and financial. The impact these barriers have on the quality of the journey, urban form, pedestrian infrastructure, and policies and programs will also be discussed.

Physical Barriers

Physical barriers are those that make walking difficult, unsafe, or unpleasant. The description, categorization, and analysis of physical barriers comprise the most significant aspect of the literature, discussion, and problem solving related to walking. Physical barriers, both real and perceived, are significant hindrances to walking and are important (and often expensive) to rectify. However, just as streets and sidewalks have been adapted to make way for the automobile, they can be redesigned and gradually repurposed to once again support non-automobile modes.



Physical barriers to walking are a by-product of the conventional approach to traffic engineering and land use planning which continues to be the norm in most cities across North America. Physical barriers also result from society's lack of understanding of the benefits of complete streets, i.e. balancing the needs of varying users, planning for community-based outcomes, and considering streets as public spaces which represent a high percentage of the public realm.



Social / Cultural Barriers

While somewhat difficult to quantify, social and cultural barriers detract from the general sense of importance of walking among the population as a whole. A car-centered culture in Edmonton diminishes the importance most people attach to walking as part of their way of life. In New York City, for example, walking is a cultural fact of life and a source of pride among locals as well as visitors. Walking is universally viewed as a sign of fitness and good health, self-reliance, and a desire to be connected to the ever changing urban environment that surrounds the pedestrian in New York.



Social and cultural barriers revolve around the fact that walking is not highly valued as a means of travel by local culture and the use of transit is often negatively viewed. Even walking reasonable distances (less than 1 km) is considered undesirable, especially where there is little social or cultural life along the streets or sidewalks to attract pedestrians. Streets are not seen as destinations, but serve only as connections. As a result, people want to pass through them as fast as possible in order to reach their 'real' destinations.



Social and cultural barriers to achieving a walkable neighbourhood are exacerbated by other categories of barriers, which serve to undermine the perception of walking as a mode of travel. For example, street and block layouts designed to give priority to motorized traffic communicate a city's attitude that being a pedestrian has a lower social status than being a vehicle user. This perception is worsened where street frontages do not enhance the aesthetics of this public space, sidewalks are heavily obstructed, and restrictions on driving through crosswalks and exceeding speed limits are not adequately enforced.

Comfort Barriers

Comfort barriers are elements, both physical and psychological, that make people feel unsafe or uncomfortable walking due to real or perceived issues. The feeling of comfort is a positive emotional reaction to the physical and social environment but also a cognitive comparison between actual physical elements and some point of reference, meaning that past experiences can also contribute to the feeling of comfort.



Comfort barriers are often derived from a lack of confidence in the street environment, uncertainty of direction, fear of getting lost, or an exaggerated perception of distance. These are exacerbated by visual obstacles such as poorly maintained buildings, vandalism, trash, vacant lots, and chain link fences, poor aesthetic and architectural quality of buildings, as well as the lack of appropriate streetscape features such as trees, landscaping, and lighting. Many other physical and environmental factors can negatively affect a pedestrian's feeling of comfort such as weather, temperature, noise, odour, and air pollution.¹



Accessibility Barriers

Accessibility refers to the ease with which pedestrians can reach their destinations in a timely fashion. Barriers to accessibility are thus reflected in the effort required to make a trip on foot (or with a mobility aid). These barriers can be considered at two levels – macro and micro. On the macro level, barriers are created by segregated and auto-oriented land uses, disconnected or indirect street routes, culs-de-sac, missing sidewalks, and absent connections to transit. On the micro level, walking distances, waiting times at crossings, curb ramps, and sidewalk obstacles (including snow and ice) must be considered and can include incorporating age-friendly and barrier-free design principles. Lack of appropriate information, directional signage, and poor wayfinding systems also represent significant barriers to accessibility as they can lengthen real and perceived travel times and



¹ See Section 3.1.4 for more discussion on winter conditions.

make the walk less comfortable, as described above.

Another major component of accessibility is the relationship between different modes of transportation such as walking distances between transit, bicycle, and parking facilities, low quality or poor design of sidewalks to bus stops, crossings to and from bus stops, and the quality of bus stop amenities such as shelters, seating areas, and route information.

Institutional Barriers

Institutional barriers are a result of the way social, political, and economic relationships are structured or organized in our society in ways that come to be taken for granted, believed to be natural, seemingly fixed, and hence unchangeable. These barriers are based on underlying competing values and beliefs about what is best for whom and, once identified, can be contested.



Institutional barriers exist within the operation of public sector administrations and elected governments. Institutional barriers often result from the application of longstanding practices that prioritize auto-oriented planning and design and neglect the importance of increasing and enhancing a city's walkability to achieve the numerous goals outlined previously. Institutional barriers also extend beyond the control of the public sector into the private realm, particularly concerning approaches to land development and parking practices such as subsidizing the cost of parking.

These barriers are usually holdovers from previous periods when the values and beliefs of decision makers and industry were based on other objectives. An example of an institutional barrier includes an outdated regulatory framework that discourages walkability through roadway design standards, neighbourhood planning practices, and zoning regulations that reinforce the creation of physical environments that are not conducive to walking. Development plans and site designs based on more progressive approaches that incorporate walkability also typically require additional time and money for approval. Identifying and challenging institutional barriers requires substantial effort and substantiation of why a change in direction is justified but can have significant impacts on improving walkability.



Financial Barriers

When one has partners who share a common vision, funding is often quite easy to find, indicating that financial barriers are a by-product of institutional barriers. They prevent the disbursement of funds to make pedestrian improvements and can discourage private sector funding of attractive and functioning pedestrian environments. Financial barriers are often created in the aftermath of political decisions and in that way, can be more ideological than actual, coming and going simply as a matter of shifting priorities. However intangible their origins may be, financial barriers can have very real impacts which point to a general lack of concern and investment in the upkeep of a significant portion of the public realm.



The costs of not investing in the public realm are cumulatively much higher than the costs associated with enhancing it. These often include increased security and maintenance costs, rising incidences of criminal activity, a negative image which produces spin off economic impacts on surrounding businesses, and a negative perception of the city overall. This can lead to reduced private sector investment, population dislocation and disenfranchisement, and ultimately to cultural fragmentation.

3.1.3 Demographic, User, and Age-Friendly Considerations

Different types of pedestrians experience different barriers to walking. Solutions designed to improve walkability should address the specific needs and issues faced by different pedestrian types. While this study is not solely focused on proposing strategies for pedestrians with disabilities, it is mindful of those who may have more difficulties walking, or have certain limitations in their freedom of movement and access including mobility, hearing, vision, and cognitive challenges. This includes the review and alignment of the Walkability Strategy with the recommendations and direction of the City's Aging in Place Study (Community Services Consulting Ltd., 2007). As a rule of thumb, designing solutions with the most vulnerable pedestrians in mind will result in comfort and ease of movement for all.



Some of these vulnerable pedestrian groups include children, seniors, and persons with disabilities. Children and youth, people with disabilities, and seniors often rely on walking, cycling, and public transit to move about in a city as their primary modes of transportation. As

PROPOSED WALKABILITY STRATEGY FOR EDMONTON

Walkability Barriers, Root Causes, and Solutions

mode choice and physical ability is restricted, it is increasingly important to provide convenient, direct, continuous, and accessible pedestrian links to destinations that are within close walking distance in order to create a socially inclusive city and to promote physical activity among these pedestrians. Therefore, it is useful to think about who the pedestrians are in Edmonton and how their trips can be made easier, safer, and more pleasurable.



In Edmonton, the proportion of people over the age of 65 will increase from about 12% in 2008 to almost 20% by 2025 and the population under the age of 20 will decline from about 24% in 2008 to 20% in 2025 (City of Edmonton, 2008a; Applications Management Consulting, 2002). These percentages suggest that the number of residents aged 65 and over will increase while the proportion of children and school-aged people will decrease over the same period of time. Similar shifts will be undergoing throughout the world; according to the World Health Organization, 25% of North America's population will be over the age of 60 by 2050 (World Health Organization, 2007). This 'aging of the population' is a significant factor that must be taken into account when designing and building new facilities, including the pedestrian network, but also in the retrofitting of cities to accommodate the needs of this age group.



In addition, over 17% of Edmonton's population has a disability and about two-thirds of the disabled population experiences mobility limitations (City of Edmonton, 2006b). Data also suggest that residents within the Capital Region can expect an average disability-free life of 68 years (Shields and Tremblay, 2002). As the number of residents aged 65 and over increases, the City of Edmonton will experience a significant increase in the number of residents with disabilities. Ensuring that adequate infrastructure, services, and accessible pedestrian networks are in place to serve the transportation and recreation needs of this population and all people with disabilities will be essential to Edmonton's long term success and the health and vitality of the community.

3.1.4 Considerations for a Winter City

As a winter city, Edmonton faces certain challenges to accommodate pedestrians and promote walking. The design of the urban form, provision of transit service, maintenance of pedestrian infrastructure (including removal and storage of snow and ice), and education/promotion programs are important in a winter city to ensure that pedestrians can efficiently, confidently, and safely navigate the landscape. Being a winter city is not an insurmountable barrier to walkability but presents a factor that has to be considered when reviewing design, maintenance, and promotion practices.



Winter cities elsewhere, from Scandinavia to Minneapolis, also contend with winter issues of the cold, snow, ice, and reduced amounts of light. Scandinavian cities have excelled in providing a year-round walking environment, by focusing on connected streets, sidewalk snow removal, high frequency transit service, and providing programming and animation of public spaces throughout the winter.

Edmonton has programs and design practices in place to address winter conditions. In particular, the recent creation of the Winter Light Festival will, over time, increase the animation and activities for Edmonton residents during winter and help to provide events for Edmontonians to celebrate and embrace their northern climate year-round. The considerations of working within a northern climate have been incorporated throughout the Walkability Strategy and the recommended solutions.

3.1.5 Approach to Defining Barriers

Barriers were defined and organized corresponding to each of the four components of walkability – pedestrian infrastructure, urban form, quality of the journey, and policies and programs. The barriers were defined based on stakeholder input, input from the City's management team, past experience of the consultant team, review of research and literature, and interviews with specific parties that have direct impacts on the planning, design, and function of the City².



² Refer to Appendix B for a summary of stakeholders and consultation activities carried out as part of the Walkability Strategy.

3.2 ROOT CAUSES TO WALKABILITY BARRIERS

3.2.1 What are Root Causes?

Understanding the barriers that are limiting walkability in Edmonton is very important in order to identify feasible solutions; however, even more important is understanding the underlying issue that is in full or in part causing the barrier. Root causes are these underlying issues. For each identified barrier, a number of potential root causes can be defined that lead to the emergence of the barrier. The root causes of barriers could result from planning and design practices, legislation, development patterns, user preferences, and resident perceptions.

3.2.2 Approach to Defining Root Causes

Root causes were defined based on consultation with stakeholders, focus group interviews, review of professional and academic literature, and the experiences of the project team. (Refer to Appendix B for description of stakeholder consultation undertaken.) The approach to defining the root causes was based on a critical process of asking a series of probing questions to get at the underlying values and/or beliefs that create or reinforce each barrier. The analysis peeled back the issues layer by layer to reveal what each barrier is based on. The following example illustrates the process to define root causes.

Barrier: There is a lack of interspersed, fine-grain mix of land uses in Edmonton's neighbourhoods.

- Why are neighbourhoods lacking streets with a mixture of uses? Developers are not planning, designing, and constructing mixed-use neighbourhoods.
 - What is preventing developers from developing mixed-use neighbourhoods? Developers typically specialize in one type of development – residential, commercial, or industrial.
 - How has this single land use specialization been created?
 - The existing Zoning Bylaw is primarily based on single use zoning for parcels of land, increasing the cost of approvals for mixed-use developments.
 - Developers are in some ways risk averse and unsure of the success of changing their business models to build mixed-use developments.
 - Lenders undervalue or are unsure of how to analyze the cost and profitability of mixed-use developments, impacting the ability of developers to obtain funding for mixed-use projects.

3.3 SOLUTIONS TO ROOT CAUSES

3.3.1 What are Solutions?

Solutions are the action items that would mitigate the barriers and root causes if implemented. Some of the barriers and root causes are currently being addressed through existing programs, though perhaps not at the pace residents, businesses, and the City of Edmonton would like. In these instances, a solution may involve strengthening, promoting, or prioritizing the expansion of the existing initiative. For most of the barriers and root causes, however, there is a need for a change in direction or approach: new policies, practices, and initiatives are required to address the barriers and root causes for which limited or no action is current being taken.



3.3.2 Approach to Defining Solutions

Solutions were identified based on a review of successful approaches in Edmonton and other jurisdictions and a review of professional and academic literature regarding walkability improvements that have been shown to have the greatest impact toward increasing walking. The identified solutions were also vetted by stakeholders, focus groups, the City of Edmonton, and the project team to create the most constructive portfolio of solutions that will address the issues limiting walkability in Edmonton in a timely manner while also focusing on those issues that will result in the greatest impact toward increasing walking. Associated references are located in Chapter 7.0.



4.0 Determining Edmonton's Walkability Priorities

Walkability barriers, root causes, and solutions were identified based on stakeholder input, research, and literature review. Numerous items were identified to exist in Edmonton pertaining to the four components of walkability – urban form, pedestrian infrastructure, quality of the journey, and policies and programs.

All of the elements of walkability defined in Section 1.5 provide incremental improvements to the walkability of an area or city. However, the impact of each component is not equal – some elements are essential to provide the minimum support for walking, some elements can encourage new walking trips or shift vehicle trips to walking, and some elements provide assistance in transforming a functionally walkable area into a pleasurable walking experience. In addition, some of the elements of walkability may be more important for supporting recreational walking than the destination-walkability focus of the Walkability Strategy.

To provide a meaningful and focused Walkability Action Plan for the City of Edmonton, results from quantitative research were considered in addition to reviewing transportation and demographic statistics. This research aided in identifying which of the walkability elements have the greatest impact on active transportation (specifically destination-walkability) and which are the essential elements that create the backbone of a walkable area. The priorities of the Walkability Action Plan are represented by solutions to the barriers / root causes concerning the identified key elements of walkability in Edmonton. The following presents this analysis.

4.1 KEY CONTRIBUTING FACTORS TO WALKABILITY

4.1.1 Personal Security and Pedestrian Safety

In order for people to walk to destinations, the environment must be safe, or perceived to be safe, for the activity to occur (Johnson and Marko, 2007). The term 'safe' can refer to pedestrian safety with regard to high traffic speeds, busy roads, and uneven or missing sidewalks. 'Safe' can also refer to personal security in terms of concerns regarding theft, vandalism, or assault. Both pedestrian safety and personal security, and primarily the perception of safety and security, are important considerations for many decisions including choosing to walk, live, work, or play in an area, choosing to take transit, or allowing children to walk to school.

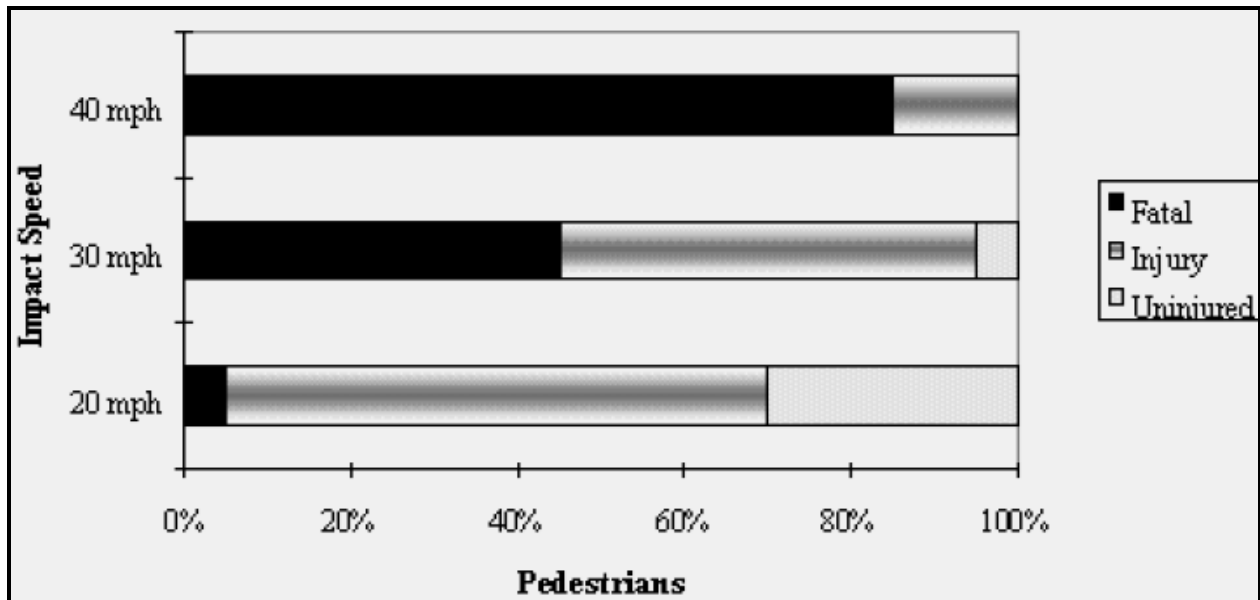


Pedestrian safety is primarily a function of urban form and roadway regulations such as speed limits. Sprawling urban form, wide streets, and auto-oriented land uses all impact safety. Sprawling urban forms are designed to move vehicles efficiently and quickly. However, fast

moving traffic creates an uninviting and unpleasant environment for pedestrians while also significantly increasing the probability of death for pedestrians hit by vehicles (Frank et al., 2005; Johnson and Marko, 2007).

In Edmonton, traffic collision statistics indicate that vehicle-pedestrian collisions increased by 5.5% from 2006 to 2007. A majority of the collisions between vehicles and pedestrians (about 60%) occurred when the pedestrian was legally crossing the roadway (City of Edmonton, 2008b). A review of the impacts of vehicle travel speeds and pedestrian injuries by the U.S. National Highway Traffic Safety Administration (NHTSA) clearly illustrates the significance of travel speed on pedestrian fatalities. At speeds of 40 miles per hour (about 65 km/hr), only one or two out of ten pedestrians would survive the collision, whereas at speeds of 20 miles per hour (about 32 km/hr) less than one in ten pedestrians would be expected to die and three in ten would go uninjured as illustrated in Figure 5 (NHTSA, 1999). These statistics clearly indicate the importance of considering the needs of pedestrians and the impacts that the roadway system has on pedestrians when designing roadways and establishing speed limits.

Figure 5: Vehicle Impact Speed and Pedestrian Injury Severity (NHTSA, 1999)



The condition of sidewalks and the accessibility of the pedestrian network also impacts pedestrian safety, in particular for those with limited mobility. Ensuring that the pedestrian network is fully accessible improves pedestrian safety by reducing trip hazards and increasing the ease of navigating the city as a pedestrian.³

³ See Section 4.1.4 for more discussion on accessibility.

Personal security has been shown to be of greater importance to people than the issue of pedestrian safety (Department for Transport, 2006). Studies have shown that increased rates of crime affect the probability that individuals will choose to walk, and that the perception of insecurity increases in the evening (Department for Transport, 2006; Ferrell et al., 2008). The perception of an insecure environment was found to impact the choice to walk in all areas of a city (i.e. suburbs and inner areas) (Ferrell et al., 2008). However, surveys in the United Kingdom indicate that the feelings of insecurity and its impact on choosing to walk was more pronounced in 'inner city' areas that were perceived to have higher crime rates (Department for Transport, 2006).



Though personal security and pedestrian safety impact the choice to walk, numerous studies indicate that the importance of personal security and pedestrian safety is significantly related to the existing urban form and the type of trip being made. Ferrell et al. found that, while high crime rates reduce the probability of choosing a non-automobile mode, statistically significant relationships between crime rates and mode choice could not be found, which suggests that the strength of these relationships differ depending on the urban form, the relative level of perceived safety and security, and the type of trip being made (2008). A study by Anable and Gatersleben found that safety and security factors were not as important for pedestrian work trips as were factors related to urban form (2005). Finally, a study reviewing the environmental factors that influence pedestrian route choice found that minimizing time and distance (through grid street networks and pedestrian connections) were most important in pedestrian route choice, followed by secondary factors of safety, aesthetics, sidewalk quality, and duration of waits at traffic lights (Schlossberg et al., 2007). All of these studies indicate that pedestrian safety and personal security are factors in choosing to walk, however the evidence clearly points to urban form as the primary factor that impacts people's decisions to walk. Considering the walkability barriers identified in Edmonton, most of the elements that need to be addressed are related to urban form, which, based on the research and literature reviewed, will have a significant impact on encouraging walking trips, and increasing the number of individuals that can provide surveillance of an area through their daily pedestrian-oriented activities.



4.1.2 Density, Mix of Uses, and Connectivity

A comprehensive review of research from the planning, engineering, and health fields regarding the impacts of more-walkable versus less-walkable neighbourhood design concluded that three aspects of the built environment (or urban form) have been consistently found to be the most important predictors of walkability, mode choice, and physical activity: density, land use mix, and connectivity (Bagley and Mokhtarian, 2002; Frank and Engelke, 2001; Frank et al., 2005; Goldberg et al., 2007; Ho, 2008; Hoehner et al., 2005; Johnson and Marko, 2007; Sallis et al., 2005). Density refers to providing a concentration of people (residential density), jobs (employment density), or shopping space (commercial density) within a unit area.⁴ Land use mix refers to providing a variety of land use destinations within walkable proximity of one another, encouraging activity throughout the day. Connectivity refers to providing convenient and direct links between the supportive uses (e.g. residential to commercial or employment). None of these elements will foster destination-walkability on their own; the combination of all three is the key.



High residential density in North American cities is typically located in a city's downtown. Downtowns generally have a number of other associated phenomena that also impact mode choice and walkability, and therefore, the number of people walking. Downtowns are typically well-served by transit, have a mix of employment, commercial, and residential uses, and have limited and priced parking. All of these factors tend to favour walking and transit. When residential density is treated as being inclusive of these related phenomena, the relationship between density and walking/transit use is quite strong (Kuzmyak et al., 2003).



When density is paired only with connectivity, research indicates that there is a modest to non-existent effect of density and block size on total walking and physical activity (Oakes et al., 2007). This finding may be the result of having limited destinations (related to little or no mix of land uses) within the neighbourhoods that were studied, which reinforces the need to incorporate density, connectivity, and a mix of uses.

Research indicates that the number of non-residential destinations (e.g. schools, libraries, restaurants, health services, etc.) near residents' homes strongly and consistently correlates

⁴ Throughout the remainder of the report, 'Density' refers to residential density as opposed to commercial or employment density unless otherwise specified.

with physical activity even more so than proximity to parks and recreational facilities, transportation infrastructure, neighbourhood aesthetics, and social considerations (e.g. security and physically active neighbours) (Hoehner et al., 2005; Schlossberg et al., 2007). In fact, the study by Hoehner et al. found that the number of destinations had the strongest correlation to destination-walkability and that people in their study typically engaged in physical activity for transportation purposes despite the sidewalk's physical condition.⁵ The findings also indicate that the physical environment may affect physical activity for transportation purposes more so than for physical recreation activity (Hoehner et al., 2005).



The type of destination has also been found to influence mode choice behaviour. A research study completed for King County, Washington found that the land uses most strongly linked to percentage of household trips made on foot were educational facilities, commercial office buildings, restaurants and taverns, parks, and neighbourhood-scale retail establishments, with civic uses and grocery stores following closely. The study also found that having such establishments within one kilometre from one's home allows residents to meet their recommended physical activity needs by walking. Another interesting result from the study was that the actual number of recreational, educational, retail, entertainment, and other commercial attractions near one's home appeared to be more important than the size of the attraction itself indicating that interweaving small destinations within residential neighbourhoods would be the best way to encourage walking for errands and other non-work purposes (and, conversely, limiting large scale, single use developments or big box development) (Sallis et al., 2005).



None of this is to say that density or connectivity can be neglected. As Kuzmyak et al., Tumlin, and Frank et al. point out, higher density is a precondition for higher levels of land use mix and transit service by increasing the potential market that will support the non-residential uses and to support higher frequency transit (Kuzmyak et al., 2003; Tumlin, 2002; Frank et al., 2005).

⁵ This is not to say that accessibility is not an important component of a walkable city. Accessibility is discussed below.

Density also concentrates more people into an area, increasing the perceived security of an area due to more activity.

A comprehensive summary of research on the impacts of land use and site design on travel behaviour found that density affects travel in at least three ways:

- By influencing what types of households make up the travel market, producing a tendency for less need of travel and a higher dependency on public transit;
- By offering a wider array of choices for meeting a household's daily travel needs within reach of walking or very short productive auto trips; and
- By making driving itself less attractive due to lessened availability of parking. (Kuzmyak et al., 2003)

The concept of density has been found to be important on the choice of travel mode at both ends of a trip. The residential density at the trip origin, the employment density at the trip destination, and the mix of land uses at both the trip origin and trip destination have significant associations with transit use and walking for both work trips and shopping trips (although the extent of importance of these variables is impacted by trip purpose). Significant mode shifts from single-occupant vehicles to transit and walking for work trips were shown to occur when employment density was between 20 and 75 employees per gross acre and at densities of over 125 employees per gross acre (but little impact between 75 and 125). Residential densities of over 13 persons per net residential acre (or about 7 to 9 dwelling units per acre) were found to be required to have a significant impact on mode shift from single-occupant vehicles to transit and walking for shopping trips (Frank and Pivo, 1994).



Research by Pushkarev and Zupan indicates that the minimum residential density to support frequent local transit service (120 buses per day with 800 m route spacing) is 15 dwelling units per residential acre, if the residential area is connected to 18 to 70 million ft² of non-residential floorspace (Pushkarev and Zupan, 1977). The Institute of Transportation Engineers also acknowledges the link between residential density and the necessity of having it connected to a destination and recommend that 7 to 8 dwelling units per residential acre with connections to an employment centre of 8 to 20 million ft² of commercial / office space is required to support bus frequency of 30 minutes (Parsons Brinkerhoff Quade & Douglas, 1996). These findings support the need for density while ensuring that it is paired with destinations.

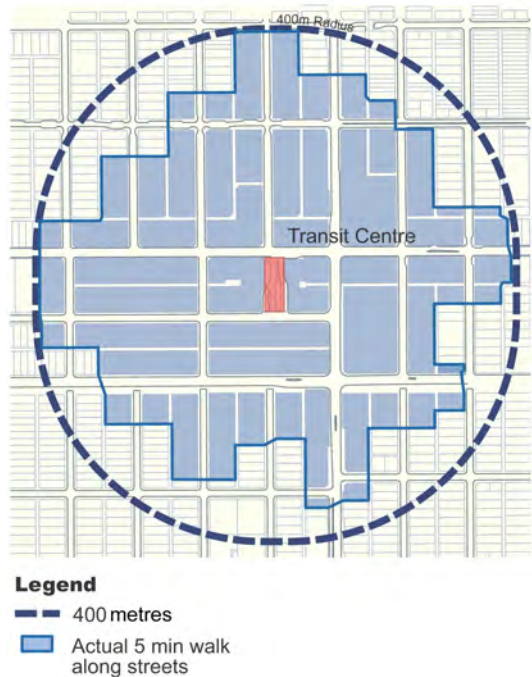


The third essential walkability element is connectivity, which provides convenient linkage between origins and destinations. Connectivity can be measured using a number of different metrics including intersection density, block length, or comparing straight-line distances to actual walking distances between two points (i.e. route directness). Research has shown that pedestrian trips are more significantly impacted by the street network than are vehicle trips (Frank et al., 2005). Ensuring that pedestrian trips are as direct as possible will help to encourage more walking trips to be made.

Pedestrian planning typically attempts to locate destinations within a 5 minute walk (about 400 m). However, data suggest that most walk trips typically exceed this distance. Edmonton's household travel survey indicates that the average walking trip distance is around 1 km and 92% of all walking trips are less than 2 km.⁶

A study of walking trips in Minneapolis, St. Paul, and Hennepin County, Minnesota found that about 90% of walk trips were 1 km or less in distance when the trip was for work, shopping, or going to a restaurant. About 70% of recreation, entertainment, and fitness walk trips were 1 km or less (Iacono et al., 2008). The results indicate that the distances people are willing to walk to work and shopping are shorter than those when people are going out for a walk for exercise or recreation.

Although these distances are greater than the typical distance used in planning, the odds of encouraging more pedestrian trips is strengthened when origins and destinations are placed closer together and when there are direct, convenient, and efficient connections provided between them. This can be seen when comparing walking in neighbourhood layouts of traditional, grid communities versus conventional, curvilinear suburban communities.



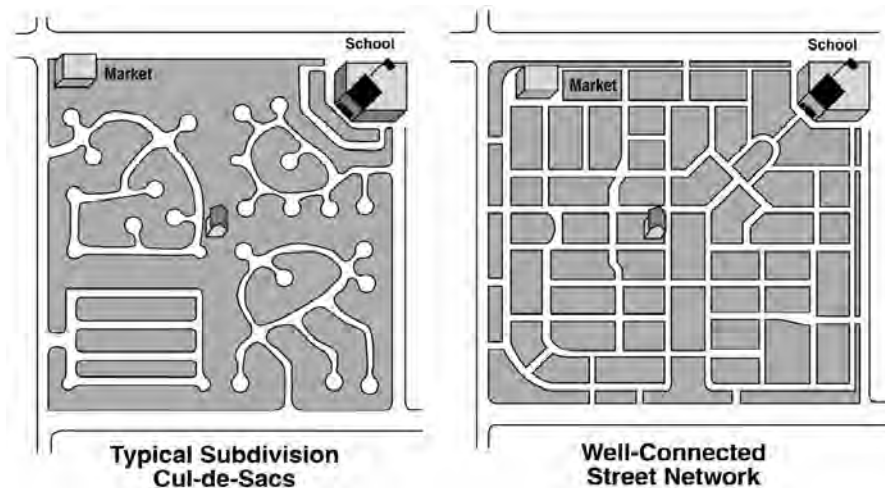
⁶ The walking trips included in the household travel survey were primary trips – those made only by walking – and do not include the walking links to transit or to people's cars in parking lots. Inclusion of these would decrease the average distance and increase the percentage of trips that are less than 2 km.

A comparison of mode choice between traditional and suburban neighbourhoods found that 73% of daily household work trips were made by automobile in traditional neighbourhoods versus 83% in suburban neighbourhoods and almost three times as many trips were made by transit in the traditional neighbourhood (as a percentage of total trips). When considering all daily trips, the results of the study found that traditional neighbourhoods resulted in 25% fewer automobile trips, over twice as many transit trips, 45% more bicycle trips, and 25% more walking trips. In addition, traditional neighbourhoods were found to generate almost 20% fewer trips overall inclusive of all modes (Frank and Pivo, 1994).

The study for King County found that with each quartile increase in the number of intersections per km², there was a 14% increase in the odds of making a walking trip for non-work travel (Sallis et al., 2005). Review of various research projects found that intersection densities (i.e. the number of intersections within a certain area) need to reach around 50 intersections per square km before pedestrian travel becomes more commonplace (Frank et al., 2005).

As an example of how street layout and corresponding connectivity affect the likelihood that a person would choose to walk, consider Figure 6. The figure illustrates two neighbourhoods – a curvilinear, loop and cul-de-sac neighbourhood on the left and a well-connected, more traditional neighbourhood on the right. For a person living in the house (centre of each neighbourhood), the walk distance required to access the market is longer for the curvilinear neighbourhood but not by too much. However, walking to the school would require a person to navigate around the circumference of the curvilinear neighbourhood as opposed to walking in a straight line to the school in the well-connected neighbourhood. A resident of the curvilinear neighbourhood would have to walk almost 250% further to access the school than the resident of the well-connected neighbourhood. This is a significant distance / time penalty and would greatly impact the likelihood that a person would choose to walk to the school. This example illustrates that even if high residential density and destinations (i.e. mix of uses) existed within the neighbourhood, the walkability of the community will be greatly impeded if convenient connections are not provided.

Figure 6: Example of Street Connectivity (Neighbourhood Streets Project Stakeholders, 2001)



Though density, mix of uses, and connectivity play an essential role in forming the backbone of a walkable community, there are other factors that the Walkability Action Plan should also focus on addressing to further support growth in walking trips and accommodate the needs of current and future users of the pedestrian transportation system. These aspects are discussed below.

4.1.3 Transportation Services & Policies

Transit Service

Transit service is another important walkability consideration, allowing pedestrians to extend the distances they can travel, and is impacted by a chicken-and-egg type problem. A certain number of people need to ride transit to support its operation and to warrant frequent and convenient transit service. However, infrequent and inconvenient transit service is unattractive and therefore decreases ridership and the number of people walking to access transit. Research indicates that reducing transit headways (i.e. the time between bus arrivals for a specific route) causes increases in ridership.

A summary of research on the impacts of transit service changes on ridership and travel behaviour found that improvements to transit headway caused increases in ridership and that greater increases in ridership occurred when the original transit service was infrequent as compared to when the original service was already frequent. When transit service headway was originally 10 to 50 minutes (typical of many Edmonton Transit routes), every 10% reduction in transit headway could result in about a 5%



increase in ridership (which would also increase the number of walking trips to and from the bus stops) (Evans, 2004). Other sources suggest that transit frequencies every 12 minutes or better start to attract riders who have a choice of modes (Tumlin, 2002).⁷ Therefore, decreasing the time between buses will increase ridership and pedestrian activity.

Transit Impacts on Vehicle Ownership

Transit service can also impact a household's vehicle ownership. Vehicle ownership has a major impact on travel behaviour and mode choice with research indicating that each additional vehicle per household decreases transit mode share by almost 25% (Kuzmyak et al., 2003; Evans and Pratt, 2007). Providing alternatives is crucial to limit the necessity for vehicle ownership or multi-vehicle ownership. Research indicates that providing bus service can have an influence on vehicle ownership decisions (Evans and Pratt, 2004).

⁷ Though all individuals have choices in travel modes, the statement here refers to households with higher incomes that are typically underrepresented within the anticipated mix of transit users. Edmonton statistics from the municipal census indicate that about 13% of households do not own a vehicle, 39% own one vehicle, 35% own two vehicles, and 13% own three or more (City of Edmonton, 2008a).

Preliminary results from Edmonton pilot projects indicate that transit use has a significant impact on ridership in neighbourhoods where transit service is implemented almost immediately following development as opposed to waiting for transit service to be initiated based on Edmonton Transit's population criteria.⁸ Having transit service available when individuals move into a neighbourhood has the potential to reduce the need for a vehicle or a second vehicle, especially in suburban neighbourhoods where motorized transport may be required to travel to work. Research concerning the impacts of transit-oriented development (TOD) on vehicle ownership found that the effects of living near rail transit TOD resulted in significantly fewer vehicles per household (e.g. almost 30% less in Vancouver near Skytrain stations) (Evans and Pratt, 2007). A summary of research on transportation elasticities also indicates that in the absence of transit service, many transit users would travel by vehicle (between 25% and 58%) (Litman, 2008a). Without the early delivery of transit services to new neighbourhoods, it is more difficult to convert existing vehicle users to transit, thereby decreasing the number of walk trips to access transit and impacting physical activity and health.

Parking Policies

Another important factor that has significant effects on vehicle use is parking, both in terms of supply and cost. An effective parking management policy can have many benefits including reducing land consumption, generating revenue, reducing costs of development, supporting transit use, and many others (Litman, 2008b). Parking pricing has been shown to have a significant impact on mode choice, vehicle ownership, and decisions for the location of home and work and has been found to have greater impact on transit ridership than other vehicle costs such as fuel (Litman, 2008a).



A comprehensive review of research concerning parking pricing indicates that charging for parking can significantly reduce travel by single-occupant vehicles for commuter trips. Studies also suggest that the impacts of parking pricing on non-work trips is more varied but still have been shown to reduce single-occupant vehicle travel and increase transit use, though the extent of mode shift and resulting choice of mode is dependent on the available travel alternatives. Findings from the comprehensive review also indicate that parking pricing can decrease vehicle travel throughout the city, not just in the downtown (although parking pricing did have the greatest impact on vehicle travel in the downtown likely due to better transit service and higher number of employment opportunities) (Vaca and Kuzmyak, 2005).

In addition to parking pricing, the supply of parking has a significant impact on not only the urban landscape but also mode choice and transit use (although parking price has been shown to have a greater impact). Parking supply is typically administered based on guidelines requiring

⁸ Unpublished. From preliminary data collected and provided by the City of Edmonton comparing The Grange and Terwillegar Towne neighbourhoods.

parking minimums. This typically leads to an oversupply of parking, which is commonly free in Edmonton, and encourages vehicle use and causes the resultant congestion, pollution, reductions in transportation efficiency, and impacts on public health.

Parking supply policies can include establishing parking maximums instead of minimums or by setting parking supply based on the available roadway capacity (as opposed to by building type). Another major impact on walkability is supplying parking in at-grade parking lots, which make inefficient use of land that could otherwise be used to increase residential, employment, or commercial density and create walkable destinations (Kuzmyak and Weinberger, 2003; Tumlin, 2002). The results from the research clearly identify that establishing effective parking policies can impact walking and the walkability of communities and should be incorporated as part of the Walkability Action Plan.

4.1.4 Accessibility

As discussed previously, the average age of Edmonton's population is increasing with the proportion of the population over the age of 65 anticipated to increase from about 1 in 10 to 1 in 5 people by 2025 (Applications Management Consulting, 2002). This significant change will increase the importance of providing an accessible transportation system that accommodates the mobility needs of this demographic and for people with



disabilities. Planning, designing, and constructing facilities to accommodate the mobility of individuals over the age of 65 will assist in allowing seniors to meet their recommended daily physical activity through walking and allow them to access destinations to meet their daily and/or weekly needs (including accessing transit). Important walkability considerations with regard to accessibility include curb ramps at intersections, a clear and continuous sidewalk network, and, to a lesser extent (in terms of priority), providing amenities for resting. These concepts are consistent with those identified in the City's Aging in Place Study (Community Services Consulting Ltd., 2007).

4.1.5 Administration & Management of the Transportation System

The final priority to address is the administration of transportation and land use development by the City of Edmonton. The consistent application of guidelines, standards, and legislation and the willingness to change these where required significantly impacts the ability to create or transform a city from an auto-oriented landscape to a walkable, livable community. City Council and the City of Edmonton must be willing to apply existing standards that support walkability and shift from current practices that limit walkability toward ones that do, otherwise progress toward walkability and the improvements to quality of life that it brings will not be achieved. Therefore, barriers, root causes, and solutions that limit the application or implementation of progressive actions to achieve walkability are essential to identify and overcome.

4.1.6 Discussion of Self-Selection

Most of the analysis of mode choice and walking relies on cross-sectional data comparing the activities of different people located in different types of neighbourhoods. This is different than longitudinal data that would track the differences in a specific individual's mode choice depending on the type of neighbourhood they lived in. Some would argue that the results of more people choosing to walk in walkable neighbourhoods is due to self-selection, meaning people that like to walk choose to live in walkable neighbourhoods.

Research such as the Land Use, Transportation, Air Quality, and Health study in King County has found that regardless of the reason, people living in more walkable neighbourhoods walk more than their similar counterparts that live in more auto-oriented neighbourhoods. Other studies have shown that substantial numbers of residents living in low density, low walkability neighbourhoods would prefer to live in more walkable places, indicating that impacts of self-selection may be negligible (Sallis et al., 2005).

Another study reviewed the impacts of personal values, urban environment, and vehicle availability on travel mode choice. It was found that individuals that had convenient access to a vehicle and lower conscience to environmental issues had a 50% higher green mode share (walking, biking, and transit) when these individuals lived in compact, walkable neighbourhoods than if they lived in non-compact neighbourhoods. These results suggest that urban form does impact mode choice regardless of personal values (Jenks et al., 2008).



4.2 EDMONTON WALKABILITY PRIORITIES

Based on the preceding discussion, the Action Plan for the Walkability Strategy focuses on the following factors which have been shown to have significant impacts on destination-walkability and provide the essential elements of a walkable community.

- Density (i.e. residential, commercial, and employment)
- Mix of Uses (i.e. destinations through a variety of land uses)
- Connectivity (i.e. directness of connections between origins and destinations)
- Transportation Services & Policies (i.e. transit service and parking policies)
- Administration & Management of the System (i.e. transportation and land development standards, guidelines, and practices; integration of City departments; funding; system monitoring)

Additional barriers, root causes, and solutions were identified through the completion of the Walkability Strategy but are not included in the priority Action Plan and nonetheless represent actionable solutions to address other walkability barriers and solutions. The catalogue of these additional walkability considerations are summarized in Appendix C for reference and consideration when completing transportation, urban planning, revitalization, and other projects or initiatives.

5.0 Walkability Action Plan

The following presents the Action Plan for the Walkability Strategy based on the priority walkability elements defined in Chapter 4.0. The solutions described are placed under the category for which the solution primarily addresses; however, many solutions address multiple barriers and elements of walkability. This cross-over and the applicability of the solutions to multiple barriers/root causes is discussed for each solution. The solutions present a mix of regulations and incentives to require certain actions and encourage others.

The summary of the Action Plan solutions is presented in Chapter 6.0. In addition, to these priority solutions, solutions that address other barriers/root causes of walkability are included in Appendix C. These additional solutions can be referenced and implemented when circumstances allow. Please use the following listing to navigate Chapter 5.0.

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5.1 DENSITY

Density relates to the number of individuals or opportunities within a set area, encompassing aspects such as residential housing units, commercial establishments, or employment opportunities. Walkability has been found to increase as density increases. This section discusses barriers, root causes, and solutions to increasing density in Edmonton.

5.1.1 Barrier: Conventional Approaches to Outward Growth

Edmonton has a relatively low overall residential density as compared to other major Canadian and North American cities and there have been minimal constraints on outward expansion of Edmonton's developed area. Accommodating a greater proportion of growth within existing built-up areas of Edmonton would increase the density of those areas. Rapidly expanding suburban areas of the city are distributing the expanding population over an ever-increasing area onto relatively inexpensive land. In 2008, 42 suburban neighbourhoods were defined as under-construction by the City of Edmonton (i.e. less than 95% of single family lots completed), of which 28 neighborhoods were less than 80% complete, and 18 neighborhoods were less than 50% complete.

The following root causes have created or perpetuated this approach to outward growth.

- Residential and commercial development in the expanding suburban areas costs less and has fewer existing stakeholders that have to be consulted as compared to urban redevelopment / intensification.
- Developers have catered to perceived market demands but typically have not taken a leadership role in changing consumer behaviour or preferences that would aid walkability or sustainability.⁹
- Roadway operational standards that are applied during the transportation analysis of proposed developments have resulted in the reduction of the number of units and/or density of these developments due to exceeding the capacity of adjacent roads.
- Planning large commercial developments to cater to retailer preferences of concentrating these developments along major roadways has caused significant vehicle trips to be projected, limiting the amount of residential development that can be accommodated within the available roadway capacity.

The following solutions have been identified to address the above barrier and root causes.

⁹ From Chapter 4.0, review of research has shown that substantial numbers of residents living in less-walkable neighbourhoods would prefer to live in more-walkable neighbourhoods (Sallis et al., 2005).

5.1.1.1 Solution: Manage Suburban Growth

Solution Description and Objectives

Managing the suburban growth of Edmonton will influence the rate of suburban expansion and increase the importance of urban redevelopment / intensification to accommodate increases in the city's population. Constraints could include limiting the number of suburban neighbourhoods under construction at any one time. The constraints would assist in increasing the residential density in developed areas of the city as well as new suburbs, since the development industry will likely strive to maintain revenues by offsetting decreases in the amount of land that can be developed through developing more units on less area.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of outward suburban expansion, specifically targeting the root causes of inexpensive suburban development by placing controls on the extent that this development can occur. The solution applies to the Outer Suburban transect but will also increase densities in the Inner Suburban, Mature Stable, and Mature Stressed transects.

How, Where, and Why It Works

Ottawa, Ontario and Victoria, British Columbia have well established agricultural land reserves that have been implemented to constrain growth and preserve agricultural land of these two capital cities. Even though physically constrained due to geography, Victoria has still enforced restrictions on developing on prime agricultural land, even though this policy limits the expansion of Victoria and the surrounding municipalities.

The City of Edmonton's Draft Municipal Development Plan includes a Growth Strategy. This strategy, if approved and implemented, will place a limit on the number of new neighbourhoods that can be opened up at one time, and will require them to be almost fully developed before additional neighbourhoods can be developed. This will improve walkability in Edmonton by ensuring that the population thresholds needed to warrant the provision of schools, parks, recreation facilities, and commercial centres are achieved sooner.

Ease of Implementation

Implementation of this solution would be initiated by the approval of the Draft Municipal Development Plan. In addition, City Council and Administration would have to establish the details and enforce a growth strategy that would be changing the way development occurs in Edmonton and would likely require coordination with other Capital Region municipalities through the regional land use and development plan. This solution presents an opportunity to address an institutional barrier that has impacts on not just walkability but economic vitality, urban and environmental sustainability, the cost of running the city, public health, and conservation of natural and agricultural land.

5.1.1.2 Solution: Establish Minimum Residential Density Targets

Solution Description and Objectives

Establishing minimum residential density targets will help to ensure both that quality transit service can be supported, and that a sufficient customer base will exist for businesses serving daily and/or weekly needs. Increasing densities will help to reduce per-dwelling-unit costs of providing infrastructure as more people can be housed in a smaller area. By establishing minimum densities at the neighbourhood level, housing choices can still be provided while achieving the minimum densities prescribed. As part of the solution, maximum densities for individual sites may also be required to ensure a few extremely high density buildings do not offset large areas of low density when the calculation is completed.

Barrier(s), Root Cause(s), and Transect(s) Addressed

Establishing minimum residential densities for developments (both new neighbourhoods and large site redevelopment projects) addresses the barrier of low residential densities and should act as an incentive to the development industry to increase the density of development. It is anticipated that this solution will mostly pertain to providing a mix of housing options with greater preference toward higher densities to create walkable communities. The solution also helps to increase security by increasing the activity and population that could provide surveillance of the area. This solution mostly applies to the Outer Suburban transect.

How, Where, and Why It Works

As discussed in Chapter 4.0, minimum residential densities have been shown to increase walking, decrease vehicle use, and support retail, services, and transit (Kuzmyak et al., 2003; Tumlin, 2002; Frank et al., 2005). Research suggests that residential densities need to be more than 8 dwelling units per residential acre to have impacts on vehicle use and at least 15 dwelling units per acre to support frequent transit service, though these areas must be linked to destinations such as employment or commercial areas as described in Sections 5.3 and 5.2 (Parsons Brinkerhoff Quade & Douglas, 1996; Pushkarev and Zupan, 1977; Frank and Pivo, 1994). The distribution of density in new neighbourhoods is outlined in the New Neighbourhood Design Guidelines currently being prepared by the City of Edmonton. Consideration should be given to incorporating density targets within the New Neighbourhood Design Guidelines prior to its approval and implementation. The Growth Plan for the Greater Golden Horseshoe provides a comprehensive reference of establishing binding intensification targets (Ministry of Public Infrastructure Renewal, 2006).

Ease of Implementation

The Planning and Development Department would have to establish the density guidelines and would likely require City Council approval and revision of the Zoning Bylaw. Establishing density guidelines could help with buy-in of the development industry of the Growth Strategy solution defined previously and would also require the implementation of changes to transportation analysis practices as discussed below.

5.1.1.3 Solution: Provide Incentives to Encourage Densification

Solution Description and Objectives

Providing incentives to encourage densification would result in development projects within existing areas intended to increase population density, create commercial destinations, and/or increase the employment density. These incentives would increase the attractiveness and profitability of completing infill development or redevelopment projects for the development industry and would be intended to direct more development within the existing areas of Edmonton as opposed to greenfield suburban sites. The incentive details would require analysis by an inter-department group from Transportation, Planning and Development, and Finance as well as consultation with the development industry to identify appropriate triggers for increased densification but could include a package of: deferred property taxes for a period of time (e.g. three years), parking supply relaxations, increases in the number of allowable units, expediting approvals, and paying for public amenity upgrades and improved transit service to make the development more attractive to potential residents/tenants and more palatable to existing neighbours.¹⁰

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of low density development and assists with decreasing the costs of infill development to make infill development / redevelopment more attractive to developers as compared to suburban development and fits well with the Growth Strategy and minimum residential densities proposed previously. The solution also helps to increase security by increasing the activity and population that could provide surveillance of the area. The solution mainly applies to the Mature Stable, Mature Stressed, and Inner Suburban transects.

How, Where, and Why It Works

Edmonton's 1997 Capital City Downtown Plan created the Housing Reinvestment Program to spur housing development in the downtown. The \$4.5 million fund that was created by City Council was used to provide \$4,500 per residential unit upon occupancy. The program successfully increased the amount of residential development in the downtown and helped to create and support the urban infill housing market. The program has since ended yet residential development in the downtown is ongoing due to the market support that the initial incentive helped to create.

Ease of Implementation

Implementation of this solution will require the identification of the preferred incentives and have them endorsed by relevant Senior Management and Corporate Finance. This solution is consistent with the goals and objectives included in the Draft Municipal Development Plan.

¹⁰ The expeditious approval of redevelopment proposals is discussed in Section 5.10.

5.1.2 Barrier: Traffic Analysis Practices Limit Allowable Density for Developments

Based on discussions with the development industry, there is market-based support for increasing the density of developments. However, during the impact assessment phase of planning for developments, high residential, commercial, or employment densities result in high projected vehicle volumes.

Transportation impact assessments for proposed developments typically apply trip generation rates that are based on data collected since the 1960s and do not necessarily reflect the impacts of other factors such as socio-demographics, urban form, and transportation services that have an impact on travel behaviour and mode choice. The trip rates are believed to overestimate the amount of vehicle travel resulting from proposed developments, resulting in large amounts of land dedicated to wide road rights-of-way (and inefficient use of land) or significant scaling back of the proposed density. Many of the transportation analysis procedures and practices used by transportation planners and expected by the Transportation Department potentially run in opposition to the densification and urban form goals of the Planning and Development Department.

This barrier has been created and perpetuated primarily by applying outdated data and practices to the analysis of proposed developments.

5.1.2.1 Solution: Research Appropriate Edmonton Trip Generation Rates

Solution Description and Objectives

Trip generation rates are used to assess the number of vehicle trips that a proposed development would likely generate. One primary source for these trip rates is the Institute of Transportation Engineers (ITE) Trip Generation reference (ITE, 2008). Data from the ITE Trip Generation manual has been collected since the 1960s. The age of the data and the potential impact to skew trip generation based on historic and outdated travel behaviour is an obvious issue in applying the average or trend line rates to proposed developments. In addition, the data have been collected in numerous cities with differing levels of transportation alternatives, land use patterns, and climate, further impacting the applicability of applying the rates in the ITE manual.

Another common source is to complete a trip generation survey of an existing example of the development. However, completing these surveys is time consuming and labour intensive and, in certain instances, difficult to complete due to site layout, access locations, and lack of comparable developments. Recent surveys completed in Edmonton for residential land uses in suburban developments have indicated that the ITE trip generation rates are significantly higher than those documented in Edmonton.

To overcome the lack of comprehensive data for estimating trip making potential in Edmonton requires the collection of good quality trip generation data for existing developments, analysis of the data to establish trip generation rates, and distribution of the results to the transportation

and planning community. This will assist in more accurately analyzing the transportation impacts of proposed developments, particularly higher density development.

The data collection and analysis must take into account the corresponding urban form, transportation services, and socio-demographic information for each surveyed site. The data collection should include developments throughout Edmonton and include the collection of the data will then be analyzed to define appropriate trip rates based on:

- The exhibited trip rates for all modes for the surveyed land uses;
- The impacts that factors such as urban form, socio-demographics, parking availability, and/or transit services have on trip rates (for all modes), typically viewed as trip reduction factors due to their ability to decrease vehicle trips; and
- The review of trip rates and reduction factors from other jurisdictions that have more experience and longer histories with higher density development to account for changes to travel behaviour over time.

The anticipated results of this solution will be the support of higher density development by transportation practices through applying consistent and appropriate trip generation rates reflecting the anticipated behaviour of the proposed developments.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of traffic analysis limiting the density of proposed developments due to applying outdated travel behaviour data. The solution also helps to control the width of roads (a Pedestrian Infrastructure barrier in Appendix C) and impacts the time available for allocation to pedestrian crossing at intersections (an Accessibility barrier). The solution increases personal security by increasing the activity and population that could provide surveillance of the area. This solution is applicable to all transects.

How, Where, and Why It Works

This type of solution was established previously in 1984 (Trip Generation and Travel Characteristics Guidelines, City of Edmonton Transportation Department, TSR 56/84), but requires updating.

Multi-storey apartment developments in the MacEwan and Ellerslie Crossing neighbourhoods were surveyed by Bunt & Associates in support of the Callaghan Staging Transportation Impact Assessment (September, 2006). Results from this study indicated that the application of standard ITE trip rates can overestimate the traffic volumes generated by higher density residential developments and provides support and rationale for completing an Edmonton trip generation data collection and analysis program.

Ease of Implementation

Collecting and analyzing the data will require an intensive data collection and analysis program. Some of the data may be available from existing sources or collection programs such as the household travel survey.

5.1.2.2 Solution: Revise LOS Standards for Roadway Planning

Solution Description and Objectives

Revising the roadway planning operational standards for level of service (LOS) that are included in the City of Edmonton Roadway Planning and Design Objectives (City of Edmonton, 2005a) is another requirement for supporting the goals of urban densification. These standards outline the objectives for roadway operation in Edmonton in the short, medium, and long term planning horizons (based on population) and are used during the evaluation of development proposals. The standards are based on vehicle flow in terms of level of service (LOS) and volume to capacity (v/c) ratios but do not include the operation and flow of other modes (e.g. pedestrians) or the flow of goods, both of which are priorities of the Draft Transportation Master Plan.

The City of Edmonton Roadway Planning and Design Objectives state that peak hour operating conditions should not exceed LOS D and v/c ratios of 0.90 for all non-signalized and signalized intersections¹¹ in the short and medium term (population less than 1,000,000). In the long term (population greater than 1,000,000), peak hour operating conditions should not exceed LOS E or v/c of 1.0.

The analysis of future roadway operations based on the Roadway Planning and Design Objectives results in the definition of road widths for the initial construction and protection of right-of-way for the future expansion of the roads based on the projected long term traffic volumes and roadway operation. The analysis of roadway operations is based on peak hour conditions. The morning and afternoon peak hours account for about 20% of the daily traffic volumes but less than 10% of the operating hours. Designing roads to accommodate this amount of traffic at high standards for LOS results in roads being overbuilt for most of the day and increases material consumption, construction costs, maintenance costs, and encourages greater vehicle use during off-peak periods.

In addition, the Roadway Planning Design Objectives standards do not consider the level of service experienced by transit users, pedestrians, or cyclists or the trade-offs that planning solely for automobiles has on transit, pedestrians, and cyclists.

While revising the trip generation rates may decrease the projected vehicle traffic on the roadway system, revising the roadway operation standards will allow for the acceptance of increased congestion during peak periods. By accepting more congested roads during peak periods, increased residential and employment densities will be supported, transit service will

¹¹ Except for signalized intersections within the Inner Loop (or inner ring road) for which LOS E and v/c at or below 1.0 is acceptable.

become more attractive (particularly with prioritization measures described in Section 5.5), and walkability will be improved. The incorporation of the operation of the pedestrians, transit, and bicycles should also be incorporated into the Roadway Planning and Design Objectives, such as multi-modal LOS, to shift the focus of roadway operation toward the movement of people and goods rather than automobiles (as included in the Draft Municipal Development Plan and Draft Transportation Master Plan).

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of traffic analysis limiting densification and the root causes of using outdated analysis practices. The solution also addresses the barrier of wide roads and increased pedestrian crossing distances (a Pedestrian Infrastructure-related barrier described in Appendix C) and is related to the barrier of inadequate pedestrian crossing times (an Accessibility barrier). The solution helps to increase personal security by increasing the activity and population that could provide surveillance of the area. This solution will also increase pedestrian safety by slowing automobiles during rush hour, reducing the probability of fatal vehicle-pedestrian collisions. The solution is applicable in all transects.

How, Where, and Why It Works

Multi-modal transportation analysis techniques have been proposed and used by numerous organizations including the Transportation Research Board (Dowling et al., 2008; Litman, 2007) and the Victoria Transport Policy Institute (2008a). In addition, cities such as Vancouver, BC, have increased the level of acceptable congestion and mainly focus on providing infrastructure and service improvements for pedestrians, bicycles, and transit over those for automobiles, choosing to focus on the movement of people rather than the movement of automobiles. This approach has in part resulted in only 10% of trips within Vancouver's downtown being made by automobiles (City of Vancouver, 2007).

Ease of Implementation

Implementation of this solution will require the revision of the City of Edmonton Roadway Planning and Design Objectives. Analysis of applicable standards and measures for the movement of people and goods will be completed following the approval of the Draft Transportation Master Plan update and could incorporate the principles of this solution as the solution is consistent with the goals and objectives of the Draft Transportation Master Plan.

5.1.3 Barrier: Community Opposition to Infill Developments & Intensification

Infill developments in Edmonton have ranged in scale and density from duplexes on single lots to high rises on multiple acre sites. Infill developments, the replacing of existing uses with larger developments or different uses, have been identified as a key strategy to accommodate Edmonton's growth while controlling urban sprawl. Infill developments increase the population density of residential neighbourhoods and can aid in supporting neighbourhood schools, businesses, and transit service.

Large infill developments have recently been proposed and approved in some mature neighbourhoods that represent a significant departure from the urban form of the existing community (e.g. Strathearn Heights). This difference and change has caused significant community opposition to the proposed scale and density of these large infill developments. The recent infill developments have been primarily single-use with very little commercial space and negligible employment, while also being located away from high speed transit. These developments will increase the number of people in the neighbourhoods but will not in themselves increase the services and destinations available to the new and existing residents.

This barrier has been created and perpetuated by the following root causes:

- Residents in neighbourhoods with proposed infill developments are resistant to change in their urban form (sometimes even modest changes such as duplexes and fourplexes) and are untrusting of administration, City Council, and developers.
- Large infill developments have been supported and approved by administration and City Council that have significantly increased residential density but have not increased commercial space or professional services and have not been located to make use of existing investments in LRT.¹²
- The Smart Choices Checklist has not provided adequate guidance regarding the suitability of proposed infill developments.

The following solutions could be implemented to address the above barrier and root causes.

5.1.3.1 Solution: Implement the Residential Infill Guidelines

Solution Description and Objectives

The Residential Infill Guidelines (and the complementary Large Site Rezoning Process) establishes guidelines to assist the City of Edmonton in reviewing and approving proposed redevelopment projects within Edmonton's mature neighbourhoods. The project incorporated extensive public consultation to identify the permissible locations, densities, and heights for varying scales of residential redevelopment from secondary suites to large infill high rises. The implementation of the Residential Infill Guidelines will improve walkability by increasing density to support existing neighbourhood services while incorporating the concerns and issues that community groups and residents raised through the completion of the project, helping to reduce community opposition to infill redevelopment and densification.¹³ By considering a mix of residential forms to increase the density of neighbourhoods, the guidelines should also help to encourage neighbourhood diversity including more families to support neighbourhood schools.

¹² Providing destinations as part of infill developments is discussed in Section 5.2.

¹³ The importance of incorporating destinations with infill developments is addressed in Section 5.2 and is not included in the Residential Infill Guidelines.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of community opposition of infill developments and the root causes of resident resistance to change and distrust of administration, City Council, and developers, and the requirement for more rigid guidance that was lacking from the Smart Choices Checklist. The solution also helps to increase security by increasing the activity and population that could provide surveillance of the area. This solution applies to the Mature Stable and Mature Stressed transects.

How, Where, and Why It Works

Research concerning community opposition to developments, in particular multifamily housing, identified increased public information and directed public participation as two components to reduce opposition and engage the community (Obrinsky and Stein, 2007). The Residential Infill Guidelines incorporated these direct components in the creation of the guidelines through public and stakeholder engagement, including extensive consultation with community leagues and the Edmonton Federation of Community Leagues. The resultant guidelines explicitly outline where different types of infill development should be located which will help community leagues and the public in controlling the type and location of redevelopment in their communities.

Ease of Implementation

The Guidelines have already been completed and require formal approval. The implementation of the Guidelines will require substantive revisions to the Zoning Bylaw including the Mature Neighbourhoods and Medium Density Overlays. The Zoning Bylaw Group within Planning and Development will implement the solution with assistance from Smart Choices staff.

5.1.3.2 Solution: Locate Large Scale Redevelopments near Transit Centres and Existing Transit Corridors

Solution Description and Objectives

Recent approvals of large scale infill developments have not been located in areas with high speed transit service, and in some cases, have been located in areas with relatively infrequent bus service or such that the development density is located more to the centre of the development and removed from transit. The lack of transportation options is a major source of community opposition to infill based on fears of high traffic volumes and parking spillover. To allay these concerns, one of the key considerations that should be incorporated into the review of infill development proposals is whether or not the development will be located to take advantage of the City's existing transit investment. Should this not be the case, costs to improve transit to adequately serve the residents of the infill development should be borne by the developer including costs for transit routing, service hours, or frequency.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of community opposition to infill developments by targeting the root causes of communities being untrusting of administration, City Council, and developers

by proactively locating large infill developments adjacent to higher quality transit or obligating the development to improve transit service as part of the infill development process. This solution could apply in all transects but will likely be focused to the Inner Suburban, Mature Stable, and Mature Stressed transects.

How, Where, and Why It Works

The Edmonton Integrated Transit and Land Use Policy Framework prepared by Glatting Jackson Kercher Anglin for the City of Edmonton provides specific guidance regarding the integration and development of transit and land. In particular, the Framework recommends that higher density development be located closest to transit centres and high frequency transit service. Therefore, large scale infill developments should be placed at these recommended locations.

Ease of Implementation

The City's proposed Transit Assessment Policy could be used as a guide to apply to large infill developments to pay for required transit service improvements if the infill development does not meet the location requirements.

5.2 DESTINATIONS

To encourage walking as an alternate for driving, destinations are required in neighbourhoods that meet the daily and/or weekly needs of residents such as stores, libraries, schools, bus stops and employment. In Edmonton, many of the destinations are concentrated in areas further than most people are willing to walk and are segregated from other uses. This section identifies the barriers, root causes, and solutions regarding destinations.

5.2.1 Barrier: Long Distances between Homes and Destinations

According to Edmonton's Household Travel Survey, trip lengths between home and destinations (such as work, school, shopping, and recreation) are increasing. The distance from expanding suburban areas to post secondary institutions and downtown employment / education destinations is increasing, as is the distance between mature residential areas and industrial employment growth areas.

Distances from home to school have increased, reducing the propensity for children to walk to school and increasing dependence on parents driving their children. Children in suburban neighbourhoods live in communities without schools. As Edmonton continues its outward expansion, schools in mature areas are increasingly under pressure to achieve enrollment targets, and in some cases have closed. The open boundary policies of the Edmonton Public and Catholic School Boards have decreased the importance of the neighbourhood school as children enter more specialized schools in different neighbourhoods throughout Edmonton.

In addition, the location of many municipal services such as recreation facilities and libraries are located in mature and older areas of Edmonton. Land is provided as part of suburban

development for the construction of future schools and other uses, however, it is up to the school board or City of Edmonton to construct the facilities. This leaves most suburban residents with fewer destinations and increases the reliance on automobiles to access services. The following root causes have created or perpetuated this barrier:

- Less expensive housing in suburban areas is attracting young families and new home buyers due to the cost of housing in more established areas.
- Residential population growth in the suburban areas, longer distances to destinations, and limited alternative transportation options increases vehicle ownership.
- Growth in the number of auto-oriented large commercial areas in suburban areas has increased the travel distance to access these locations and they are difficult to serve with transit due to their location and low density.
- Segregated land use zoning has increased distances between homes and employment and has created concentrations of land uses on a large scale limiting the convenience of transportation modes other than the private vehicle.¹⁴
- Schools and other municipal facilities are not being built in new neighbourhoods as Edmonton expands.
- The open boundary policy allows parents to choose any school in the city to attend.
- Expansion of employment in the Industrial Areas that are poorly served by transit and segregated from residential developments relies on employees to drive to work.¹⁵

The following solutions will address the above barrier and root causes.

5.2.1.1 Solution: Establish a Pilot Location Efficient Mortgage Program

Solution Description and Objectives

One way to encourage people to live closer to destinations is to offer Location Efficient Mortgages (LEMs). LEMs incorporate lower down payments, competitive interest rates, and/or flexible criteria for financial qualification to reflect the lower cost of living for people that own homes in neighbourhoods that have transit, stores, schools, and jobs within walking distance. LEMs take into consideration transportation costs which are lower for individuals and families that live in neighbourhoods that are walkable with access to transportation alternatives (resulting in lower vehicle ownership to achieve the household mobility needs). This type of mortgage can help people that may not otherwise qualify for mortgages to secure mortgages due to the cost savings that living nearer work, services, and good quality transit has for a family.

This solution would see the City of Edmonton work with local financial institutions such as the Alberta Treasury Branch, Servus Credit Union, or Canadian Western Bank to develop a

¹⁴ See Section 5.3 for solutions pertaining to mixture of uses and Section 5.9 for solutions to standards and tools such as the Zoning Bylaw.

¹⁵ See Section 5.5 for solutions for transit service.

Location Efficient Mortgage Program that could be rolled out on a trial basis for three years and be made available for properties at the Century Park TOD development, within the Stadium Station TOD plan, and within the Quarters area. Specifics of the LEM program would have to be finalized in consultation and collaboration with the partner institutions and the City of Edmonton.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution increases the access to funds to purchase homes in more walkable neighbourhoods as compared to suburban neighbourhoods lacking in services and employment opportunities addressing the barrier of large distances between homes and destinations. The solution addresses the root cause of financial constraints for individuals and the relative costs of suburban and urban homes. This solution applies to the specified sites which are located near the Downtown and within the Inner Suburban transects. Expansion of this solution may be possible following the trial depending on the success of the program.

How, Where, and Why It Works

Location efficient mortgages have been provided in cities in the United States by the Institute for Location Efficiency and partnering with lenders in the cities in which it operates (Institute for Location Efficiency, 2008).

Ease of Implementation

Implementation would require the collaboration with local lenders and potentially partnering with established organizations such as the Institute for Location Efficiency.

5.2.1.2 Solution: Create 'Live Near Where You Work' Pilot Program

Solution Description and Objectives

A second program to assist in the affordability of living in established neighbourhoods is the implementation of a 'Live Near Where You Work' pilot program. The initiative would provide financial incentives to individuals that live within a specified distance of their workplace. The financial incentives could be in the form of a flat amount or a savings on property tax if the individual lives at the location for a certain number of years (and meets specified eligibility requirements). Funding could be provided through some mix of funds from the City of Edmonton and employers.

Barrier(s), Root Cause(s), and Transect(s) Addressed

The solution addresses the barrier of long distances between homes and destinations and the root causes of the cost discrepancies between established and suburban housing options and the increasing suburbanization of the population. This solution affects all transects and is dependent upon the location of one's residence / workplace and the pilot program details.

How, Where, and Why It Works

A review of existing programs produced two examples that could be applicable to Edmonton: Maryland's Live Near Your Work program and Missouri's Neighborhood Preservation Act (National Governors Association, 2001). Edmonton's Housing Reinvestment Program from the 1997 Downtown Plan could be used as a reference for structuring this type of program.

Ease of Implementation

Funding and negotiations with willing employers, City Council, and potentially the Federal and Provincial Governments will be required. Additional employers could join the program following its pilot-phase if the program is fully implemented following a successful pilot.

5.2.1.3 Solution: Work With School Boards and Partners on Policy & Programs To Support Walkability

Solution Description and Objectives

The Open Boundary Policy of Edmonton Public and Catholic Schools increases the distance that some children travel to get to school as they can choose to attend any school within Edmonton. This poses a significant transportation challenge and has decreased the number of students walking to school, increased the number of parent drop-offs, and increased the costs of providing bus service.

The Community Services Department should work with Edmonton Public and Catholic Schools to review whether the open boundary policy should be modified or scaled-back, or if there are ways to revise the policy that would allow for additional travel options and walking, and decreasing the School Board's costs of providing bus service. This should include the fostering of 'walking school buses' and a 'safe routes to school' program in conjunction with the School Boards, SHAPE (Safe, Healthy, Active People Everywhere), and the City of Edmonton (Walkable Edmonton, Community Services, and Transportation).

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of long distances between home and destinations and the root cause of the open boundary policy for school enrollment. The solution impacts all transects.

How, Where, and Why It Works

Safe Routes to School is an international movement designed to reach communities and is currently being offered in Edmonton through SHAPE. It began in Europe and has spread to the United States as a means to encourage and enable children to walk and bicycle to school safely.

Between December 2007 and March 2009, Green Communities Canada is spearheading a pilot test of School Travel Planning in four provinces across Canada – British Columbia, Alberta, Ontario and Nova Scotia. School Travel Planning is a community-based approach that has been used with success in other countries to increase the number of children choosing active

transportation modes to get to and from school. School Travel Planning is an important step in the future sustainability of the Active & Safe Routes to School program in Canada. This pilot project will inform future directions for Canada.

School Travel Planning addresses the issues of sustainability, safety and, health using a collaborative community-based approach. While the physical and attitudinal barriers to walking, cycling, and other environmentally friendly modes of travel are addressed, all aspects of how children travel to and from school are investigated and documented. A key emphasis is placed on determining the extent to which a community allows for the independent mobility of children.

Ease of Implementation

The City of Edmonton could partner or assist Edmonton Public and Catholic Schools in the review of this policy. However, significant revisions to this policy may be difficult to achieve and could require a lengthy process. Implementation of transportation options and programs such as the 'walking school bus' and 'safe routes to school' could be easier and quicker to implement and would not require changes to the open boundary policy.

5.2.1.4 Solution: Pursue Construction of Schools, Recreation Facilities, and Other Public Destinations when New Neighbourhoods are Developed

Solution Description and Objectives

New neighbourhoods in suburban areas are planned to include schools and other public facilities (e.g. recreation facilities and libraries), however, most are initially built without these facilities and some of the facilities will never be developed. Neighbourhood development includes the dedication of Municipal Reserve land that is used for parks, greenways, storm water facilities, and public facilities such as schools. The land is provided but the public facilities are not built until some time later when the neighbourhood meets certain criteria and funds exist for the City of Edmonton or a School Board to build the facility. In the meantime, residents of these neighbourhoods have a greater need for car ownership and habituate to driving to other neighbourhoods to access public facilities.

This solution would result in the construction of public facilities as the neighbourhood is built, through some combination of funding from the municipality, the school board(s), and the developer. In this manner, some measure of the incremental cost would likely be passed on to the new property owners and thus the prices of suburban property would more accurately reflect the costs of providing services and infrastructure to residents in these new areas.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of the long distances between homes and destinations by targeting the root causes of a lack of destinations in new development areas and the cost discrepancy between purchasing homes in established and suburban neighbourhoods. In

addition, the solution helps to pay for public facilities for which insufficient funding currently exists.¹⁶ The solution applies to the Outer Suburban transect.

How, Where, and Why It Works

This solution follows the same rationale as providing transit service to a community as soon as it is developed. By providing public facilities up-front, resident travel behaviour can be influenced and established based on readily available services and destinations to meet their daily and/or weekly needs. This will result in residents having a choice between driving to a destination and alternative modes because the destination will be provided within their neighbourhood. Continued approaches to developer / municipality funding are being examined by the City of Calgary to reduce the community infrastructure timing gap between development of the neighbourhood and the construction of the community facilities (Guttormson, 2009).

Ease of Implementation

Implementation of this solution would require changes to the infrastructure assessment requirements applied to neighbourhood developments with a funding arrangement similar to the Arterial Roads Assessment or proposed Transit Assessment Policy.

5.2.2 Barrier: Lack of Destinations as part of Infill Developments

Recent infill development proposals have focused on residential development with brief mentions of incorporating some minor retail. However, most of the approved large residential infill developments have not incorporated or defined the commercial and professional services that would meet the daily and/or weekly needs of residents, which would increase walking, decrease use of automobiles, and increase the convenience and efficiency of meeting these needs.

The following root causes have been identified that create and perpetuate this barrier:

- Requirements for varied destinations as part of large developments do not exist.
- The goals and objectives of Smart Growth are not translated into appropriate requirements in existing guidelines or the Smart Choices Checklist.

The following solutions will address the above barrier and root causes.¹⁷

5.2.2.1 Solution: Establish Mixed-Use Requirements for Large Infill Developments

Solution Description and Objectives

Though increased density from large infill developments can support existing neighbourhood services including retail and transit, most large infill development proposals include negligible amounts of non-residential uses. Establishing requirements for mixed-use as part of large infill

¹⁶ See Section 5.11 for barriers, root causes, and solutions pertaining to funding.

¹⁷ See Section 5.3 for solutions to mixture of uses such as definitions of mixed-use.

developments will create destinations that the increased residential density will support and new services that the existing residents can enjoy. Because most large infill developments use a direct control zoning, the requirement of mixed-use will have to be consistently applied on a case by case basis for each proposed development.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of a lack of destinations as part of infill developments and the barrier of community opposition to infill developments by providing new services to the neighbourhood that improves everyone's quality of life. This solution also increases the convenience and efficiency of walking trips to meet residents' daily and/or weekly needs. This solution is applicable to all transects but primarily to Mature Stable, Mature Stressed, and Inner Suburban.

How, Where, and Why It Works

Establishing requirements for mixed-use as a part of commercial developments has been proposed by a number of organizations including the San Francisco Planning Department (2003). Edmonton's draft Residential Infill Guidelines for Large Sites include the recommendation that "neighbourhood scale commercial uses, oriented to grade, that meet the daily and weekly needs of residents should either be provided on site or met in the immediate vicinity of the site."

Ease of Implementation

Implementation of this solution will require the definition of what is an adequate amount of mixed-use, most likely based on the number of proposed units or population. Guidelines would then have to be drafted and approved and would likely be required to be incorporated into the Zoning Bylaw. The first stage in the implementation of this solution would be the approval of the Residential Infill Guidelines for Large Sites with future revision of the guidelines to include minimum percentages of mixed-use on large sites.

5.2.3 Barrier: Inability to Support Neighbourhood Retail & Services

Older Edmonton neighbourhoods were originally planned and built to include commercial retail and professional services to the local residents. A local grocer, restaurant, or barber shop was typically present to serve daily and/or weekly needs of the residents within walking distance of their homes. However, retail preferences since the 1980s have changed the neighbourhood landscape. Retailers now prefer large commercial sites with convenient and abundant vehicle access along arterial roads that residents have increasingly used for commuting. This practice increases the visibility of the businesses to potential passing clientele. The large big box commercial developments have since influenced and changed consumer preferences by providing more services in one store and at lower prices. The result of these changes has been the collapse of neighbourhood businesses, further reinforcing the market strength of big box style commercial and services.

The root causes of the inability of support for neighbourhood retail and services includes following:

- Successful marketing of the convenience and price savings from shopping at large, big box stores has changed people's expectations for the price of goods and has resulted in a change in their shopping preferences both in terms of frequency of shopping trips and location of shopping trips.
- Increased success of the big box stores has decreased the market share for neighbourhood stores and caused many to close because of the inability to compete with prices offered by the larger chain stores located in outlying commercial areas.¹⁸
- Lower residential densities have not provided the local market to support neighbourhood commercial businesses for convenience items and services.¹⁹

The following solutions could be implemented to address the above barrier and root causes.

5.2.3.1 Solution: Partner with Development Industry in Research Program to Identify Successful Neighbourhood Retail and Service Developments

Solution Description and Objectives

Undertaking a research program to identify the types of neighbourhood retail and service developments that are typically successful is the first step to enhancing and increasing the number of destinations within Edmonton's neighbourhoods. Creating an understanding from other jurisdictions and Edmonton examples of what types of businesses or specific factors create successful neighbourhood commercial developments is an important component to initiate broader programs to encourage those types of developments or fostering the supportive factors that will create walkable destinations within neighbourhoods.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of the inability to support neighbourhood retail and services by focusing on defining what types of businesses and supportive factors are required to adequately support neighbourhood retail. The solution addresses the root causes created by consumer behaviour in response to retailer preferences for commercial development location and function. This solution applies to all transects.

How, Where, and Why It Works

As mentioned previously, a research study completed in King County, Washington found that the following land uses were strongly linked to the percentage of household trips made on foot: educational facilities, commercial office buildings, restaurants and taverns, parks, and neighbourhood-scale retail establishments, with civic uses and grocery stores following

¹⁸ See the following barrier for more discussion on the size of commercial developments.

¹⁹ See Section 5.1 for solutions pertaining to increasing density.

closely (Sallis et al., 2005). A study on methods to encourage mixed-use recommended a similar approach (Grant, 2004).

Ease of Implementation

The ease of implementation will be dependent on the scope of the study.

5.2.3.2 Solution: Establish Incentives Pilot Program for Neighbourhood Commercial Projects

Solution Description and Objectives

Following the definition of the types or factors that create successful neighbourhood businesses, an incentives pilot program would be defined and targeted to encourage their development and growth. Incentives could include suspending property taxes, assisting with promotion, expediting development or business license approvals, or assisting with securing mortgages or loans from lenders. This program could be incorporated into the Neighbourhood Commercial Revitalization Program proposed in the 2009 Smart Choices work program whose purpose is to develop a program to revitalize older small neighbourhood commercial areas, with a trial period of 3 years.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of the inability to support neighbourhood commercial and services and the root causes of market pressures on these types of businesses. The solution is applicable to all transects.

How, Where, and Why It Works

Targeting those businesses and assisting in the creation of supportive factors that have been shown to be successful at the neighbourhood level through incentives is a responsible and targeted approach to providing neighbourhood destinations. Rather than providing incentives for any and all types of proposed neighbourhood businesses, the research completed in the previous solution will provide guidance on which types are more likely to be successful and for which a pilot program should be initiated. Additional data from piloted developments is useful to strengthen the understanding of the neighbourhood service dynamics. These types of programs are recommended as a strategy for governments to implement based on research completed at Dalhousie University (Grant, 2004).

Ease of Implementation

Implementation could occur following the conclusion of Solution 5.2.3.1 and the identification of funding requirements for the pilot program. Incorporating the pilot program within the Neighbourhood Commercial Revitalization Program may reduce costs and lead time for implementation.

5.2.4 Barrier: Commercial Developments Located on Large Low-Density Sites

Placing development on large parcels of land with low densities and limited mixture of uses results in greater walking distances to travel between buildings and between different land uses (e.g. home to shopping). Developing these large, single use sites has decreased walkability and reduced the likelihood that individuals in these areas will walk. These types of developments can be found throughout Edmonton, particularly in the Inner Suburban transect and are also being incorporated into planning of the Outer Suburban transect. Research has shown that the number of destinations has a greater impact on walking than the size of the destinations, a significant finding to be reflected in the way commercial areas are designed (Hoehner, 2005).

These barriers have been created and perpetuated by the following root causes:

- The City of Edmonton Zoning Bylaw is based on segregated (i.e. Euclidean) zoning.
- Neighbourhood planning practice since the 1980s has been to define large single use zones and retailer preferences have been to require large sites for commercial developments.
- Reductions in the number of neighbourhood retail and service developments (e.g. grocery stores) has further increased the expansion of large stores further from residents' homes and has decreased the convenience of shopping, increased the distance to stores, increased the infrastructure spending to accommodate travel to these stores, and significantly reduced the potential for people to walk to serve daily and/or weekly needs.²⁰

The following summarizes the solutions to address the above barrier and root causes.

5.2.4.1 Solution: Set Standards for Maximum Area of a Single Land Use

Solution Description and Objectives

Enacting a redefinition of zoning from use-based to form-based would be difficult to accomplish in Edmonton due to the large size of the city and the effort required to rezone every property. A form-based zoning bylaw would help to define how the development would look, improving walkability, but would not necessarily create smaller commercial areas. However, within Edmonton's existing segregated use-based Zoning Bylaw, revisions could be included to set standards for the maximum area that a single land use could encompass. Other land uses would have to be located surrounding this area to separate areas of the same land use, particularly commercial land uses. This would reduce large, single use commercial developments and intersperse the commercial lands between residential, institutional, or employment land uses.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of large, low-density commercial developments and the root causes of neighbourhood planning practices while working within the existing zoning philosophy. The solution applies primarily to the Outer Suburban transect.

²⁰ Solutions for this root cause are discussed in the previous barrier.

How, Where, and Why It Works

Providing greater numbers of destinations has been shown to have a greater impact on walking and mode choice than providing larger amounts of floor space (Sallis et al., 2005). Consistent with this finding, this solution increases the number of destinations by interspersing the commercial areas throughout a neighbourhood and will reduce walking distances to these destinations, increasing the convenience of walking.

Ease of Implementation

This solution could occur in conjunction with other revisions to the Zoning Bylaw (see Section 5.9).

5.2.4.2 Solution: Establish Guidelines on Maximum Block Size

Solution Description and Objectives

Further to Solution 5.2.4.1, establishing guidelines for the maximum block size will further reduce the size of single commercial developments within the area designated as a single land use. Setting maximum block sizes will increase the number of destinations and increase the pedestrian connectivity between businesses as compared with navigating a spread-out parking lot typical of most auto-oriented commercial sites. The maximum block size guidelines would be used during the planning and design of neighbourhoods.²¹

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of large low-density commercial sites and the root cause of planning practices. The solution addresses pedestrian safety by creating defined routes between destinations while also increasing the convenience and efficiency of walking trips. The solution applies primarily to the Outer Suburban transect but could also apply to large scale urban redevelopment planning such as the Quarters.

How, Where, and Why It Works

Maximum block sizes have been implemented in Fort Collins, Colorado with the maximum block size varying from 7 to 12 acres depending on the zoning (Dill, 2004).

Ease of Implementation

Setting applicable maximum block size guidelines would likely require revisions to the Design and Construction Standards.

5.3 MIXTURE OF USES

Mixture of uses or mixed-use describes the combining of residential, commercial, employment, entertainment, and other land uses, within a precinct of human scale. Mixture of uses provides destinations to residents and supports walkability if paired with an appropriate scale

²¹ Barriers, root causes, and solutions related with connectivity are in Section 5.4.

(i.e. destinations within a five minute walk). Mixes of residential options – single family, townhouse, apartment – can also assist in attracting and retaining residents as their housing needs change. This section discusses the barriers, root causes, and solutions to issues regarding mixture of uses in Edmonton.

5.3.1 Barrier: Lack of Fine-grained Neighbourhood Supportive Mixed-use Areas

There are few areas in Edmonton that are mixed-use with a combination of housing, shopping, civic, entertainment, and employment opportunities that would be considered supportive of walkability. With the exception of the Downtown, Oliver, Whyte Avenue, and 124 Street, most neighbourhoods have limited mixing of uses. Commercial areas are typically segregated on large sites along high volume, high speed arterial roads. Some mature neighbourhoods have small, walkable commercial developments with coffee shops and professional services located in the centre of the community such as Parkallen and McKernan while others have these developments along arterials such as Crestwood and Parkview. In inner suburban areas, the mixing of uses is essentially non-existent. In outer suburban areas, town centres are being planned to incorporate mixture of uses such as Heritage Valley but this is not consistent among all plans and there is still limited mixing of uses interspersed throughout outer suburban neighbourhoods.

Root causes for the lack of fine-grained mixed-use areas include the following:

- The City of Edmonton Zoning Bylaw is based on segregated zoning.
- Neighbourhood planning practice since the 1980s has been to define large single use zones and retailer preferences have been to require large sites for commercial developments.²²
- City of Edmonton approval processes for mixed-use developments and other innovations increases the complexity, time, and cost of the development application.²³
- Developers are in some ways risk averse and unsure of the potential for success of mixed-use developments due to limited or no previous experience.
- Lenders undervalue or are unsure of how to analyze mixed-use developments, impacting the ability of developers/builders to obtain necessary financing.
- Marketing and development of big box commercial sites has influenced people's behaviour and expectations (low prices, large selection), while impacting the success and reducing the number of smaller scale commercial sites that are consistent with walkable distances.²⁴
- Market economy dictates which land uses are most economically attractive resulting in redevelopment / rezoning of normally supportive uses into homogeneous areas.
- Mixed-use is not well defined by current policies and development checklists.

²² See Section 5.2 for solutions to destinations and solutions related to commercial developments.

²³ See Section 5.10 for solutions pertaining to process.

²⁴ See Section 5.2 for solutions to destinations and solutions related to commercial developments.

The following solutions can address the above barrier and root causes.

5.3.1.1 Solution: Develop a Definition of Mixed-Use in Zoning Bylaw

Solution Description and Objectives

A clear and precise definition for mixed-use must be prepared in order to create a walkable mixed-use city. What constitutes mixed-use must be defined to be able to consistently evaluate development proposals. What types of uses create the desired results of a mixed-use development? How many destinations are required? The definition of mixed-use should be prescriptive to a point (defining those non-residential land uses that are supportive of the surrounding residences), but also allowing flexibility (e.g. mandating a variety of retail stores in an area without prescribing in such detail that individual sites are undevelopable, also avoiding redundancy of stores / businesses too close proximity).

In addition, the location, layout, and design of the buildings/area should be at a pedestrian scale – developed up to the sidewalk with parking behind and with destinations within acceptable walking distances of the neighbourhood residences. This may require that some commercial and non-residential land uses have to be located away from the arterial roads on the periphery of neighbourhoods and located more centrally within the neighbourhood.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the lack of mixed-use areas that are supportive of communities and walkability and addresses the root cause of an unclear definition and understanding of what is mixed-use. The solution is applicable to all transects.

How, Where, and Why It Works

The consistent evaluation of development proposals requires a clear and precise definition of mixed-use. The City of St. Albert is currently initiating a form-based development code which provides an outline of the different types of non-residential land uses that are applicable to mixed-use and a minimum number of each type. This approach provides a good model for creating mixed-use areas while retaining flexibility for the developer, retailers, and business community.

Ease of Implementation

This solution could occur in conjunction with other revisions to the Zoning Bylaw (see Section 5.9).

5.3.1.2 Solution: Revise Planning Framework to Target Higher Levels of Mixed-Use

Solution Description and Objectives

The Zoning Bylaw and other elements of the planning framework (such as NSPs) should be revised to require targeted / appropriate developments to incorporate a mix of uses. Most existing commercial zoning allows residential units as discretionary uses. However, requiring a

minimum amount of mixed-use for commercial and medium- and higher-density residential developments would provide a better mix of homes and destinations within walking distance and help to establish more walkable communities. To be cognizant of market forces, flexibility could be incorporated into the requirement, such as having the first floor of multi-storey buildings built with rough-ins for utility connections and appropriate floor heights that could be used for either residential or commercial purposes as market conditions change over the life of the building.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the lack of mixed-use areas that are supportive of communities, walkability, and livability and addresses the root causes of segregated zoning, providing a clearer definition of what is mixed-use, and may help to streamline the review and approval process of mixed-use developments. The solution is applicable to all transects.

How, Where, and Why It Works

This type of approach has been studied and recommended by both academics (Grant, 2004) and planning departments (San Francisco Planning Department, 2003) and would represent a slight revision to the requirements of existing zones in the Edmonton Zoning Bylaw.

Ease of Implementation

This solution could occur in conjunction with other revisions to the Zoning Bylaw (see Section 5.9).

5.3.1.3 Solution: Provide Leadership for Investments in Mixed-Use Development

Solution Description and Objectives

Funding for mixed-use developments can be more difficult to secure than for more conventional development projects. There are a number of reasons for this as discussed in the root causes above. To reduce the impacts of limited or restricted funding, the City of Edmonton should provide leadership and guidance to the development and lending communities with regard to the following:

- How to appropriately assess the financial viability of proposed mixed-use developments by considering each use separately.
- Assisting developers in obtaining loans by partnering (financially or non-financially) to provide a greater degree of project certainty.
- Creating a list of lenders that are 'mixed-use development friendly' for the development industry.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of a lack of mixed-use developments and the root cause of financial and funding issues due to inexperienced lenders. This solution applies to all transects.

How, Where, and Why It Works

These issues and the above solutions have been identified in previous studies posted on websites by financial organizations, such as the Federal Reserve Bank of Minneapolis, and in a study of how to implement mixed-use in practice (Georgia Quality Growth Management, 2008; Grant, 2004).

Ease of Implementation

Implementation of this solution would require negotiations and discussions with the financial lending industry, the development industry, and could benefit from participation by the Provincial and Federal governments.

5.3.1.4 Solution: Provide Incentives to Developers for Mixed-Use Projects

Solution Description and Objectives

Similar to the approach to encourage neighbourhood commercial services, a financial incentives program to target and encourage mixed-use development should be implemented. Incentives could include suspending property taxes for a set period of time, assisting with securing mortgages or loans from the lenders, or providing funding grants. In conjunction with Solution 5.3.1.3, this solution would encourage mixed-use development and help to address funding issues.

In addition to financial incentives, additional cost-saving incentives related to the development of mixed-use facilities could be provided to further encourage their construction. Incentives could include bonus density criteria, flexible design guidelines, reduced parking requirements, and expediting development approvals and permitting for proposed mixed-use developments.²⁵ The incentives would increase the profitability of completing mixed-use development projects, increasing their attractiveness to the development industry and creating more walkable communities with destinations and the population to support them.

The development review process could include a point-based system for the review of proposed developments where points would be given for providing or designing the development based on walkability (e.g. mixed-use, street-oriented building placement, transit improvements, TDM initiatives, street amenities, etc.) and points taken away for more auto-oriented design features (e.g. drive-thrus, set-back buildings, large at-grade parking lots). The more points received would correspond to greater incentives.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of a lack of mixed-use developments and targets the root causes of reducing risks for developers, increasing the profitability and improving the attractiveness to lenders, helping to readjust the market preferences and economics of mixed-

²⁵ See Section 5.10 for solutions regarding City process and recommendations for expeditious approvals.

use versus conventional development, and could help to streamline the approvals process. This solution applies to all transects.

How, Where, and Why It Works

Providing financial incentives could provide monetary support for mixed-use developments. The extent of the impact that this support would have on development of more mixed-use buildings would be dependent on the amount of funds provided, the type of financial incentives, and the history of the developers and their level of experience with these developments. A similar approach has been proposed by Boston's Metropolitan Area Planning Council (2006).

Bonus density criteria and parking relaxations are concepts that have been proposed in Edmonton studies such as the 109 Street Corridor Study and Strathcona Junction. In these instances, the incentives were defined to encourage quality development and the use of alternative modes. The Boston Metropolitan Area Planning Council and the San Francisco Planning Department have also encouraged implementation of these types of practices (Metropolitan Area Planning Council, undated; San Francisco Planning Department, 2003).

Ease of Implementation

The Transportation and Planning and Development Departments will have to define the incentives package that will be offered to mixed-use developments. The results of the program may require revision of the Zoning Bylaw.

5.3.1.5 Solution: Establish Program to Transform Existing Community Shopping Centres into Mixed-Use Urban Villages

Solution Description and Objectives

There are numerous community-scale shopping centres throughout Edmonton, some of which are quite healthy while others are struggling to be profitable and successful. The layout and structure of these community shopping centres provide an excellent opportunity to transform them into mixed-use urban villages, as residential buildings and mixed-use buildings can be incorporated into the site. In addition, the buildings in these shopping centres were typically designed for a 25 year service life which many are reaching or have exceeded. As these areas naturally redevelop to replace building stock, new pedestrian-oriented and scaled mixed-use buildings could be constructed and placed adjacent to the street where there are currently parking lots. As the new buildings are constructed and businesses relocated, the older buildings can be demolished and that part of the site redeveloped to provide amenities in support of the new buildings, including the potential to construct parking if warranted.

Many of these shopping centres are also well served by transit and offer existing transportation alternatives for the influx of residences that would live at these mixed-use urban villages. A program should be established to lead the transformation of the existing community shopping centres from auto-oriented commercial areas to mixed-use urban villages, strengthening and supporting the businesses by increasing their market base.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of a lack of mixed-use development by targeting the root causes of transforming existing large commercial developments. This solution primarily applies to the Mature Stressed, Mature Stable, and Inner Suburban transects.

How, Where, and Why It Works

A feasibility study is being completed that is part of the proposed 2009 Smart Choices Work Program to review the transformation of existing community shopping centres into mixed-use urban villages.

Ease of Implementation

Implementation could occur as part of the Smart Choices work program.

5.3.1.6 Solution: Prepare Transit-Oriented Development Plans for Areas Surrounding LRT StationsSolution Description and Objectives

The public investment in Light Rail Transit (LRT) provides an enormous opportunity to maximize the impacts that this transit service can have on travel behaviour. Intensifying development surrounding LRT stations will increase the number of people living within convenient distances to travel by LRT, will place more people nearer transit centres located at LRT stations, and can provide retail and employment opportunities conveniently located near high quality transit service, providing destinations and services to existing area residents. This type of development is called Transit-Oriented Development (TOD).

Preparing TOD plans for the areas surrounding existing and future LRT stations, and incorporating TOD planning in conjunction with LRT planning, will make more efficient use of the land surrounding these large transportation investments, provide travel choice to residents and businesses, and can help to revitalize areas by increasing services, retail, employment, and population. This last benefit should help to ease community opposition to infill developments in the areas that the TOD plans apply.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of lack of mixed-use development and the root causes of previous planning practices, particularly the coordination of land use and transportation planning. The solution also increases security by increasing the activity and population that could provide surveillance of the area. This solution could eventually apply to all transects, but is primarily focused on the Inner Suburban, Mature Stable, and Mature Stressed transects.

How, Where, and Why It Works

A TOD plan is currently being prepared for Stadium Station with completion anticipated at the end of 2009. The City of Edmonton management team for this study could then apply their

expertise and experience from the Stadium Station TOD project to areas surrounding other LRT stations.

Ease of Implementation

Implementation will require the creation of a TOD Planning Group at the City of Edmonton and that could occur following the completion of the Stadium Station TOD Plan.

5.4 CONNECTIVITY

Connectivity describes and controls a city's urban form, its extent of interconnectedness, and ease with which pedestrians can access destinations via the pedestrian network. As the number of connections increases (i.e. high connectivity), block lengths become shorter and more links are created providing increased route choices to make a particular trip.

Increasing connectivity decreases the walk distance and walk time by providing more direct access to destinations via the street (or pedestrian) network. As connectivity decreases, the attractiveness of walking also decreases because walking distances and time to reach destinations increases due to out-of-direction travel and backtracking.

Connectivity has a significant impact on walkability and is dependent on the layout of the street network and the extent that sidewalks and pedestrian links are provided. If connectivity is not considered during the planning of a neighbourhood, it is far more difficult to create connectivity after the neighbourhood is constructed.

5.4.1 Barrier: Long Block Lengths

Many of Edmonton's streets have been planned and constructed with long block lengths. This creates longer walking distances between destinations and also increases the distance between pedestrian crossings (i.e. the distance between intersections). As the distance between crossing points increases, walking time increases and the attractiveness of walking decreases. Long distances between crossing points may also encourage jaywalking, a practice not typically anticipated by drivers in Edmonton. A number of root causes have created and perpetuated this barrier including the following:

- Designing neighbourhoods based on curvilinear street networks (to limit cut-through traffic and reduce residential traffic speeds) has reduced the pedestrian connectivity and increased the walk distance to destinations and crossing locations.
- Emphasis of planning to accommodate and facilitate efficient traffic flow has reduced the implementation of mid-block crossings and higher density street grids (i.e. resulting in more intersections) that would impose delays on vehicle traffic.
- The use of hierarchical street classification (i.e. arterial, collector, local) has concentrated traffic on arterial streets, increasing the traffic volumes and generally the distance between intersections.

- High design speeds and traffic volumes along arterial roads have limited the implementation of mid-block pedestrian crossings.

The following solutions could be implemented to address the root causes that have created and are perpetuating the barrier.

5.4.1.1 Solution: Establish Block Length Maximums

Solution Description and Objectives

Establishing a maximum block length criterion for neighbourhood planning and design will increase the connectivity of new neighbourhoods. There are many measures that can be used to evaluate connectivity including block length, block size (measured by area), block/intersection/street density, and others. By requiring shorter blocks, additional intersections are created which result in shorter travel distances and a greater number of routes between destinations. In addition, traffic volumes can be dispersed over a larger number of roads, increasing pedestrian comfort and safety.

Barrier(s), Root Cause(s), and Transect(s) Addressed

A maximum block length addresses the connectivity barrier of long distances between pedestrian crossings and the barrier of wide roads, and targets the root causes of the hierarchical roadway network philosophy (by increasing the number of route options available to both pedestrians and motorists), high traffic volumes that limit mid-block crossings (by dispersing traffic over more roads), and the curvilinear roadway design (by introducing a more grid-like network with additional pedestrian linkages). Establishing maximum block lengths refocuses planning to provide a balance between automobiles and other travel modes. This solution is primarily applicable to the Outer Suburban transect but is also applicable in large scale redevelopments in all transects.

How, Where, and Why It Works

Based on research completed by Dill, the selection of block length as the connectivity measure has the benefit from a policy standpoint of being easy to understand and apply (Dill, 2004). Typical maximum block lengths range from about 90 m (300 ft) to about 180 m (600 ft) (Dill, 2004). This type of policy has been implemented in a number of North American communities including Portland, OR, Raleigh, NC, Boulder, CO, and Fort Collins, CO (Handy et al., 2005).

Specific block length requirements will have to be finalized by the Planning & Development and Transportation departments but the following presents potential street connectivity criteria that could be implemented in Edmonton.

- Maximum intersection spacing for local and collector roads of 180 m (about 600 ft).
- Maximum intersection spacing for arterial roads of 300 m (about 1000 ft).
- Maximum spacing between pedestrian connections of 100 m (about 350 ft).
(Victoria Transport Policy Institute, 2008b)

Ease of Implementation

This recommendation will require review and approval by the Transportation and Planning and Development departments and will require revisions to the Design and Construction Standards to include requirements for maximum intersection spacing in addition to the existing minimum spacing requirements.

5.4.1.2 Solution: Establish Limits on Culs-de-sac

Solution Description and Objectives

Limiting the number of culs-de-sac in a neighbourhood increases the connectivity for both pedestrians and automobiles. There are fewer dead-ends and greater route choice, decreasing the travel distance and travel time. In addition, fewer culs-de-sac disperses traffic volumes over more streets, increasing the comfort and safety of pedestrians.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the connectivity barrier of long distances between pedestrian crossings and addresses the root causes of planning based on curvilinear and hierarchical street network and the high traffic volumes on arterial streets. This solution primarily applies to the Outer Suburban transect.

How, Where, and Why It Works

This type of approach has been applied in a number of jurisdictions throughout North America where the number of culs-de-sac are limited including Eugene, OR, Huntersville, NC, Cary, NC, and Lancaster County, SC (Handy et al., 2005). Limiting culs-de-sac can be done in two ways: establishing a minimum connectivity index or setting a maximum for the proportion of culs-de-sac versus other streets.

The connectivity index is typically calculated by dividing the number of roadway links (streets) by the number of roadway nodes (intersections and ends of culs-de-sac). A higher index means that travelers have greater route choice, allowing more direct connections between destinations. Similar to the connectivity index, establishing a maximum proportion of culs-de-sac versus all streets (measured from node to node) also increases connectivity by providing greater route choice.

As both measures are a ratio, the results can be impacted by offsetting culs-de-sac by providing additional links elsewhere. However, this will still result in a more walkable neighbourhood overall (especially with the implementation of maximum block lengths).

Implementation of this solution could be based on limiting culs-de-sac to 20% of all streets or requiring a connectivity index of 1.4 or greater (Victoria Transport Policy Institute, 2008b). The specific targets would be defined during implementation.

Ease of Implementation

This solution will require negotiation and review by the Transportation and Planning and Development departments.

5.4.1.3 Solution: Provide Pedestrian Walkway Connections to Culs-de-sac and Loops

Solution Description and Objectives

Many existing culs-de-sac and loops have pedestrian linkages at their ends or between their entrances that help to reduce travel time and travel distance, and increase the attractiveness of walking. However, in some instances these pedestrian links have not been provided. Numerous public utility lots (PULs), that could be developed as walkway connections, have been historically leased to adjacent property owners and could be reclaimed. In addition, the Design and Construction Standards do not require pedestrian links at the end of all culs-de-sac nor do the standards have any requirement for spacing of pedestrian connections.

This solution would revise the Design and Construction Standards to require pedestrian connections at the ends of culs-de-sac and midway between loop entrances and should be completed in conjunction with Solutions 5.4.1.1 and 5.4.1.2. This solution would also include reclaiming relevant PUL leases (where effective pedestrian connections could be constructed) either pro-actively or as the lease periods expire.

Barrier(s), Root Cause(s), and Transect(s) Addressed

Providing more pedestrian links addresses the barrier of long distances between pedestrian crossings by increasing the number of routes and reducing out-of-direction for pedestrians. Specifically, this solution addresses the root cause of missing pedestrian connections at the end of culs-de-sac and improves walkability in the Outer Suburban transect.

How, Where, and Why It Works

Providing pedestrian linkages at ends of culs-de-sac and between loop entrances has been shown to increase pedestrian connectivity and increase the walking mode share (CMHC, 2007a). In addition, as the pedestrian connectivity increases relative to vehicle connectivity, there has been shown to be a reduction in the vehicle kilometres traveled (CMHC, 2007a). Providing these types of linkages for culs-de-sac has become near-standard practice in Edmonton's suburban developments.

Ease of Implementation

The revision to the Design and Construction Standards could be accomplished in conjunction with the other proposed revisions. Reclaiming PUL leases would be easiest at the end of lease periods, and the terms of the leases should allow for their effective return to the City in their original condition unencumbered by fences etc. To minimize leaseholder resistance to reclaiming the PULs, some cost-sharing of removing encumbrances could be considered.

5.4.1.4 Solution: Create Mid-block Pedestrian Crossings along Long Blocks in Existing Neighbourhoods

Solution Description and Objectives

Another solution to improve the connectivity of existing neighbourhoods is to implement mid-block pedestrian crossings along long blocks. Long blocks would be defined based on maximum intersection spacing and could include collectors with intersection spacing of greater than 180 m and arterials with intersection spacing of greater than 300 m (see Solution 5.2.4.2). This solution would allow individuals to cross long blocks along collector and arterial streets at locations other than intersections, reducing out-of-direction travel and pedestrian travel time while increasing the relative connectivity of pedestrians versus automobiles. The appropriate locations for mid-block crossings would have to be evaluated on a case by case basis based on criteria defined by the Transportation Department that would include the assessment of pedestrian safety.

Barrier(s), Root Cause(s), and Transect(s) Addressed

Providing these crossing opportunities addresses the barrier of long distances between pedestrian crossings by increasing the number of pedestrian crossing locations. Specifically, this solution addresses the root cause of limited provision of mid-block crossings and improves walkability in the Inner Suburban, Mature Stable, and Mature Stressed transects.

How, Where, and Why It Works

Similar to providing pedestrian connectivity between adjacent streets through breezeways or pedestrian-only links, providing mid-block crossings will increase the level of connectivity for pedestrians overall and relative to vehicle connectivity and decrease pedestrian travel time, which has been shown to increase the odds of making a walking trip and decrease the vehicle kilometres driven (CMHC, 2007a; 2007b).

Ease of Implementation

Installing mid-block pedestrian crossings along long collector and arterial blocks will require the establishment of criteria regarding what constitutes a long block. In addition, review and revision of the Transportation Department's 2002 Pedestrian Control Guidelines should be completed.

5.4.1.5 Solution: Allow Unconstrained Pedestrian Crossings On Local Streets

Solution Description and Objectives

Traffic Bylaw #5590 states that all pedestrian crossings must be made at the intersection of two or more roadways (with the exception of Rice Howard Way). This bylaw makes it illegal to complete an unconstrained crossing, sometimes referred to as jaywalking, along streets. Conversely, the Alberta Traffic Safety Act allows pedestrian crossings at any location along the road but the pedestrian yields the right-of-way to automobiles when crossings occur at locations other than at intersections. Traffic Bylaw #5590 also prohibits the use of local streets for activities such as street hockey.

As discussed in the City of Edmonton Sidewalk Strategy, allowing unconstrained pedestrian crossings along local streets would increase pedestrian connectivity and would make it legal for citizens to cross local streets to access sidewalks on the other side of the street in those locations where sidewalks are missing on one side. This solution would also legally allow pedestrians to walk along local streets in locations where no sidewalks currently exist.

Barrier(s), Root Cause(s), and Transect(s) Addressed

Allowing unconstrained pedestrian crossings along local streets addresses the barrier of long distances between pedestrian crossings by allowing crossings to occur at any location along the street. This solution improves walkability in all existing and future neighbourhoods.

How, Where, and Why It Works

The City of St. Albert Traffic Bylaw allows unconstrained pedestrian crossings with two exceptions: where the road forms part of a school zone or playground (during applicable hours) and where the road has four or more lanes, a speed limit greater than 50 km/hr, and a median that divides that portion of the road (City of St. Albert, 2005).

Edmonton could implement a similar approach: Allowing unconstrained pedestrian crossings, when safe to do so, along undivided two lane roadways with speed limits of 50 km/hr or less, with pedestrians yielding the right-of-way to oncoming vehicles.

Ease of Implementation

This solution would require the revision of Traffic Bylaw #5590 and would also require a public education and awareness campaign which could be occurring as the bylaw revisions are progressing.

5.4.2 Barrier: Limited Pedestrian Networks to and within Commercial Developments

The design of commercial developments has typically not provided high-quality design for pedestrian movements to, from, and within the site, limiting connectivity and impacting walkability. Such commercial developments cater to vehicle users providing abundant parking and direct access to major thoroughfares. Significant parking is provided between the stores and the road, through which pedestrians, either walking from the street or from their cars, have to traverse. The effect is an unattractive walking landscape. The following root causes have created or perpetuated the barrier:

- Retailers and developers believe the success of commercial developments relies on vehicle access and high visibility of the development from the roadway.
- Design standards do not specify site design requirements for providing internal pedestrian networks and connectivity.
- Design standards for parking lots on commercial sites cater to vehicle access and do not provide guidance, incentives, disincentives, or allow innovative design to make the site more pedestrian-oriented.

- Emphasis and focus of retailers/developers is to provide parking and vehicle access for customers instead of direct transit access and appropriate pedestrian connections to the business entrances.
- Large parking lots increase the distance from the street to the storefront and the exposure of pedestrians to vehicles as they walk to the store.
- Large setbacks of buildings from the street increase the distance to walk to businesses entrances and create uninviting corridors.

The following solutions address the above barrier and root causes.

5.4.2.1 Solution: Adopt Requirements for Walkable Design of Commercial Developments

Solution Description and Objectives

Most commercial developments focus on the access, circulation, and parking of vehicles but give lower priority to circulation and movement of pedestrians – be it walking to the site or walking from parked vehicles. Access to businesses for pedestrians should include walkways and curb ramps to allow for convenient and direct links from the adjacent street and the parking areas associated with the development. In addition, the placement of the commercial building to front the street decreases the distance for pedestrians to access the front entrances, provides enclosure of the adjacent roadway, and creates a more appealing and walkable area. Guidelines should be adopted for the design of commercial development sites that take into consideration of the circulation of pedestrians. These guidelines should be made applicable to mixed-use and large development sites as well.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of limited connectivity in commercial sites and larger developments, and barriers related to accessibility and safety.²⁶ The solution targets the root causes of lack of standards for pedestrian access and planning / retailer / developer preferences on site design. This solution is applicable to all transects but primarily for new commercial developments in the Outer Suburban transect and the redevelopment of large developments in the Inner Suburban, Mature Stable, and Mature Stressed transects.

How, Where, and Why It Works

The Institute of Transportation Engineers has adopted a “recommended practice” entitled Promoting Sustainable Transportation Through Site Design (2004), which provides a relevant and thorough set of example guidelines for the design of commercial development sites.

Ease of Implementation

Implementation of this solution would require establishing standards for pedestrian circulation and evaluating proposed developments based on these standards during the development permit stage and could require revisions to the Zoning Bylaw. The Planning and Development

²⁶ See Section 5.7 for accessibility solutions.

and Transportation Departments should cooperate in creating and enforcing pedestrian circulation standards.

5.5 TRANSIT SERVICE

Transit is an important component of urban form. The goals of transit service include increasing transit ridership, shifting travel from automobiles to public transit, promoting economic development, and providing an affordable travel alternative to residents. The quality and quantity of transit service has been shown to be correlated with transit ridership – poor transit service limits the willingness of residents to ride transit. However, transit service is also usually provided in response to observed ridership levels, meaning low ridership routes are not typically considered for improved transit service unless ridership increases or significant land use changes occur.

Transit service can also be thought of in terms of the impacts that it has on pedestrian travel. Bus stops and transit centres act as intermediary destinations between a pedestrian's origin and ultimate destination. Transit service also extends the distance that pedestrians can travel. As transit ridership increases, so too does the number of pedestrians walking to and from the bus stops. The following section discusses barriers, root causes, and solutions related to transit service.²⁷

5.5.1 Barrier: Uncompetitive Transit Service

Outside of Edmonton's central core (Downtown and University of Alberta North Campus), the peak hour periods, and some major service corridors (including LRT), transit service in Edmonton is generally uncompetitive for residents with private vehicle travel options. Though only about 30% of daily trips are made for commuting or school purposes (City of Edmonton, 2006a), the Edmonton Transit Ridership Growth Strategy suggests that commuters and school trips make up at least 60% of the daily transit ridership (ENTRA Consultants, 2008), indicating that travel in periods outside the AM and PM peak periods rely more heavily on automobiles and less on transit.

Uncompetitive transit service has been created and perpetuated by the following root causes:

- Ongoing suburban growth increases the area and distances that transit must serve, increasing the cost of transit operation.²⁸
- The lack of exclusive transit right-of-way or transit priority measures increases the travel time and decreases the reliability of on-time arrivals for transit users because buses must interact with vehicular congestion.

²⁷ Discussion of pedestrian connections to bus stops is discussed in Section 5.7 while discussion regarding amenities at bus stops can be found in Appendix C.

²⁸ See Section 5.1 for growth management solutions.

- The lack of funding and investment in transit infrastructure and transit service improvements has limited the ability to attract more riders and keep pace with urban growth. This includes the service budget made available by City Council.
- Shifting travel patterns with increasing commuting trips to Edmonton's industrial areas has limited the ability for existing transit service (focused on downtown and university commutes) to capture these trips.
- Low ridership and residential densities has limited the frequency of transit service, reinforcing low ridership.²⁹

The following solutions address the above barrier and root causes.

5.5.1.1 Solution: Develop and Implement Strategies to Improve Transit Service Delivery

Solution Description and Objectives

The implementation of ridership growth strategies and transit priority measures as described in the ETS Ridership Growth Strategy and the Draft Transportation Master Plan will improve the quantity and quality of transit service provided to Edmonton residents if the programs are funded. Strategies within these Edmonton plans include increasing bus route frequencies and hours of operation, implementing transit priority corridors including east-west crosstown links, providing late night or all-night services, and providing improved service to industrial areas. Improving transit service will increase ridership and consequently the number of people walking to and from bus stops.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses transit service related barriers to walkability and targets the root causes of a lack of transit priority, shifting travel patterns, and generally placing more importance on the transit system for the city's travel needs. This solution applies to all transects.

How, Where, and Why It Works

This solution is consistent with the Draft Municipal Development Plan, Draft Transportation Master Plan, the Long Term Public Transportation Strategy, and the ETS Ridership and Growth Strategy and Planning Review.

Ease of Implementation

This solution should be implemented consistent with the recommendations of the ETS Ridership Growth Strategy.

²⁹ See Section 5.1 for solutions to density.

5.5.1.2 Solution: Develop and Implement a Transit Assessment Policy

Solution Description and Objectives

As discussed in Chapter 4.0, early introduction of transit service to new neighbourhoods can significantly increase transit ridership and negate the need to own additional vehicles, both important factors for walkability and mode choice. Much like the Arterial Road Assessment where developers are obligated to pay for the construction of arterial roads for new neighbourhoods, a Transit Assessment Policy would require developers to pay to have transit service provided to the neighbourhood as soon as stages of the development are complete and residents have moved in. Some Edmonton developers have already voluntarily implemented this approach or have stated that they will do so. In addition, Edmonton Transit is actively suggesting this approach to developers during the review of neighbourhood and area plans.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of uncompetitive transit service by targeting the root cause of the growing service area and is applicable primarily to the Outer Suburban transect.

How, Where, and Why It Works

This solution is currently being discussed by the City of Edmonton and the Urban Development Institute. Voluntary funding of early transit service by developers has occurred in Edmonton for neighbourhoods such as The Grange (Glastonbury), The Hamptons, Ambleside, Summerside, and Charlesworth. Data indicate significant impacts on transit ridership as compared to what is observed in similar neighbourhoods that did not have the transit service provided by the developer prior to when Edmonton Transit would normally provide the service.³⁰ The solution would also formalize the consideration of transit routes and services to the developing neighbourhood or area as part of the ASP, NASP, and/or NSP stage of the development process.

Ease of Implementation

Negotiations regarding this solution are already in progress.

5.5.1.3 Solution: Implement Transportation Demand Management Programs

Solution Description and Objectives

Increasing transit ridership and dissuading people from commuting by vehicle can be reinforced through Transportation Demand Management (TDM) programs. Among other things, TDM initiatives can correct discrepancies between the full cost of travel by a particular mode is and the cost the user actually pays. TDM measures can include increases to the costs of vehicle travel through parking fees, incentives to use alternative modes such as discounted transit passes and preferential car pool stalls, and flexibility in work schedule such as teleworking (i.e.

³⁰ Unpublished. From preliminary data collected and provided by the City of Edmonton comparing The Grange and Terwilligar Towne neighbourhoods.

working from home). To implement TDM programs, the City of Edmonton should implement programs for its staff, while partnering and supporting employers throughout Edmonton to implement TDM programs in their workplace. This will require a TDM Coordinator.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of uncompetitive transit service by targeting the root causes of low ridership demand and combating the effects of unconstrained growth and shifting travel patterns. This solution is applicable to all transects.

How, Where, and Why It Works

Existing TDM programs are diverse, with programs in different cities and provided by different employers varying in terms of the program strategies employed. TDM strategies have been shown to influence travel behaviour in terms of how, when, and where people travel to increase the transport system efficiency and/or achieve specific planning objectives (VTPI, 2007). A study by COMSIS Corporation for the Transit Cooperative Research Program provides guidance to public agencies in establishing employer-based TDM programs while also highlighting the characteristics of effective TDM programs (2002). This study is a reference that could be used in the development of a TDM program for the City of Edmonton.

Ease of Implementation

Implementation of this solution could potential be completed by allocating existing staff from the Transportation Department (Sustainable Transportation Section) to be the TDM Coordinator.

5.6 PARKING POLICY

The ability of parking policies to influence mode choice and walking are quite pronounced. Oversupplying and/or under-pricing parking allows driving to be convenient and less expensive, increasing vehicle travel and the cost to municipalities for providing and maintaining expanding roadway networks. Providing parking based on parking management principles can increase walking and transit use, decrease vehicle use, and create more walkable communities where land can be used for people and businesses rather than the storage of vehicles. The following section discusses barriers, root causes, and solutions related to parking policy.

5.6.1 Barrier: Inexpensive and Abundant Parking

Parking in Edmonton has been supplied based on minimum requirements and has resulted in an abundance of parking throughout the city as there are no constraints on the maximum number of parking stalls that can be provided (except in the downtown). In addition, much of the provided parking is free of charge or inexpensive when charges are applied (even in the downtown during the day when compared to downtown parking rates in other large Canadian cities). This abundance of inexpensive parking increases the convenience of driving by providing excessive amounts of parking with little to no controls on the maximum amount that is

provided or the amount charged for its use. In addition, at-grade parking stalls make inefficient use of property that could otherwise be used for homes, businesses, or employment.

The following root causes have created or perpetuated the barrier:

- Few mechanisms exist to limit the amount of parking provided.
- Retailers and developers believe the success of commercial developments relies on providing abundant amounts of parking to cater to customers.
- There is no coordinated approach to the management of parking both in terms of supply and price.

The following solutions address the above barrier and root causes.

5.6.1.1 Solution: Establish Parking Maximums

Solution Description and Objectives

Establishing parking maximums for each land use defined in the Zoning Bylaw would specifically define the maximum amount of parking that could be provided for a particular land use. The development of the standards for parking maximums would require the study of actual parking demands for each land use (taking into consideration the proximity and availability of alternative transportation modes such as transit), consideration of rates set by other municipalities that have experience with these types of standards, and the objectives for travel behaviour and mode choice changes that would be supported by capping parking supply.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of abundant parking and the root cause of few existing mechanisms to limit the provision of parking. The solution particularly applies to new development, most of which is located in the Outer Suburban transect but would also apply to new developments in all transects.

How, Where, and Why It Works

Studies have found that the use of parking maximums are an effective method for controlling the supply of parking and achieving the goals of walkability (Kuzmyak and Weinberger, 2003; Tumlin, 2002).

Ease of Implementation

This solution would require revisions to the Zoning Bylaw (See Section 5.9) to revise minimum parking requirements to maximum parking requirements.

5.6.1.2 Solution: Implement a Parking Management Strategy

Solution Description and Objectives

An extension to Solution 5.6.1.1 is the development and implementation of an integrated Parking Management Strategy for Edmonton. The strategy would provide standards on the number, location, and arrangement of parking supplies (including concepts of shared parking), address City controlled parking lots & meters, private parking properties, the standards and requirements for parking in commercial / infill developments, and would assess whether the establishment of a Parking Authority is an appropriate method to achieve parking management goals, and whether parking revenues could be directed to support sustainable transportation initiatives including walkability. This solution would require a program coordinator to manage and carry out the operation and application of the strategy.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of abundant and inexpensive parking by targeting the root causes of having few limits on parking provision and no coordinated management of parking. The solution applies to all transects.

How, Where, and Why It Works

Numerous studies have reported the impacts of strategically managing the supply and cost of parking and the impacts these factors have on mode choice and travel behaviour (Litman, 2008a; Litman, 2008b; Vaca and Kuzmyak, 2005; Kuzmyak and Weinberger, 2003; Tumlin, 2002). Research and analysis of the applicable rates for parking supply and price would have to be completed as part of the strategy development.

Ease of Implementation

Implementation of a Parking Management Strategy would require development of the strategy, obtaining necessary approvals, and hiring or designating a program coordinator.

5.7 ACCESSIBILITY

The number and proportion of seniors, children, and persons with disabilities is indicative of the walkability of a neighbourhood. These individuals have greater requirements of the pedestrian network including curb ramps, audible signals, and sidewalks clear of obstructions, tripping hazards, and snow and ice. As the needs of these individuals are incorporated in the pedestrian network, accessibility for all users increases and walkability is improved. This section discusses accessibility barriers, root causes, and solutions.

5.7.1 Barrier: Missing Pedestrian Accessibility Features

Edmonton's pedestrian network in suburban, mature, and industrial areas has many missing sidewalks, curb ramps, and connections to bus stops. This missing pedestrian infrastructure limits the city's connectivity and reduces the integration of the pedestrian and transit systems,

impacting walkability, accessibility of the transportation system, and the mobility of residents. This walkability barrier has been created and perpetuated by the following root causes:

- Planning in the past had limited focus on planning neighbourhoods for pedestrians and the accessibility of all users. Historically, some urban development was constructed based on design standards with inadequate requirements for pedestrian infrastructure.
- Sidewalks and curb ramps were not constructed consistently throughout all neighbourhoods as they were developed, particularly in industrial areas.
- In high-growth periods, it has been challenging for the City to review all construction and development plans in detail to check and specify where sidewalks and curb ramps should be provided, and to ensure coordination of bus stops with pedestrian network connections.
- Limited funding and escalating costs have restricted the construction of missing pedestrian infrastructure including sidewalks, curb ramps, and connections to bus stops.

Many of the root causes have been addressed through improvements in standards and the application of those standards. Sidewalks and curb ramps are required as part of all new suburban development. However, these improved standards have had limited impact on existing areas with missing sidewalks and curb ramps or developing industrial areas. The following solutions could be implemented to address the root causes that have created and are perpetuating the barrier.

5.7.1.1 Solution: Implement Ped Connections: A Strategy for Sidewalk Infrastructure in Edmonton

Solution Description and Objectives

The Sidewalk Strategy (Ped Connections: A Strategy for Sidewalk Infrastructure in Edmonton) proposes a thorough program for the identification and construction of missing pedestrian infrastructure including sidewalks, curb ramps, and pedestrian links to transit. By implementing the Sidewalk Strategy, the City of Edmonton would have a systematic approach to prioritizing and funding the construction of missing and discontinuous pedestrian links that currently exist for residential, commercial, and industrial areas of Edmonton. The Sidewalk Strategy also allows residents to easily report sidewalk and pedestrian infrastructure hazards. This solution would improve the connectivity and accessibility of the existing pedestrian network by providing continuously accessible sidewalks that enhance access to destinations and employment areas.

Barrier(s), Root Cause(s), and Transect(s) Addressed

Implementation of the Sidewalk Strategy addresses the barrier of missing pedestrian accessibility features. This solution addresses the root cause of funding shortages and allow for timely, systematic improvements to the connectivity and accessibility of the existing pedestrian network in the city including industrial areas. The solution impacts the Downtown, Pedestrian Commercial Area, Mature Stressed, Mature Stable, and Inner Suburban transects.

How, Where, and Why It Works

From the Sidewalk Strategy, about 3,670 km of sidewalks are physically absent along roadways in Edmonton in addition to approximately 10,000 absent curb ramps and 1,700 bus stops that are not connected to the sidewalk system. These deficiencies limit connectivity and accessibility of the pedestrian network in Edmonton. Implementation of the Sidewalk Strategy would result in the construction of missing sidewalks, missing curb ramps, and connecting bus stops throughout the residential and commercial areas of Edmonton over the next 20 years in addition to constructing sidewalks in industrial areas along transit routes.

Ease of Implementation

The infrastructure improvements portion of the Sidewalk Strategy will require approval from the Transportation Public Works Committee and City Council as well as continued budget allocations in forthcoming budgets.

5.7.1.2 Solution: Conduct Walkability Audit of Plans For New Neighbourhoods During Development Review

Solution Description and Objectives

To ensure pedestrian infrastructure does not continue to be inadvertently excluded in plans for new neighbourhoods in Edmonton, a walkability audit should be completed during the Neighbourhood Structure Plan (NSP) stage for new neighbourhoods or for large scale redevelopment projects. The walkability audit would review pedestrian connectivity proposed by the plan, ensuring continuous pedestrian routes are provided, bus stops are connected with the sidewalk system, and walking distances are minimized as well as providing an overall evaluation with regard to important walkability elements such as density, transit service, and mixture of uses. Completing the audit at the NSP stage allows the review to consider both a more detailed street network as well as larger scale connectivity with surrounding neighbourhoods while limiting the occurrence of missing pedestrian infrastructure.

Barrier(s), Root Cause(s), and Transect(s) Addressed

Completing a walkability audit for NSP or large redevelopment submissions addresses the barriers of missing pedestrian accessibility features. The solution specifically targets the root causes that have created discontinuous and limited connectivity pedestrian networks in the past by putting in place a process to review and recommend pedestrian connectivity in planned neighbourhoods prior to their development. This solution primarily targets the barriers in the Outer Suburban transect but also areas in other transects for which redevelopment plans are prepared.

How, Where, and Why It Works

The solution would address and identify pedestrian deficiencies in neighbourhood plans prior to their development. This will minimize the cost of retrofitting existing neighbourhoods to include continuous pedestrian networks and the numerous negotiations and approvals required from

each property owner. By approving this approach, consistent application and review of pedestrian connectivity practices can be completed by consultants and City staff which would provide pedestrian connectivity and accessibility consistently throughout Edmonton.

Ease of Implementation

The NSP and large redevelopment application and approval process will have to be amended to obligate the completion of a walkability audit. The walkability audit could include Walkability Strategy neighbourhood design and connectivity recommendations relating to maximum block lengths, maximum block sizes, achieving a specified range for connectivity index, and providing pedestrian 'breezeways' at ends of all culs-de-sac while also limiting the number of culs-de-sac for neighbourhoods.

This solution would require negotiation with stakeholders and City department's, formalization of requirements, and approval by City Council. The development industry may support and informally apply the requirements to NSP and large redevelopment submissions prior to official approval by City Council.

5.7.2 Barrier: Sidewalk Snow Removal Not Completed

Input from the public and stakeholder consultation completed for this project (and the Sidewalk Strategy) indicates that more can be done to improve snow removal clearing practices in the city. Community Standards Bylaw #C14600 requires that property owners are responsible for removing snow and ice within 48 hours along sidewalks adjacent to their property. However, there are many instances where property owners do not clear their sidewalks, making them inaccessible for many users, and creating pedestrian safety hazards. These deficient snow removal practices in Edmonton have been created or perpetuated for a number of reasons including the following root causes:

- Property owners are required to clear their own sidewalks because the City of Edmonton does not have the financial resources to pay for snow removal.
- Property owners are unaware of their responsibilities, or unwilling to fulfill them.
- Bylaws are poorly enforced.
- Property owners are physically unable to clear snow or ice.

The following solutions have been identified to address the identified root causes.

5.7.2.1 Solution: Increase Compliance With Existing Bylaws on Snow Removal

Solution Description and Objectives

Ensuring adequate enforcement of Community Standards Bylaw #C14600 would improve accessibility and walkability by imposing an appropriate penalty for noncompliance on property owners that do not remove the snow and ice defined in the bylaw. Their exhibited noncompliance impacts the mobility and safety of residents and a focus on compliance would

also increase the awareness to all residents of their responsibilities and the importance that snow clearing has on mobility.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of uncleared sidewalks and the root causes of limited enforcement and unawareness of property owner responsibilities, which applies to all transects.

How, Where, and Why It Works

As of January 2009, the City of Edmonton has increased the number of Community Standards Peace Officers to supplement the City's bylaw enforcement team. The additional officers will increase the capacity of bylaw enforcement to address the concerns of citizens with respect to meeting bylaw regulations including snow removal as specified in Community Standards Bylaw #C14600.

Ease of Implementation

Implementation is relatively straightforward and could potentially be initiated utilizing the recent increase in bylaw enforcement officials.

5.7.2.2 Solution: Initiate Community-Based Snow Removal Program

Solution Description and Objectives

A community-based snow removal program would assist property owners with snow removal for those that are physically unable to do so. These property owners would add their name to a list that could then be assigned to a snow removal person or team. The snow removal team could be individuals or youth / community groups who could complete the work for free or for fundraising purposes, with funds being contributed by the property owner, the City of Edmonton, or some combination depending on the ability of the property owner to pay (e.g. due to fixed or limited income). A community-based snow removal program will improve accessibility, mobility, and walkability along sidewalks by providing assistance to property owners that cannot physically meet their responsibilities as defined by Community Standards Bylaw #C14600.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of uncleared sidewalks and the root cause that property owners are physically unable to clear the snow and ice from their sidewalks. The solution applies to all transects.

How, Where, and Why It Works

This solution could be incorporated into or be used to augment the existing Snow Angels Program. The Snow Angels Program is a recognition-based program for citizens that adopt a senior's sidewalk for the winter and ensure that it is clear of snow and ice. People that participate in the program can be nominated as a Snow Angel and receive a letter and pin for contributing to keeping sidewalks clear of snow and ice. Programs similar to the community-

based snow removal for the purposes of fundraising have existed in Saskatchewan and other jurisdictions to remove garbage from highway ditches.

Ease of Implementation

Implementation would require negotiations and research to define the program in addition to funding approval. The first stage of this solution could be to expand Edmonton's existing Snow Angels Program.

In addition, the Seniors Association of Greater Edmonton (SAGE) has commissioned a report regarding home service programs for seniors including snow removal. Recommendations from this report could reduce the need for the City of Edmonton to design a snow removal program if the SAGE report has one that is acceptable for the City.

5.7.3 Barrier: Inaccessible and Interrupted Pedestrian Networks during Construction

The pedestrian network can be disrupted during roadway construction projects and even some building construction projects. A vehicle traffic management plan is a requirement of construction projects that will disrupt roadway operations and the management plan is required to outline the provisions to be made for safe and accessible pedestrian movements. However, there are currently very few specific requirements of the traffic management plans in terms of what defines an adequate temporary pedestrian route. Enforcement of the traffic management plan does occur but does not typically see the application of penalties if the pedestrian route is not safe and accessible. This can impact the mobility, connectivity, and accessibility of the pedestrian network particularly for people with disabilities and those using mobility aids.

This barrier has been created or perpetuated primarily from a lack of rigid requirements for the provision of temporary pedestrian routes as part of the traffic management plan and a lack of enforcement to ensure that the pedestrian route indicated in the traffic management plan is actually provided. The following solution could be implemented to address the root cause that has created this barrier.

5.7.3.1 Solution: Improve Requirements for Safe and Accessible Pedestrian Routes and Access to Transit in Conjunction with Construction Projects

Solution Description and Objectives

A review should be completed to establish firm and consistent requirements for temporary pedestrian routes, including access to transit, during construction projects to augment the current approaches taken by the Transportation Department. This will ensure that all construction projects that impact the pedestrian network will be evaluated consistently and that the requirements are understood by contractors and those involved in construction. In addition to strengthening the pedestrian requirements, penalties for noncompliance with traffic management plans should also be established. This will help further emphasize the importance of providing a safe and accessible pedestrian route when construction projects impact the pedestrian network.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of inadequate temporary pedestrian networks during construction as caused by lack of firm requirements and enforcement. The solution applies to all transects including developing neighbourhoods in the outer transect.

How, Where, and Why It Works

As stated, pedestrian accommodation during construction is a requirement of the traffic management plan for the City of Edmonton. However, enforcement and specific requirements could be improved. A good example of that Edmonton could reference is Salt Lake City's Guide for Pedestrian Accessibility in the Public Way during Construction. The Salt Lake City guide explicitly states the obligations of the contractor regarding alternate circulation paths for pedestrians, barricade locations, warnings and signage, and temporary traffic control plans (Esham, 2005). In addition, the intention of the Salt Lake City guide is to ensure compliance with the Americans with Disabilities Act which protects the rights of people with disabilities including the right to access public places such as the transportation system.

Ease of Implementation

Implementation would require an initial definition of the specific requirements for pedestrian routes that would be included in the traffic management plan as well as the appropriate penalties should the requirements not be implemented. The application and enforcement of these requirements and penalties would be incorporated into the regular review of traffic management plans and on-site inspections.

5.7.4 Barrier: Inadequate Crossing Time for Pedestrians at Signalized Intersections

Traffic signal timing plans include a check that pedestrians can cross the intersection during the green phase of the parallel through movements. If inadequate time exists, the length of the phase is increased. The City of Edmonton typically calculates the time required for pedestrians to cross the intersection based on a walking speed of 1.2 metres per second (m/s) though does use 0.9 m/s if there are special considerations. For some users, 1.2 m/s does not allow enough time to cross the street during the walk and flashing don't walk (or clearance) time provided. As our population ages, the average walking speed of the population will decrease, further impacting the time required for pedestrians to cross intersections. The root causes of inadequate crossing times for pedestrians at signalized intersections include the following:

- Use of outdated average walking speed data to calculate pedestrian crossing time requirements that is not based on current and projected demographics.
- Limited emphasis in traffic signal timing to review pedestrian user characteristics and limited or insufficient data regarding pedestrian users at intersections.

The following solutions could be implemented to address the above root causes.

5.7.4.1 Solution: Assess Walking Speed Used for Intersection Signal Timings

Solution Description and Objectives

Ensuring that walking speeds for signal timing calculations are consistent with pedestrian users will improve walkability by providing enough time for these users to cross the road. A two stage calculation to determine the amount of time required for pedestrians to cross a road is recommended consistent with proposed changes to the U.S. Manual of Uniform Traffic Control Devices (MUTCD). Walk speeds of 1.1 m/s would be used to calculate pedestrian clearance time and 0.9 m/s to calculate the combined walk and clearance time. In addition, surveys of the walk speed of pedestrians using the crossing or in the vicinity should be completed to validate the walk speed of users.

Using the MUTCD or a similar approach for determining pedestrian walk speeds will improve walkability by using walking speeds that are more consistent with those of the pedestrian users of the crossing. Increasing the amount of time allocated to pedestrian crossings may impact the level of service for vehicles marginally but will increase the safety and comfort of pedestrians that have disabilities or require more time to cross the street than is currently provided (e.g. children and seniors).

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of inadequate time for pedestrian crossings and the root causes that outdated walk speeds are used in analysis in addition to insufficient data regarding pedestrian users. The solution applies to all transects in Edmonton and in particular near land uses where users travel at walking speeds lower than the average.

How, Where, and Why It Works

The Canadian Capacity Guide for Signalized Intersections suggests the use of a 1.2 m/s walk speed or 1.0 m/s but state lower pedestrian speeds may be appropriate in special circumstances (Teply et al., 2007). Recent proposed changes to the Federal Highway Administration's Manual on Uniform Traffic Control Devices recommend a two step process for calculating minimum pedestrian crossing requirements (U.S. Department of Transportation, 2007).

- Calculate the pedestrian clearance time (the flashing hand time) based on a 1.1 m/s walking speed with lower speeds to be considered where data supports pedestrians walking at slower speeds (e.g. locations routinely used by wheelchair users).
- The total pedestrian walk interval and pedestrian clearance time should allow a pedestrian to walk from a point 1.8 m from the face of curb or edge of pavement to the far side of the traveled way at a speed of 0.9 m/s. Any additional time required to meet this criteria should be added to the walk interval.

Ease of Implementation

Implementation of the revised walking speed could occur during the City's four year traffic signal retiming cycle. Educating the transportation industry of this change would have to be completed but could be easily administered by the City of Edmonton during the review of traffic signal timing plans and transportation impact assessments. This policy change could also be reflected in the Roadway Planning and Design Objectives when revisions resulting from other solutions are completed in addition to possibly requiring revisions to the City's Pedestrian Control Guidelines. Collection of pedestrian characteristics may be more time consuming to collect and should be completed on a case-by-case basis and could be completed in conjunction with turning movement traffic counts.

5.8 PEDESTRIAN SAFETY & PERSONAL SECURITY

A factor in the decision to walk is the perception that an area feels 'safe'. The level of pedestrian safety of the transportation system, whether as a result of real or perceived threats, is based on a number of considerations including vehicle speeds, vehicle volumes, distance between pedestrians and vehicles, and lighting for visibility which can impact the frequency and severity of vehicle-pedestrian collisions. The perceived or real level of personal security of the pedestrian system also helps establish the level of comfort that pedestrians feel and, if lacking, their willingness to walk. Factors affecting personal security include crime rates, insufficient lighting, and the amount of undesirable or illicit activity. This section discusses barriers, root causes, and solutions associated with pedestrian safety and personal security.

5.8.1 Barrier: Lack of Focus on Improving Personal Security and Pedestrian Safety

The existence of social issues and crime, to be found in every city around the world, has an impact on the desire to walk, particularly in areas where there are few destinations or uses that attract people and provide opportunities for people to engage in positive activities. These social issues include fear of street crime and observation of undesirable street activity, and lack of on-street police presence.

Likewise, the impression of pedestrian safety can affect the desire to walk and is influenced by uneven or missing sidewalks, speeding vehicular traffic, and high volumes of traffic, trucks or other heavy vehicles. These factors alone do not always instill a feeling of being threatened by traffic; however, the combination of factors such as insufficient sidewalk width and buffers from traffic, and a lack of marked pedestrian crossings can reinforce the perceptions of a street being unsafe for pedestrians.

In Edmonton, the public and stakeholder input gathered during this project and the Sidewalk Strategy indicates that not enough has been done to improve the safety and security of the city for pedestrians. Though security issues may be more pronounced in Mature Stressed areas and the Downtown, pedestrian safety issues occur throughout Edmonton with concerns over missing and uneven sidewalks and speeding vehicles along residential and commercial streets. This

perception is further fueled with statistics and news reports indicating growth in crime and vehicle collisions involving pedestrians.

The reported growth in these indicators has caused the perception by the public that the City of Edmonton, Edmonton Police Service, and other traffic safety and personal security agencies are not doing enough to address these issues. In some cases, these issues have not been adequately addressed by the City or other organizations in a timely manner.

The following solutions could be implemented to address the above pedestrian safety and personal security barrier and causes.

5.8.1.1 Solution: Support the Office of Traffic Safety Pedestrian Safety Initiatives

Solution Description and Objectives

The Office of Traffic Safety is working on an integrated, evidence-based approach to addressing traffic safety issues in Edmonton, including pedestrian safety, by implementing the Traffic Safety Strategy for the City of Edmonton 2006-2010. Reducing road danger for pedestrians is a key element of walkability and the Office is working actively on introducing community-based and driven programs to address traffic safety issues at a community level. Recent programs that are being piloted include neighbourhood speed boards, community photo radar vans for speed limit enforcement, and a neighbourhood pace car program. The Office is also involved in re-engineering roadway and intersection geometric design practices. Ongoing collaboration with the Office of Traffic Safety will ensure an integrated approach to improving safety for pedestrians in Edmonton.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses pedestrian safety considerations throughout Edmonton in all transects by carrying out a comprehensive work plan to mitigate identified pedestrian safety issues.

How, Where, and Why It Works

The Traffic Safety Strategy for the City of Edmonton 2006-2010 provides a comprehensive and holistic approach to resolving traffic and pedestrian safety issues in Edmonton based on an integrated, evidence-based approach to defining solutions. The strategy has four specific targets including reducing the number of intersection-related collisions and reducing speed-related collisions, both significant contributors to pedestrian safety (City of Edmonton, 2005b).

Ease of Implementation

The work of implementing this solution is straightforward as the actions are already under way. Implementation could be done immediately and is already being initiated.

5.8.1.2 Solution: Walkable Edmonton to More-Actively Participate in Existing Initiatives Focused on Personal Security

Solution Description and Objectives

The City of Edmonton's ten year strategic plan identifies livability as a key principle, noting a sense of personal and community safety and overall social order as a vital element. The goal to improve Edmonton's livability includes emotional health and well-being (e.g. personal security) as a measure of its quality of life improvement. The active participation of Walkable Edmonton in ongoing Edmonton personal security (or community safety) initiatives will be an important component to improve walkability throughout Edmonton and particularly in stressed areas. The breadth of existing initiatives allows Walkable Edmonton to be immediately and effectively involved in addressing issues concerning personal security.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of personal security to walkability. The solution applies to all transects and is particularly focused on the Mature Stressed transect, Downtown, and areas for which revitalization projects exist or are being planned.

How, Where, and Why It Works

The City of Edmonton has a number of initiatives that are working to improve personal security. Some of these initiatives have been ongoing for a number of years and some have been more recently implemented to address concerns around personal security and community safety. The following are a number of the initiatives that are currently ongoing in Edmonton for which this solution would apply.

- In September 2008, Mayor Mandel struck the Edmonton Taskforce on Community Safety to coordinate a ten year strategic implementation plan with a focus on preventative rather than punitive solutions. This plan will come to City Council in June 2009 and will define strategic initiatives and targeted efforts to realize a more connected, coordinated approach to community safety and preventing crime.
- Safedmonton (formerly Safer Cities) brings together key players within the City administration and the community around the topic of crime prevention. Founded in 1989, this initiative has fostered and supported many innovative ideas that have flourished and become an integral part of the community. These include: Youth Justice Committees, Success by 6, the Safewalk program at post secondary schools, the Safe Needle Disposal Program, the Good Neighbour Awards, and social marketing campaigns like Fight Violence and Looking Out for Each Other.
- The Edmonton Police Service, in cooperation with Safedmonton and a number of City departments, offers an annual Crime Prevention through Environmental Design (CPTED) course for City Staff from a range of professions to incorporate CPTED principles into their daily work.

- The City provides high level leadership through the Community Safety Leadership Council led by the City Manager. It brings together eight key civic leaders from school boards, the police department, the justice and court system, and the university to take a big-picture approach to working more collectively and effectively on community safety.
- All departments of the City of Edmonton contribute to safety and crime prevention in some way including: Capital City Clean Up, Edmonton Transit Peace Officers, Neighbourhood Empowerment Teams, Spousal Violence and Elder Abuse Intervention Teams, Bylaw Enforcement, Park Rangers, and the Responsible Hospitality Initiative.
- The Community Services Department has initiated a number of Neighbourhood Revitalization projects to help improve the quality of life in a neighbourhood or area in order to create and sustain vibrant communities. Many of the strategies identified through the Neighbourhood Revitalization programs deal with making the streets safer, eliminating crime and prostitution in the area, and encouraging strong revitalization. Neighbourhood Revitalization is an integrated approach that addresses social, environmental, and economic aspects of the community.
- The Great Neighbourhoods Program is a new initiative that will further coordinate City work on a neighbourhood level, which is a pivotal point of citizen and community safety.

Ease of Implementation

Implementation of this solution is straight forward, as the actions are already under way, and could be done immediately.

5.8.1.3 Solution: Promote Personal Security and Pedestrian Safety Initiatives

Solution Description and Objectives

As Solutions 5.8.1.1 and 5.8.1.2 indicate, the City of Edmonton has numerous initiatives that are currently underway to improve the pedestrian safety and personal security of the community. However, residents of the community are typically unaware that these initiatives exist. This solution would publicize the significant investment in pedestrian safety and personal security that the City of Edmonton is currently making. The exact process for promotion and publicizing the initiatives would be defined based on consultation with Walkable Edmonton, the Office of Traffic Safety, the Taskforce on Community Safety, and City departments, but could be a mix of an annual report summarizing the programs / results, a website, newsletter, and press releases.

Barrier(s), Root Cause(s), and Transect(s) Addressed

Promotion of all the pedestrian safety and personal security initiatives that the City is currently undertaking addresses the misperception in the community that serious action is not being taken to address these issues. The solution applies to all transects.

How, Where, and Why It Works

The City of Edmonton has already initiated promotion of initiatives for both the Avenue Revitalization Initiative (118 Avenue) and the Jasper Place Revitalization including postings on

the City's website, advertisements of events and programs in Edmonton newspapers, and Revitalization reports such as the monthly Stony Plain (Road and Area) Urban Revitalization Report that is distributed to all households and businesses in the communities surrounding the initiative.

Ease of Implementation

Implementation of this solution will require the collection and integration of the various initiatives and the measured impact (or perceived in some cases) that the initiatives are having. Most of these initiatives are likely preparing yearly reports as part of their operation, therefore compiling the information will take time but can be implemented immediately.

5.8.1.4 Solution: Pilot Program for Pedestrian Priority Zone / Corridor

Solution Description and Objectives

A pilot program for a pedestrian priority zone/corridor should be undertaken in conjunction with an existing Revitalization project. The pedestrian priority zone could incorporate a number of infrastructure, aesthetic, and programming improvements to help test their impacts on walkability, quality of life, and success of revitalizing the area. Improvements could include pedestrian-level lighting, signal timings based on pedestrian movements, streetscape improvements and street furniture, active building frontages, public space programming, and planning to accommodate street vendors.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution provides a case study example for how various engineering, architectural, and programming solutions can impact the pedestrian safety and personal security of an area and helps to promote and highlight City initiatives regarding these issues. The solution applies to the specific location of the pilot program, but would likely be located in a Mature Stressed transect or a revitalizing corridor in the Pedestrian Commercial Area transect.

How, Where, and Why It Works

Both the Avenue Initiative Revitalization (118th Avenue) and the Jasper Place Revitalization identified a number of improvements that would typically be incorporated into a pedestrian priority corridor including streetscape improvements, curb extensions, pedestrian crossing improvements, pedestrian-level lighting, and public space programming. These projects are in the process of implementation. In terms of the effectiveness and application of focusing on pedestrian movements over vehicle movements, the cities of Toronto, Kelowna, and Vancouver all have completed traffic signal timings to focus on and facilitate the efficient flow of pedestrians along the corridor to minimize their delay. These types of signal timing plans can be time-specific based on activity and pedestrian demands.

Ease of Implementation

Implementation of a pilot pedestrian priority corridor would require the collaboration and consultation of numerous City departments.³¹ However, by implementing the pilot as part of a Revitalization initiative, these departments would already be engaged, easing the implementation and work load for the departments. Implementation would be dependent on the overall timing of the Revitalization Initiative.

5.9 STANDARDS AND TOOLS

The City of Edmonton has established standards and tools to plan, evaluate, and design the city. These include the Zoning Bylaw, Traffic Bylaw, Design and Construction Standards, and Roadway Planning and Design Objectives. City departments also rely on data and industry best practices recommended by respected organizations such as the Institute of Transportation Engineers, Transport Canada, and the Federal Highway Administration, including trip generation rates for developments. This section discusses barriers, root causes, and solutions associated with these standards and tools.

5.9.1 Barrier: Outdated Standards and Tools

Though the City of Edmonton employs a number of thorough standards and tools, which are applied by many municipalities across North America, many of these standards and tools are outdated. The philosophy and context in which many were written or the data that were referenced when the standards and tools were created are inconsistent with the City of Edmonton vision for a sustainable city. The Zoning Bylaw, Traffic Bylaw, Design and Construction Standards, Roadway Planning and Design Objectives, and Pedestrian Control Guidelines have all been identified as requiring revision to create support within the City's standards and tools for the fostering of a sustainable and walkable community. In addition, the trip generation rates used to project the transportation impacts of proposed developments should also be revised. This barrier has been primarily caused by not updating these standards and tools to:

- Reflect Edmonton's shifting goals and objectives;
- Proactively address structural issues within City processes that impact walkability, livability, and sustainability; and to
- Incorporate changes in resident behaviour.

The following solutions could be implemented to address the above barrier and root causes.

³¹ See Section 5.10 for discussion of department collaboration and integration.

5.9.1.1 Solution: Revise Outdated Standards and Tools to Encourage Walkability

Solution Description and Objectives

The following have been identified for revision based on the solutions noted.

- **Zoning Bylaw #12800:** Solutions 5.1.1.2, 5.1.3.1, 5.2.2.1, 5.2.4.1, 5.3.1.1, 5.3.1.2, 5.4.2.1, and 5.6.1.1.
- **Traffic Bylaw #5590:** Solutions 5.4.1.5 and 5.7.2.1.
- **Design and Construction Standards:** Solutions: 5.2.4.2, 5.4.1.1, and 5.4.1.3.
- **Roadway Planning and Design Objectives:** Solutions 5.1.2.2 and 5.7.4.1.
- **Pedestrian Control Guidelines:** Solutions 5.4.1.4 and 5.7.4.1.
- **Trip Generation Rates:** Solution 5.1.2.1.
- **Creation of TDM & Parking Management Strategy:** Solutions 5.5.1.3 and 5.6.1.2.

5.10 DEPARTMENT INTEGRATION & OPERATION

The integration, cooperation, and operation of City of Edmonton departments directly impacts the definition and application of standards and the processing of submissions. An efficient and coordinated team of transportation and planning professionals is required to create a walkable community due to the extensive overlap between transportation planning/design and land use planning/development. This section discusses barriers, root causes, and solutions associated with the integration and operation of City departments.

5.10.1 Barrier: City of Edmonton Not Working As Fully Integrated Organization

Operation of City departments, and among sections within departments, is currently quite segregated and is often only completed by circulating reports to impacted departments. Decisions from one department, branch, or section may or may not be made with consultation and collaboration from other departments, branches, or sections, thus potentially impeding progress toward City / community objectives. The result is that approvals of proposals and creation of plans, initiatives, or standards take extensive time to complete as each separate section, branch, and/or department reviews proposals following the review and approval by other sections / branches / departments. This is particularly the case with innovative proposals that require approving variances of the typical City standards or guidelines such as mixed-use developments or neighbourhood plans.

The primary root cause of this barrier is the lack of formal integration between the City departments, and branches and sections within departments (e.g. Sustainable Transportation Section within the Transportation Planning Branch of the Transportation Department).

The following solution should be implemented to address the root cause that has created and is perpetuating the barrier.

5.10.1.1 Solution: Create Integrated Interdepartmental Review Process

Solution Description and Objectives

Creating an Integrated Interdepartmental Review Process that include representatives from relevant departments, branches, and sections is required to improve the communication, integration, and coordination of the City organization to consistently and thoroughly apply standards to achieve the organization's goals and objectives. The solution could create Integrated Interdepartmental Teams that would specialize in the review of specific types of proposals / submissions, particularly for specialized situations like TOD and mixed-use developments, but also neighbourhood plans for which transit service must be coordinated with land use development. This would also help to streamline the review of proposals, decreasing the barriers that long timelines impose on developers and the added cost that currently accompanies proposals with progressive initiatives.

Barrier(s), Root Cause(s), and Transect(s) Addressed

An Integrated Interdepartmental Review Process addresses the barrier and root cause of lacking integration and coordination between and within City departments. The solution applies to all transects, but an Integrated Interdepartmental Team may have a focus on a particular area which may not be located in all transects.

How, Where, and Why It Works

The City of Edmonton has created Integrated Services Teams in the past to address issues where overlap in responsibilities and coordination is required between departments. Integrated Services Teams have shown to improve communication and coordination between groups and expedite the review and approvals process as can be witnessed through the teams created to spearhead the neighbourhood/corridor revitalization program for the Community Services Department. In addition, the updates to the updated MDP and TMP were completed in a coordinated manner due to the linkages between land use planning and transportation. This cooperation and integration should be continued during the implementation of these plans.

Ease of Implementation

The creation of an Integrated Interdepartmental Process / Teams would require a proposal and approval from the relevant departments for each team. The Great Neighbourhoods program may provide the opportunity to implement this solution with greater ease.

5.11 FUNDING & MONITORING THE EFFECTS OF INVESTMENT

Funding is an essential element of any plan, program, or project. The funding of projects by organizations typically reflects the priorities, goals, and objectives of the organization. For municipal governments, funding of organizational priorities is increasingly important due to the

limited amount of funds that are available and the multitude of funding needs. Priority projects must be funded to create the city that is envisioned by its residents, administration, and politicians. This section discusses barriers, root causes, and solutions associated with funding.

5.11.1 Barrier: Lack of Funding and Value Placed on Walkability Investments

Funding levels in Edmonton are currently inadequate for sufficient projects or initiatives that would significantly improve the walkability of the city. Edmonton's Strategic Plan and the goals and objectives in the draft Municipal Development Plan and Transportation Master Plan clearly state the importance of creating a vibrant, healthy city by prioritizing investments in sustainable transportation modes such as transit and pedestrians and a shift away from addressing congestion by increasing roadway capacity. These goals and objectives should be reflected in the allocation of funding for investments that would improve walkability. The current relatively-low levels of funding for walkability can be traced to a number of root causes including the following:

- Lower priority has been placed on the importance of pedestrian planning and infrastructure by the City of Edmonton until recently (within the last ten years).
- Undervaluing the benefits of pedestrian and walkability investments as compared to investments in other modes, particularly automobiles.
- Investments in auto-oriented infrastructure and low-walkability developments have increased the funding needed to provide or improve walkability.
- Limited data has been collected relating to pedestrian movements, increasing the difficulty of justifying investments in pedestrian infrastructure and walkability projects.

The following solutions could be implemented to address the above root causes.

5.11.1.1 Solution: Increase and Improve Collection of Pedestrian Data

Solution Description and Objectives

A relevant solution to limited funding in pedestrian improvements is to collect more-complete data regarding pedestrian travel within Edmonton. The collected data should include all pedestrian trips, not only trips completed entirely on foot, but also those pedestrian trips that link with other modes. This would reflect that parts of most trips are pedestrian trips (e.g. getting to/from transit stops, getting to/from parking spots). The data would help to determine more-complete pedestrian travel patterns and travel behaviour of pedestrians. With improved data, stronger justifications for funding of pedestrian / walkability projects can be made.³²

³² Solution 5.1.2.1 proposes collection of trip generation data by all modes for differing types of development.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of inadequate funding by targeting the root causes of limited pedestrian data and applies to all transect.

How, Where, and Why It Works

Accurate and comprehensive data of all transportation system users including all components of pedestrian transportation is crucial to be able to provide a more rounded understanding of people's transportation movements throughout the city – where they go, at what time, by what mode. This allows for a more holistic and unbiased analysis of the full impacts of transportation projects and is required when trying to incorporate transportation indicators such as multi-modal level of service.

Ease of Implementation

Implementation of this solution could be incorporated in the Household Travel Survey by adjusting the breakdown of travel reporting to directly reflect all of the mode components that make up a trip (e.g. specifying a trip as walk – transit – walk, rather than coding the trip as transit-only). Implementation for the data collection questions should be incorporated into the next Household Travel Survey (which is typically conducted about every five years).

5.11.1.2 Solution: Increase Investment in Transit and Active Mode Infrastructure**Solution Description and Objectives**

Roads have been provided in Edmonton to accommodate the high vehicle use by residents. Some of the high use of automobiles can be attributed to inconvenient or nonexistent transportation alternatives. If initiatives are implemented to achieve the goals and objectives of the Draft Municipal Development Plan, Draft Transportation Master Plan, the Long Term Public Transportation Strategy, Sidewalk Strategy, and Bicycle Transportation Plan, greater investment and improvements to existing transportation alternatives will be a priority. This will provide Edmonton residents with greater choice and will shift residents to transit, bicycle, or walking (and to an even larger degree if coupled with higher fuel and parking costs).

This approach will also signal to the community that the City is targeting sustainable transportation and smart growth instead of vehicle dependency. This solution could be further enhanced by only funding maintenance of roads and no further expansions of the roadway system except for goods movement.

Barrier(s), Root Cause(s), and Transect(s) Addressed

This solution addresses the barrier of inadequate funding by targeting the root causes of low priorities placed on pedestrian investments, undervaluing the benefits that pedestrian and transit investments can yield, and reversing the creation of low-walkability neighbourhoods. This solution applies to all transects.

How, Where, and Why It Works

Numerous research initiatives have studied the relationship between transit service improvements/transportation system changes and ridership/travel behaviour. The elasticity of ridership or travel behavior due to transit service improvements or transportation system changes are comprehensively summarized in TCRP Report 95. Following comprehensive transit system expansions in the 1970s, data from Vancouver (with population of 740,000 at the time the data was collected) indicates that a 10% increase in bus miles resulted in about an 8% increase in ridership. Likewise, San Diego with a population of 1,200,000 experienced about a 7% increase in ridership as the bus miles increased by 10% (Evans and Pratt, 2004). Data from Massachusetts from studies completed in the 1960s indicate that new riders attracted to transit by increasing bus transit frequency could be made up of between 18% and 67% of individuals that previously drove (Evans, 2004).

Ease of Implementation

Implementation of this solution will require City Council and the City of Edmonton administration to embrace and support the sustainable transportation goals and objectives of the MDP / TMP and shift focus away from expanding roads and other major roadway improvements to accommodate automobiles. The Edmonton plans have already been completed that recommend transit, cycling, and pedestrian improvements, therefore implementation can be initiated following Senior Management and City Council approval.

6.0 Walkability Strategy Action Plan Summary

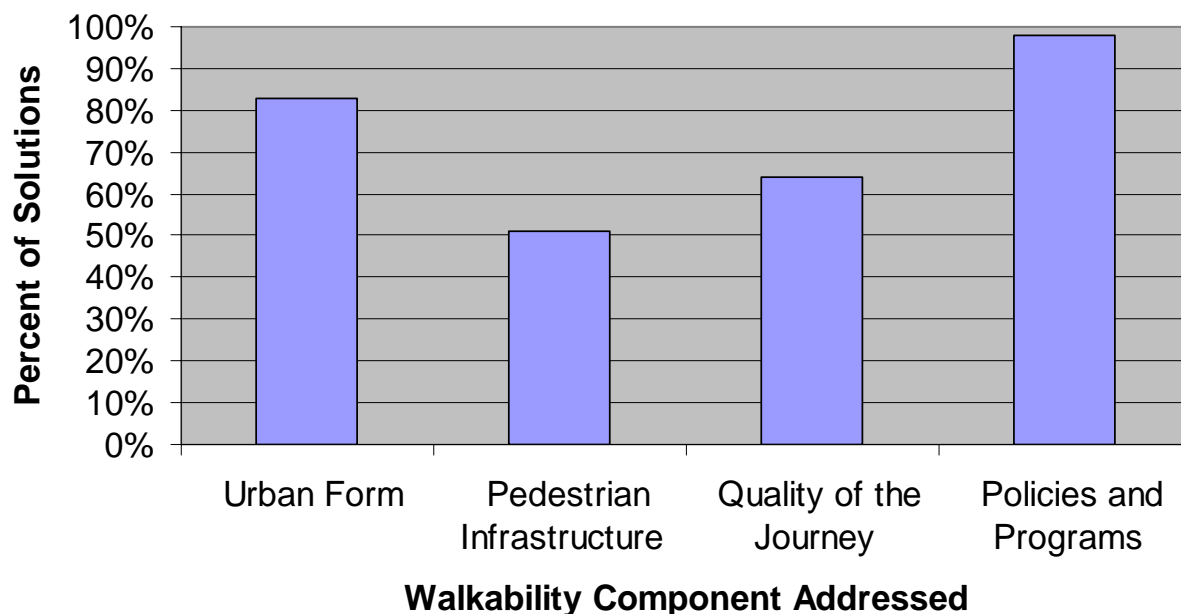
This chapter presents a summary and evaluation of the impacts of the recommended solutions detailed in Chapter 5.0. Refer to the previous chapter for details of the summarized solutions. Additional solutions that were not included in the Action Plan are summarized in Appendix C for reference and implementation if and when circumstances allow.

6.1 SCOPE OF ACTION PLAN SOLUTIONS

In total, there are 47 solutions that make up the Walkability Strategy’s Action Plan. The solutions represent a comprehensive approach to addressing issues relating to the four overarching components of walkability – urban form, pedestrian infrastructure, quality of the journey, and policies and programs.

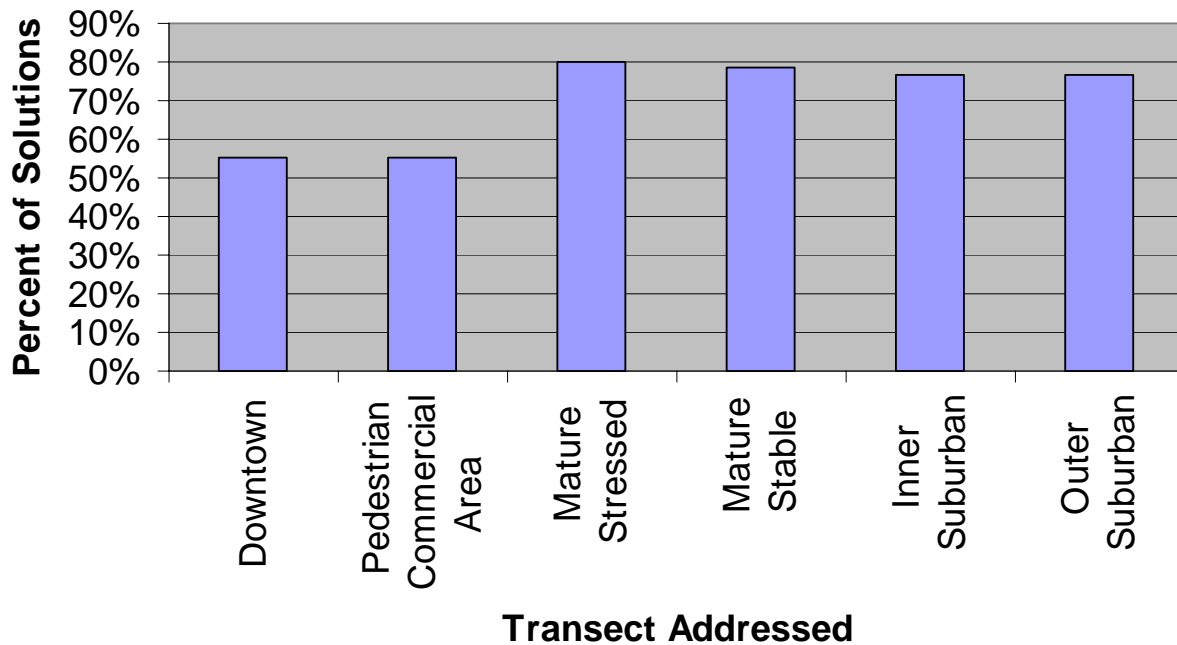
Figure 7 summarizes the percentage of all of the solutions that apply to each of the four components and clearly illustrates that each solution addresses more than one of the four overarching walkability components. As illustrated, almost all the Action Plan solutions address policy or program issues while over 80% of the solutions also address barriers related to crucial urban form barriers including density, destinations / mixture of uses, and connectivity. Overall, the Action Plan provides a thorough and diversified suite of solutions to improve walkability in Edmonton.

Figure 7: Distribution of Solutions by Walkability Components Addressed



In addition to reviewing how the 47 solutions are distributed among the four overarching walkability components, the solutions were also evaluated to determine their distribution among the six transects that were defined for Edmonton – Downtown, Pedestrian Commercial Area, Mature Stressed, Mature Stable, Inner Suburban, and Outer Suburban. As illustrated in Figure 8, between 70% and 80% of the solutions apply to the Mature Stressed, Mature Stable, Inner Suburban, and Outer Suburban transects while about 55% of the solutions relate to the Downtown and Pedestrian Commercial Area transects. Again, the solutions are diverse and many address walkability barriers that exist in multiple transects.

Figure 8: Distribution of Solutions by Transect Addressed



6.2 ACTION PLAN PRIORITIES

Due to the number of solutions in the Action Plan, an analysis was completed to establish the level of impact that each of the solutions exhibit toward improving walkability. The solutions were evaluated by determining how many of the following eleven elements were directly impacted by each solution (as identified and discussed in Chapter 4.0, Determining Edmonton's Walkability Priorities).

- Density
- Destinations
- Mixture of uses
- Connectivity
- Transit service
- Parking policy
- Accessibility
- Pedestrian safety and personal security
- Standards and tools
- Department integration and operation
- Funding and monitoring

The Action Plan solutions were grouped into lower, medium, and higher impact based on the number of elements directly impacted. Lower impact solutions directly impact up to three walkability elements, Medium impact solutions directly impact four to six elements, and Higher impact solutions directly impact seven or more walkability elements. (Refer to Appendix D for breakdown of elements impacted for each solution.)

Each of the solutions will also produce secondary results that are caused by the outcomes of the direct impacts. For example, increasing and improving the collection of pedestrian data directly impacts the walkability elements of Standards & Tools and Funding & Monitoring. The secondary outcomes of this solution will be the potential to improve density, connectivity, transit service, destinations, and other walkability elements when a more thorough understanding of pedestrian use is shaped. These secondary outcomes have not been incorporated into the impact evaluation of the Action Plan solutions.

Table 1 presents the analysis of the solutions in terms of their impact. The table also includes a definition of the estimated implementation timelines (assuming funding and resources are available) and the departments that would be responsible for leading the implementation.

The following legend defines abbreviations used in Table 1.

- ST = Short Term (up to 3 years)
- MT = Medium Term (3 to 5 years)
- LT = Long Term (more than 5 years)
- A = Asset Management and Public Works
- P = Planning and Development Department
- T = Transportation Department
- C = Community Services Department
- COE = City of Edmonton

Table 1: Evaluation of Action Plan Solution Impacts

Solution Number	Solution Description	Impact (Lower, Medium, Higher)	Approx. Implementation Timelines	Responsibility (Lead Dept. listed first)
5.3.1.6	Prepare Transit-Oriented Development Plans for Areas Surrounding LRT Stations	High	LT	P, T
5.7.1.2	Conduct Walkability Audit of Plans For New Neighbourhoods During Development Review	High	ST	T, P
5.9.1.1	Revise Outdated Standards and Tools to Encourage Walkability	High	ST	P, T, C
5.10.1.1	Create Integrated Interdepartmental Review Process	High	ST	P, T, C
5.3.1.5	Establish Program to Transform Existing Community Shopping Centres into Mixed-Use Urban Villages	High	ST	P, T
5.11.1.2	Increase Investment in Transit and Active Mode Infrastructure	High	LT	T
5.1.1.1	Manage Suburban Growth	High	ST	P, T
5.6.1.2	Implement a Parking Management Strategy	High	ST	P, T
5.8.1.4	Pilot Program for Pedestrian Priority Zone / Corridor	High	ST	C, T, P
5.1.1.3	Provide Incentives to Encourage Densification	High	ST	P, T
5.1.3.2	Locate Large Scale Redevelopments near Transit Centres and Existing Transit Corridors	High	ST	P, T
5.2.1.4	Pursue Construction of Schools, Recreation Facilities, and Other Public Destinations when New Neighbourhoods are Developed	High	ST	P, C, A
5.3.1.4	Provide Incentives to Developers for Mixed-Use Projects	High	ST	P, T
5.5.1.1	Develop and Implement Strategies to Improve Transit Service Delivery	High	MT	T
5.1.2.1	Research Appropriate Edmonton Trip Generation Rates	Med	ST	T
5.1.2.2	Revise LOS Standards for Roadway Planning	Med	ST	T
5.2.1.3	Work With School Boards and Partners on Policy & Programs To Support Walkability	Med	ST	C, T, P
5.2.4.1	Set Standards for Maximum Area of a Single Land Use	Med	ST	P
5.2.4.2	Establish Guidelines on Maximum Block Size	Med	ST	T, P
5.3.1.1	Develop a Definition of Mixed-Use in Zoning Bylaw	Med	ST	P, C
5.4.1.1	Establish Block Length Maximums	Med	ST	T, P
5.4.2.1	Adopt Requirements for Walkable Design of Commercial Developments	Med	ST	T, P
5.5.1.3	Implement Transportation Demand Management Programs	Med	ST	T, P, C

PROPOSED WALKABILITY STRATEGY FOR EDMONTON

Walkability Strategy Action Plan Summary

Solution Number	Solution Description	Impact (Lower, Medium, Higher)	Approx. Implementation Timelines	Responsibility (Lead Dept. listed first)
5.1.1.2	Establish Minimum Residential Density Targets	Med	ST	P
5.1.3.1	Implement the Residential Infill Guidelines	Med	ST	P
5.2.2.1	Establish Mixed-Use Requirements for Large Infill Developments	Med	ST	P
5.4.1.2	Establish Limits on Culs-de-sac	Med	ST	T, P
5.4.1.3	Provide Pedestrian Walkway Connections to Culs-de-sac and Loops	Med	ST	T, P
5.5.1.2	Develop and Implement a Transit Assessment Policy	Med	ST	T
5.6.1.1	Establish Parking Maximums	Med	ST	P, T
5.7.1.1	Implement Ped Connections: A Strategy for Sidewalk Infrastructure in Edmonton	Med	LT	T
5.7.3.1	Improve Requirements for Safe and Accessible Pedestrian Routes and Access to Transit in Conjunction with Construction Projects	Med	ST	T, P, C
5.4.1.4	Create Mid-block Pedestrian Crossings along Long Blocks in Existing Neighbourhoods	Med	ST	T
5.8.1.1	Support the Office of Traffic Safety Pedestrian Safety Initiatives	Med	ST	T, C
5.2.1.1	Establish a Pilot Location Efficient Mortgage Program	Low	MT	C
5.2.1.2	Create 'Live Near Where You Work' Pilot Program	Low	MT	C
5.2.3.2	Establish Incentives Pilot Program for Neighbourhood Commercial Projects	Low	ST	P
5.3.1.2	Revise Planning Framework to Target Higher Levels of Mixed-Use	Low	ST	P
5.3.1.3	Provide Leadership for Investments in Mixed-Use Development	Low	ST	COE
5.4.1.5	Allow Unconstrained Pedestrian Crossings On Local Streets	Low	ST	T
5.7.2.1	Increase Compliance With Existing Bylaws on Snow Removal	Low	ST	COE
5.7.2.2	Initiate Community-Based Snow Removal Program	Low	ST	C, COE
5.7.4.1	Assess Walking Speed Used for Intersection Signal Timings	Low	ST	T
5.8.1.2	Walkable Edmonton to More-Actively Participate in Existing Initiatives Focused on Personal Security	Low	ST	C, T, P
5.8.1.3	Promote Personal Security and Pedestrian Safety Initiatives	Low	ST	C, T
5.2.3.1	Partner with Development Industry in Research Program to Identify Successful Neighbourhood Retail and Service Developments	Low	ST	P
5.11.1.1	Increase and Improve Collection of Pedestrian Data	Low	ST	T

The summarized solution evaluation presented in Table 1 can be used by the City of Edmonton and the departments identified to create an implementation plan that takes into consideration both the impact that the solution will have as well as the length of time required to complete the solution. In this way, the implementation plan can provide a mix of higher impact and longer term solutions and lower impact shorter term solutions (and combinations in between).

6.3 MONITORING, MEASUREMENT, & EVALUATION

A performance monitoring program should also be included as part of the implementation plan that will be defined by the City of Edmonton in order to track progress toward improving Edmonton's walkability. Monitoring, measurement, and evaluation of the Walkability Strategy will be primarily based on data collected and analyzed by the Transportation Department concerning mode split, pedestrian trips, and pedestrian safety and should be aligned as much as possible to reduce costs with the Transportation Master Plan performance measures. A monitoring or status update report should be completed each year stating what solutions have been implemented and summarizing the latest data concerning pedestrian travel.

6.4 CONCLUSIONS

The Walkability Strategy provides an overview of what walkability is and what is required to create a walkable community. The Walkability Strategy provides a comprehensive, diverse, and research-based Action Plan of solutions that have been shown to address identified barriers and root causes that are impeding Edmonton's walkability. The forty-seven solutions target elements that are essential to creating a walkable and livable community by:

- Creating a supportive regulatory framework;
- Increasing residential, commercial, and employment density;
- Providing destinations and a mixture of uses (including a diversity of housing options);
- Improving connectivity between destinations;
- Providing an accessible, safe, and secure pedestrian network;
- Improving transit service; and
- Creating a more equitable transportation system.

The Walkability Strategy Action Plan aligns with many existing City of Edmonton plans, policies, and work programs while also providing additional support and rationale for concrete actions to be taken by the City of Edmonton that will improve Edmonton's walkability and livability. The successful implementation of the actions identified in the Walkability Strategy will require an integrated and collaborative approach by City of Edmonton departments and external stakeholders for which current actions and approaches provide a foundation.

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8.0 Appendices

APPENDIX A: ELEMENTS OF WALKABILITY

APPENDIX B: SUMMARY OF STAKEHOLDERS AND CONSULTATION

**APPENDIX C: CATALOGUE OF ADDITIONAL WALKABILITY
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Appendix A

Elements of Walkability

INTRODUCTION

The following Appendix provides details on the elements of walkability and are organized by overarching walkability component – Quality of the Journey, Urban Form, Pedestrian Infrastructure, and Policies and Programs.

QUALITY OF THE JOURNEY

Security – People choose to walk when and where they feel most secure. While motorists have a protective steel chassis enveloping them, pedestrians are subject to their emotions and feelings about personal security. As a result, building placement, density, street connectivity, pedestrian and street activity, and other factors contribute to a feeling of having ‘eyes on the street.’ This feeling of being secure is essential to increase, encourage, and support walking.

Building placement – Suburban setback design, empty lots, and other voids on blocks significantly dampen the desire to walk. Ideal placement positions buildings in an urban format, built very close to sidewalks. Where townhouses and homes can be set back 4.5 or even 7.5 metres, further distancing of residential properties lowers the desire to walk through an area. It is felt that classic ‘stoop’ designed buildings, where conversation with a resident is easy, provides the most comfortable and secure walking environment.

Ground level window transparency – Second in order of bringing about a ‘secure’ feeling of a street is glass doors and windows. Buildings should have 70-90% glass at ground level. In some cases, one or two buildings that create the feeling of watchfulness but lack this window percentage will work; however, even one poorly designed building can have a negative impact.

Lack of hiding places – Designers are challenged to create sufficient building articulation to make it attractive while not creating a potential hiding place. Inset doors, for example, can create an alcove where a potential mugger could lurk. Subliminally, people walking down a street see these as dangerous places. Either angling walls to these inset doors or keeping them largely flush provides the best solution.

Aesthetics – The presence of abandoned cars, bars on windows, chain link fencing, unkempt yards or buildings, litter, and broken glass – clues that may indicate that a crime has occurred – instruct people to stay away from this block, neighbourhood, or shopping district. It is important to inventory features along a walking corridor that create a negative impression, and then work for their early removal.

Safety – A key factor in the decision to walk is the perception that an area feels safe to walk to and through. Safety differs from security as safety refers to more accidental events such as tripping or pedestrian-vehicle collisions. Feeling unsafe when walking to or through a place – whether as a result of real or perceived threats – is a major barrier that must be overcome in order to increase the levels and amount of walking in a city. Safety considerations include vehicle speeds, vehicle volumes, sight lines, distance between pedestrians and automobiles, and lighting for visibility.

Convenience & Efficiency – Walkability is greatly enhanced through the combining of needs to create efficient trips. People on foot want to perform many errands at once, so the convenient placement of stores and civic services within walking distance of a home or office encourages many walking trips. For example, pharmacies, physical therapy clinics, social service agencies, medical laboratories, and other businesses that build next to health facilities capitalize on the proximity between the complementary centres, thereby increasing the opportunity for foot traffic. This eliminates the need for people to drive and park between services. The same formula holds true for commercial success, such as a number of restaurants, bars, theatres and comedy clubs all in one entertainment district. Very efficient districts allow a person to access the services more conveniently by transit (or parking once and walking between destinations), just as they do in shopping malls.

Comfort – While motorists receive many comforts such as a place to sit, climate control, and listening to music, pedestrians rely on comfort to be provided by their environment. The provision of seating, temporary wind or sun shelter, and public restrooms appeal to walking individuals and families and are especially important to seniors.

Welcome / Appeal – People receive subliminal welcoming messages when they go down a street, or into a particular building. For example, a store that invites people to bring their dog with them will have a convenient place to sit and care for their dogs. Gateways into a town centre, window dressings, and the overall appearance sets the level of welcome a person feels.

Human scale – This ‘welcome’ is also set through streetscaping. Placement of buildings, tree canopies, active building frontages, and other design features provide a human scale to streets which creates a pleasing, comfortable, and welcoming feeling. Re-scaling of blocks and town centres can help to slow motorists down by making the roads more interesting.

Character – Refers to the memorable qualities of a walk, block, or street. Designers considering the personality and features of a given walking environment are striving to make that walk unique. Character encourages people to return for special occasions, adding to the successful retail life, vitality, and social exchange occurring on a street.

Outdoor living rooms – Through careful placement of street furniture, and clustering of certain public or private space features, a series of outdoor rooms are created. Just as in any great park, wedding garden, or well landscaped public realm, people will be attracted and spend time in a variety of outdoor rooms.

Complexity – Walkability and the desire to return to a place over and over is highest where street designers achieve high levels of complexity. Wise use of color, texture, patterns, building articulation, plant materials, and signs create lasting interest and intrigue. Streets with very high complexity offer the treat of discovering new things on subsequent walks down the same sidewalk.

URBAN FORM

Scale – Walkability is greatly enhanced by compact development with many civic uses concentrated within a 400 metre radius. This is the ideal walkability scale because it is often easier to walk a distance of 5 minutes (400 metres) than it is to use other forms of travel.

Block Size – Small, compact blocks create ease in walking to destinations. Best dimensions for blocks range from 350 to 500 metres in circumference, and even more compact blocks of 250 to 275 metres can be found in cities like Portland, Oregon. Small block sizes make it easy to have quick connections to more places. Short blocks also discourage high speed auto travel.

Connectivity – Well connected community streets increases the degree of walking. High connectivity leads to more dispersed motor vehicle traffic, reduced walking distances, and easier access to transit and pedestrian attractions. Two forms of connectivity are important: internally within the community and externally to connect to other communities. This connectivity also includes having sidewalks or pedestrian walkways adjacent to residences and destinations.

Streets – All forms of roads should support walking. Neighbourhoods are primarily about access to homes, so streets internal to neighbourhoods should be narrow enough to encourage low speed movement. In recent auto-centric years, production of streets led to speeds higher than considered safe, comfortable, or desirable for neighbourhoods and town centres. Walkability depends on getting street designs comfortable and safe for walking.

Destinations – Proximity of destinations increases walkability. A range of services should be found in close proximity to housing in order to meet the various needs of the residents. These include parks (a park, plaza or open public space to gather), civic space (a park, branch library, small post office, neighbourhood office, community building, or etc.), schools, and bus stops.

Mix of Uses – Mixed-use neighbourhoods have combinations of homes, retail, employment, and civic facilities (such as schools) or all four that encourage and support pedestrian activity throughout the day. Larger districts can also support some civic use such as parks, plazas, a branch library, or other city services. It is not necessary for a single block to have more than one land use. A mixed-use corridor may include several blocks of townhouses without retail, some blocks with exclusively retail, and others with housing above retail but with destinations within a comfortable walk distance.

Residential mix – Neighbourhoods and walkability benefit from a mix of residence types. These range from single family detached properties of different sizes and proportions to single family attached dwellings, townhouses, apartments, condominiums, and adaptable and fully accessible housing units. Many neighbourhoods support 2-3 of these residence types, while some can support 4-6 varieties. The more residence types present in a community, the greater the freedom to attract and retain a diversity of people of all abilities with varied incomes and interests.

Residential, Commercial, and Employment Density – Increasing the number of people walking requires higher residential, commercial, and employment densities, where density refers to the number of residences, amount of commercial floor space, or number of employees within a specified area. Even a modest increase in residential density from 4-5 dwelling units/acre (du/a) to 6-7 du/a can bring some change. Increasing to 11-14 du/a provides support for reasonable transit service, and 22-30 du/a can result in support for a number of stores, excellent transit, and reduced potential for crime.

Transit Service – Transit can extend the legs of people to most reaches of their community, and often to other communities as well. High levels of transit service provides a transportation alternative to residents and allows people who do not drive – youth, seniors, people with disabilities – to still be mobile. Transit is successful when it is well connected by streets, has frequent service, and reaches most amenities.

Frequency and predictability – Transit service should be predictable and frequent enough that pedestrians can rely on it as a competitive mode. When times are not frequent or the arrival of a bus is uncertain, people tend to rely on using a car or other mode of travel.

Stop location – Stops and shelters can be located on the near side of an intersection, the far side, or mid-block. Location of the bus stop must be carefully selected based first on minimizing street crossings. If most destinations are on the far side of an intersection then this must be considered a high priority location. If destinations are well distributed then other safety and operational decisions are made. Mid-block crossings are often important when a major destination is in the centre of a long block.

PEDESTRIAN INFRASTRUCTURE

Walking is greatly enhanced by having an adequate system of sidewalks, ramps, stairs, and other walkways (e.g. trails).

Sidewalks – Walkways must be wide enough to accommodate two people walking comfortably side-by-side or a wheelchair or scooter. When pedestrian volumes are higher, this width must be increased to allow a person traveling the other direction to pass without having to wait.

A minimum width for residential sidewalks in moderate residential density areas is 1.5 metres. As land use densities increase an added 0.3 to 1.0 metres is supportive of walking. For commercial sidewalks, a clear walking width of 1.5 to 2.1 metres is common. This walking width excludes the first 0.6 metres next to a building (shy zone) and all areas where street furniture (trees, seating, lamps, traffic control boxes) is placed. A clear walking width of 1.0 metre is typically required for accessibility. Sidewalks should be constructed of non-slip surfaces along the path of travel such as concrete and asphalt.

Maintenance – Sidewalks should be built and maintained in an even, non-tripping, and full width condition, free of ice and snow. Materials (asphalt, concrete, etc.) should be selected for their ability to be maintained at affordable costs.

Planter strips and other buffers – People prefer to be separated from the risks of traffic, and out of the ‘splash zone.’ A planter strip is the most common solution. When on-street parking is provided this can act as a buffer. When neither a planter strip nor on-street parking is provided, bike lanes can act as an important buffer.

Accessibility – Sidewalks and walkway systems along a corridor and connecting to neighbourhoods and destinations must provide continuous support for people with disabilities and seniors. This includes the application of barrier-free and age-friendly design guidelines.

Number of curb ramps per corner – While it is cheaper and often easier to only provide one ramp per corner, this directs pedestrians toward the center of an intersection. With the use of proper corner radii, curb extensions, and other measures, it is often possible to provide much more supportive designs with two ramps per corner.

Ramps for building access or along steep inclines – Ramps are provided for a grade above 1:20 (5%) when no other direct, convenient, or easy route is available. Ramps are levelled every ten metres to allow those going up or down to have a place to rest.

Street Crossings – Street crossings are provided to get across streets at convenient locations. When volumes of vehicular traffic and pedestrians are light, there may be no specific design actions needed. As traffic and pedestrian volumes increase, more formal and specific actions are necessary.

Intersection types – Intersection traffic volume, geometric angles, sight lines, speed, and many other factors dictate the design and operational control of a pedestrian crossing. It is important that more complex intersections offer a range and selection of tools to increase the comfort and safety of pedestrians of all ages and abilities when crossing streets.

Intersection controls – For high volume streets, tools such as well marked crossings, four way stops, or signals can be used to create proper motorist yielding behaviour or create gaps. Designers are guided by manuals, engineering practices, and professional experience to come up with the proper level of intersection treatment to make crossings effective. Recent intersection control innovations include pedestrian count-down signals.

Geometric controls – Streets intersecting at 90 degrees are ideal. When streets intersect at other angles, crossing distances increase, sight lines are disrupted, and irregular operational controls are needed. Intersection geometries should keep intersections no wider than functionally necessary. Non-essential turn lanes or wider than necessary travel lanes cause delays to all who use the intersection. Poor design discourages drivers and pedestrians from using these intersections.

Pedestrian crossing widths and sight lines – Narrowing the width of pedestrian crossings through curb extensions has multiple advantages. Placed correctly, curb extensions improve the visibility of pedestrians waiting to cross the street. Motorists need adequate time to see a pedestrian and stop, and pedestrians should be able to see the motorists for the total length of

time it takes them to cross the street. Hill crests, curves, and parked cars are taken into account when assessing sight distances.

Pork chop islands – Pork chop islands are a form of road channelization used for right turning automobiles. A set of effectively placed and designed pork chop islands assist pedestrians in street crossings by significantly reducing overall street width and separating conflicts in time and place.

Curb radii – Turning radii on each corner should be kept as tight as reasonable for the design vehicle. When too wide a radius is used, turning speeds and crossing distances increase.

Mid-block crossings – Mid-block crossings are installed on existing streets where block lengths and traffic volumes are problematic. Along shopping district streets, these crossings can appear every 175 metres, while on more suburban streets they may be placed less frequently.

Transit Amenities – Transit can help make walking a competitive mode, and it is important to encourage users by designing comfortable bus stops and shelters.

Design of shelters – Transit shelters should provide shelter from the applicable elements (rain, snow, wind, cold, etc.) and be comfortable, inviting and not interrupt pedestrian flow. Since their presence along a street is well pronounced, shelters should also be attractive, distinctive, and add to the character and personality of the neighbourhood they inhabit and require adequate maintenance to be kept in an attractive condition.

Street Amenities – Streets are not complete without providing amenities for people to rest, find their way, and to otherwise feel invited to the street. Benches, garbage/recycling receptacles, newspaper racks, outdoor cafes, kiosks, signs, and other amenities should appear in a zone specifically dedicated for these uses. This zone often acts as a buffer to traffic, and separates the pedestrian from vehicular movements. In some streetscape designs using curb extensions, added furniture is placed to help ‘activate’ the corner.

Street Lighting – Adequate lighting of streets and pedestrian crossings is essential for both safety and security. Street lighting should be scaled to conditions; with low, pedestrian scale lamps in town centres, and higher lamp placements on high speed suburban roads. Main streets where people are expected to shop and linger in conversation require multiple sources of lighting. This includes pedestrian scale street lamp lighting and retail stores with lights set on timers to create a warm, attractive atmosphere. Other accent lighting is placed on buildings, in trees, and in public spaces to set a theme. This added accent lighting, as found in homes or yards, adds to the character and charm of important shopping, or other walking districts.

Driveways – Pedestrians find driveways uncomfortable if too frequent, too wide, or where entry and exit speeds are not well controlled. As a general rule, the number of driveways in a walkable community should be minimized. Pedestrians and motorists should also be guided visually to the interruption of driveways. Residential driveways should be flat across sidewalks, allowing a minimum of 1.2 metres of nearly level space (<2% grades). When block designs

include alleys, all driveways can be eliminated. When alleys are not used, planter strips allow grade transitions to occur.

Off-street Parking – Few provisions were made as town centres became suburbanized, with large numbers of abandoned lots converted to off-street parking. Poorly designed entry and exit ramps, poor edges, and large unattractive lots create visual blight, crime, and other conditions that discourage walking.

Well defined edges – Provisions for low walls, shrubs, and other landscaping reduces the blight and scary, abandoned feeling of walking along parking lots.

Vertical green – Edges and interior spaces can be made more attractive through careful placement of trees and other ground cover.

Parkades – Parkades (or parking garages) should ideally be placed on the perimeter of town centres or other districts so that motorists are converted to pedestrians early. This minimizes the number of cars and disruptions to pedestrians in the centre. Parkade entrances and exits should be kept to side street locations, minimizing the number of pedestrians in conflict with turning cars. In addition, adequate sight lines are critical to ensure pedestrian safety.

Access to Buildings – Buildings in mixed-use centres and downtowns should provide easy, direct access to pedestrians. Many suburban designs force pedestrians to enter parking lots and walk among cars to gain access and have limited accessibility for persons with disabilities.

Double front stores – Retail shops offering parking to the side or rear can provide a separate entry to the front allowing pedestrians direct access. Although many shops feel double front entries are undesirable (requires a second station for checkout, and added shoplifting concerns), large retailers have found ways to make this successful.

Passageways – Another means for assuring main street access to shops with parking in the rear is to interrupt buildings with a passageway. Design and layout of buildings allows an added array of small, competitive shops in this passageway.

POLICIES AND PROGRAMS

Encouragement and promotion of walking is dependent upon the policies, programs, and direction provided by administration and elected officials.

Design Standards and Guidelines – Design standards and guidelines for roads and transportation infrastructure should ensure that adequate facilities are provided for pedestrians including sidewalks, curb ramps, and bus shelters, including the consideration of user needs such as sidewalk width, accessibility, and other age-friendly and barrier-free considerations.

Roadway Operation Standards – Standards for the operation of the transportation system (e.g. intersection level of service) should strive to balance the needs of all users including

pedestrians. The operational standards should allow for the assessment of travel delay, travel time, and level of service experienced by all users arising from proposed changes to the transportation system.

Zoning Bylaw – Zoning legislation should be supportive of the land uses and development patterns that encourage walkability and walkable communities, and allow for the flexibility to incorporate innovation into developments.

Area and Neighbourhood Plans – Land use and transportation plans for new and existing neighbourhoods should establish the urban form elements and pedestrian infrastructure needs that allow walking to be a convenient and viable travel option for the daily and/or weekly needs of residents.

Support / Education / Marketing – Programs that support, educate, and market the benefits of walking to residents are essential in creating awareness of the impacts that individual choices (e.g. housing location, mode choice) have on people's health, cost of living, the environment, retail diversity, and many others. These programs can help to motivate residents, governments, administration, and other decision makers to adopt strategies to support walkability.

Government / Administration Support and Resources – The support and resource backing of local government and administration is a critical component to creating a walkable community. With the increasing infrastructure needs of cities, the support and prioritization of improvements targeted at pedestrians is crucial to the success of creating and transforming areas to walkable communities. Specific resources should be directed to improvements to the pedestrian realm and could be in the form of funding, personnel, and research support. This support and provision of resources should also be carried through to other key organizations including provincial and federal governments, health authorities, corporations, the development industry, and local community and business groups.

Funding – Funding is an essential component to the creation of walkable communities. Most transportation funding for the development and rehabilitation of communities is directed to auto-oriented investments. Greater emphasis should be given to investments in pedestrian-oriented infrastructure and urban form to create more walkable communities.

Implementation – Plans and guidelines that incorporate walkability can only be successful and create walkable neighbourhoods if implementation occurs. Implementation requires the support of decision makers and stakeholders, the existence of plans, and the funding required to move the plans and programs to fruition.

Appendix B

Summary of Stakeholders and Consultation

INTRODUCTION

The following summarizes the stakeholders that were contacted and consulted with as well as the consultation activities that were undertaken for the Walkability Strategy.

CONSULTATION ACTIVITIES

The following consultation activities were completed for the Walkability Strategy.

- Submission of Public Involvement Plan
- Stakeholder Meeting #1, June 12, 2008
- Working Group Meeting, July 16, 2008
- Youth Consultation, August 5 & 6, 2008
- Walkable Edmonton Committee Meeting, September 10, 2008
- Focus Group Meetings, October and November, 2008
- Stakeholder Meeting #2, December 11, 2008
- Submission and circulation of Draft Report #1, January 23, 2009
- Submission and circulation of Draft Report #2, March 20, 2009

STAKEHOLDERS

The following stakeholders were invited to attend consultation sessions and provide input on barriers, root causes, solutions, and recommendations for the Walkability Strategy.

Alberta Centre for Active Living

Alberta Centre for Injury Control and Prevention

Alberta Committee of Citizens with Disabilities

Alberta Healthy Communities

Alberta Motor Association

Business Revitalization Zones (BRZs) and Associations

- 124 Street & Area BRZ
- 97 Street & Area BRZ
- Alberta Avenue BRZ
- Beverly BRZ

- Downtown BRZ
- Fort Road & Area BRZ
- Inglewood BRZ
- Kingsway BRZ
- Northwest Industrial BRZ
- Old Strathcona BRZ
- South Edmonton Business Association
- Stony Plain Road & Area BRZ
- West Edmonton Business Association

Canada Lands Company

Canada Post

Capital Health (Alberta Health Services)

CARMA Developers

Cecil Place development

Chamber of Commerce

Christenson Developments

City of Edmonton, Asset Management and Public Works

- River Valley Parks & Trails
- Parks Planning
- Communities in Bloom
- Capital City Clean-up

City of Edmonton, City Council

City of Edmonton, Community Services:

- Walkable Edmonton
- Neighbourhood and Community Development
- Active Edmonton
- Child Friendly
- Alberta Avenue Neighbourhood Revitalization
- Chinatown Neighbourhood Revitalization
- Stony Plain Road Neighbourhood Revitalization
- Strategic Services

- Community Recreation Coordinators
- Edmonton Advisory Board on Services for Persons with Disabilities
- Recreation Facility Services
- Great Neighbourhoods Program
- Office of Community Safety
- Safe Edmonton

City of Edmonton, Deputy City Manager's Office

- Office of the Environment

City of Edmonton, Planning and Development

- Smart Choices
- Planning and Policy Services
- Downtown Plan
- Focus Edmonton

City of Edmonton, Transportation

- Development and Capital Planning
- Strategic Planning
- Sustainable Transportation
- Transportation Master Plan
- Edmonton Transit
- Office of Traffic Safety
- Roadway Design

Edmonton Area Councils and Associations

- Area Council No. 17
- Castle Downs Recreation Society
- Central Area Council
- Clareview and District Area Council
- Edmonton North District Area Council
- Grand Trunk Recreation Council
- Mill Woods Council of Community Leagues Association
- South East Community Leagues Association
- Southwest Area Council of Community

- Terwillegar Riverbend Advisory Council
- West Edmonton Communities Council

Edmonton Arts Council

Edmonton Bicycle Commuters

Edmonton Catholic School District

Edmonton Design Committee

Edmonton Economic Development Corporation / Tourism Edmonton

Edmonton Federation of Community Leagues

Edmonton NextGen

Edmonton Police Service

Edmonton Public School Board

Edmonton Seniors Coordinating Council

Edmonton Seniors Council

Edmonton Transit System Advisory Board

Edmonton Youth Council

Mature Neighbourhoods Action Group

Media Art & Design Exposed in Edmonton (MADE)

Mennonite Centre for Newcomers

Multicultural Health Brokers Co-op Ltd.

Northern Alberta Shopping Centre Association

Retail Alberta

Safe, Healthy, Active People Everywhere (SHAPE)

Seniors Association of Greater Edmonton (SAGE)

Sherrick Management

Sierra Club

Trails, Paths, and Routes Advisory Committee

United Communities

University of Alberta

Urban Development Institute

Appendix C

Catalogue of Additional Walkability Barriers and Solutions

INTRODUCTION

The following summarizes additional barriers and their related solutions that were identified through the completion of the Walkability Strategy but were not included in the priority Walkability Action Plan. These additional solutions were not included in the Action Plan for two reasons:

- They do not meet the criteria as presented in Chapter 4.0.
- They were deemed to be solutions to larger problems for which the solutions included in the Action Plan would have more effect.

The additional solutions are organized based on the four overarching components of walkability as discussed in Section 1.5, the elements of which are discussed in more detail in Appendix A.

URBAN FORM

DENSITY

Barrier: Community Opposition to Infill Developments & Intensification

- Solution: Provide Discounted Transit Passes to Residents in Large Scale Infill Developments for a Trial Period

DESTINATIONS

Barrier: Lack of Destinations as part of Infill Developments

- Solution: Plan New Neighbourhoods to Incorporate Internal Nodes of Commercial and Civic Uses
- Solution: Revise Smart Choices Review Process

Barrier: Commercial Developments Located on Large, Sprawling Sites

- Solution: Limit Size of Shopping Centres and Individual Stores

MIXTURE OF USES

Barrier: Lack of Fine-grained Neighbourhood Supportive Mixed-use Areas

- Solution: Encourage Partnerships between Developers Specializing in Different Types of Development
- Solution: Develop Parking Guidelines (Location / Number of Stalls) for Mixed-Use Areas
- Solution: Invest in Public Amenities and Services to Encourage Mixed-Use Development
- Solution: Create Neighbourhood Preservation Act to Encourage Rehabilitation of Older Homes and Construction of New Housing in Existing Urban Areas

CONNECTIVITY

Barrier: Long Block Lengths

- Solution: Revise Municipal Reserve Allocation Policy to Encourage Greenways
- Solution: Create Pedestrian Cut-Throughs along Long Blocks in Existing Neighbourhoods

Barrier: Long Traffic Signal Cycles

- Solution: Implement Half Cycle Signal Timings
- Solution: Implement Pedestrian Scramble Signals
- Solution: Take Pedestrian Signals Offline

TRANSIT SERVICE

Barrier: Uncompetitive Transit Service

- Solution: Provide Amenities and Services on Transit Vehicles to Encourage Ridership

QUALITY OF THE JOURNEY

SECURITY

Barrier: Perceived and Real Lack of Personal Security in Edmonton's City Centre

- Solution: Mount a Coordinated Effort to Minimize Impacts of Social Problems on Pedestrian Realm
- Solution: Replace Graffiti with Art

SAFETY

Barrier: Perceived and Real Lack of Safety

- Solution: Improve Paving Surfaces and Keep Walking Areas Cleared
- Solution: Undertake a Roadway Signage Strategy to Reduce Visual Clutter
- Solution: Review Speed Limit Policy to Potentially Decrease Speed Limits
- Solution: Reduce Free-flow Right Turns to Slow Vehicle Turning Speeds

Barrier: Pedestrian-Bicycle Conflicts on Sidewalks

- Solution: Implement the Bicycle Transportation Plan Update

AESTHETICS

Barrier: Unappealing Environment Discourages Walking

- Solution: Enhance the Attractiveness of the Public Realm
- Solution: Partner with Edmonton Arts Council to Create Public Art
- Solution: Work with Organizations to Identify Locations for Public Art
- Solution: Encourage Active Street Building Frontages
- Solution: Promote Development of Urban Green Spaces or Community Gardens in Undeveloped Lots

COMFORT

Barrier: Lack of Street Furniture and Amenities

- Solution: Prepare a Street Amenity Strategy

EFFICIENCY & CONVENIENCE

Barrier: Dispersed Activity Generators

- Solution: Cluster Services and Retail
- Solution: Create a Unified Trailblazing and Wayfinding System

PEDESTRIAN INFRASTRUCTURE

SIDEWALKS

Barrier: Missing Pedestrian Connections to Bus Stops

- Solution: Create Integrated Interdepartmental Team consisting of Transportation, Planning, and Edmonton Transit to Coordinate Planning of New Areas and Expansions of Transit Service

BUFFERS

Barrier: Missing Buffers between Pedestrians and Automobiles

- Solution: Revise Design Standards to make Boulevard Sidewalks Mandatory
- Solution: Incorporate On-street Parking or Bicycle Lanes as Pedestrian Buffers along Mono-walks

INTERSECTIONS/CROSSINGS

Barrier: Wide Intersections and Long Pedestrian Crossing Distances

- Solution: Establish Maximums for Number of Lanes or Roadway Width
- Solution: Limit or Prohibit Roadway Widening
- Solution: Develop Staged Roadway Expansion from Centre Outward

- Solution: Install Pedestrian Refuge Islands
- Solution: Install Curb Extensions and Convert Curb Lanes to Parking
- Solution: Increase Road Connectivity to Disperse Traffic

ACCESSIBILITY

Barrier: Sidewalk Snow Removal Not Completed

- Solution: Establish Snow Removal Public Awareness Campaign

Barrier: Inadequate Sidewalk Width

- Solution: Encourage Increased Consideration of Pedestrian Demands when Designing Sidewalks for Commercial Areas

TRANSIT AMENITIES

Barrier: Lack of Adequate and Appealing Bus Stop Amenities

- Solution: Prepare Bus Stop Amenity Strategy

LIGHTING

Barrier: Poor Lighting of Pedestrian Network

- Solution: Incorporate Pedestrian-Level Lighting in Design Standards
- Solution: Prepare Pedestrian Lighting Strategy

POLICIES & PROGRAMS

SUPPORT / EDUCATION / MARKETING

Barrier: Lack of Understanding the Impacts of Residence and Work Location Choices

- Solution: Develop Marketing and Promotion Campaign to Encourage Urban Living and Support Neighbourhood Businesses

Barrier: Lack of Tools for Public Engagement

- Solution: Develop Tools to Engage Underserved Populations in Transportation Decision Making
- Solution: Develop Pedestrian Charter
- Solution: Active Promotion of the Benefits of Walking

Barrier: Lack of Education for Children of the Benefits of Walking

- Solution: Implement Educational Programs to Encourage Children to Walk

Barrier: Not Capitalizing on Supportive Factors

- Solution: Strengthen Partnerships among Alberta Health Services, Recreation Groups, Government, and the Alberta Motor Association to Maximize Resources

Barrier: Lack of Promotion of Neighbourhood Services within Walking Distance

- Solution: Create Neighbourhood and Area Walking Maps
- Solution: Create Walking Ambassadors for Areas

Barrier: Lack of Pedestrian-Oriented Events

- Solution: Streamline Process for Holding Pedestrian Events Requiring Street Closures

FUNDING

Barrier: Lack of Funding and Value Placed on Walkability Investments

- Solution: Fund Active Modes Based on Proportional Share of Travel Activity
- Solution: Review Alternative Funding Sources
- Solution: Develop Unbiased Cost Benefit Analysis Approach for Comparison of Investments in Projects for Different Travel Modes

Appendix D

Analysis of Action Plan Impacts

INTRODUCTION

The following summarizes the impact analysis of the solutions included in the Walkability Strategy’s Action Plan. Descriptions of the solutions can be found in Chapter 5.0 while a summary discussion of the solutions can be found in Chapter 6.0. Table D.1 only includes the direct impacts and does not incorporate secondary outcomes as discussed in Chapter 6.0.

Table D.1: Impact Analysis of Walkability Strategy Action Plan Solutions

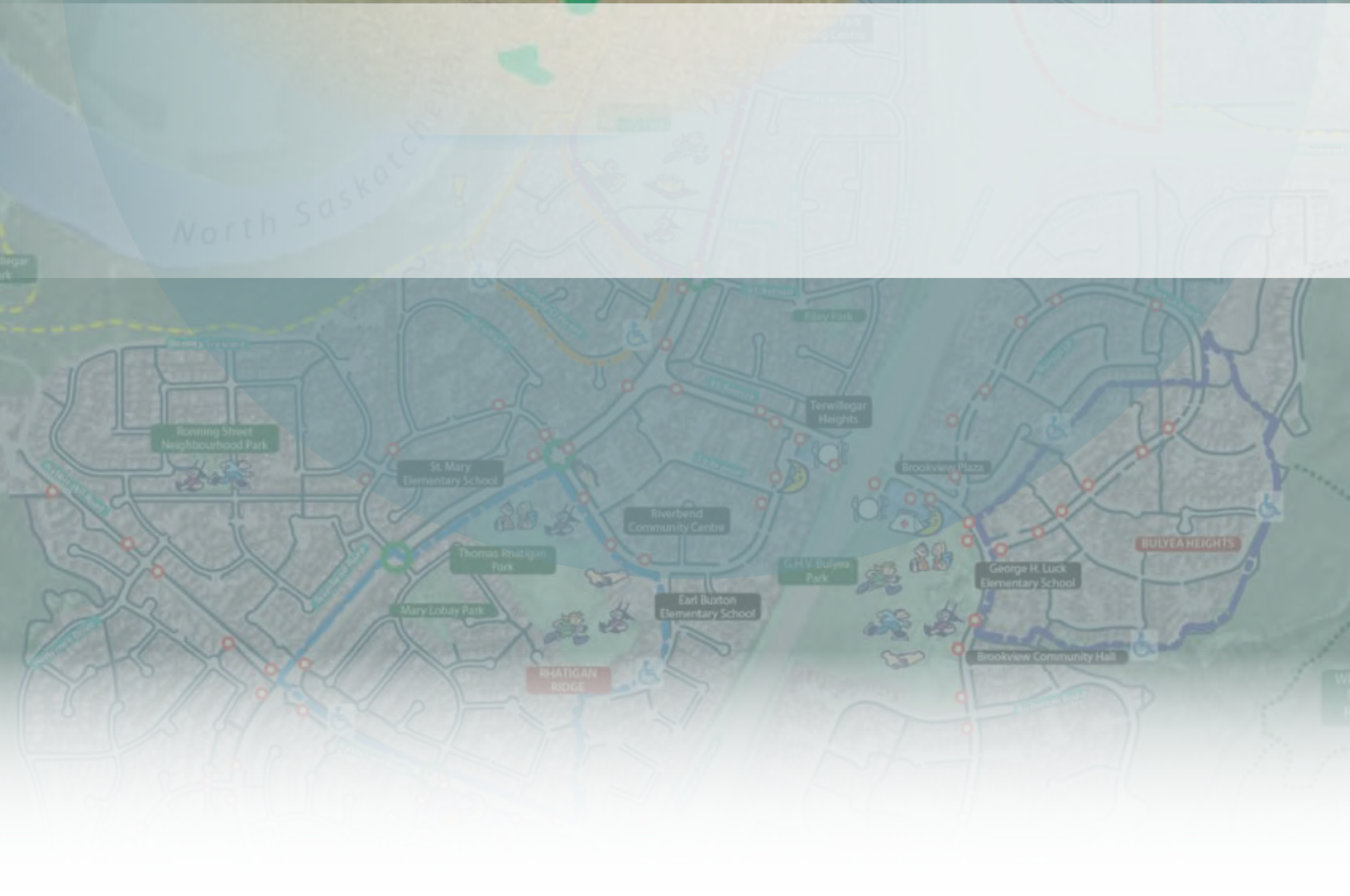
Solution Description	Walkability Elements Impacted										Impact (Lower, Medium, Higher)	
	Density	Destinations	Mixture of Uses	Connectivity	Transit Service	Parking Policy	Accessibility	Safety & Security	Standards & Tools	Dept. Integration & Operation		Funding & Monitoring
5.3.1.6 Prepare Transit-Oriented Development Plans for Areas Surrounding LRT Stations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		High
5.7.1.2 Conduct Walkability Audit of Plans For New Neighbourhoods During Development Review	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		High
5.9.1.1 Revise Outdated Standards and Tools to Encourage Walkability	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		High
5.10.1.1 Create Integrated Interdepartmental Review Process	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		High
5.3.1.5 Establish Program to Transform Existing Community Shopping Centres into Mixed-Use Urban Villages	✓	✓	✓	✓	✓	✓			✓	✓		High
5.11.1.2 Increase Investment in Transit and Active Mode Infrastructure	✓	✓	✓	✓	✓		✓	✓		✓		High
5.1.1.1 Manage Suburban Growth	✓	✓		✓	✓			✓	✓	✓	✓	High
5.6.1.2 Implement a Parking Management Strategy	✓	✓	✓		✓	✓			✓	✓	✓	High
5.8.1.4 Pilot Program for Pedestrian Priority Zone / Corridor		✓		✓	✓	✓	✓	✓		✓	✓	High
5.1.1.3 Provide Incentives to Encourage Densification	✓	✓			✓	✓		✓		✓	✓	High
5.1.3.2 Locate Large Scale Redevelopments near Transit Centres and Existing Transit Corridors	✓			✓	✓	✓	✓	✓		✓		High
5.2.1.4 Pursue Construction of Schools, Recreation Facilities, and Other Public Destinations when New Neighbourhoods are Developed		✓		✓			✓	✓	✓	✓	✓	High
5.3.1.4 Provide Incentives to Developers for Mixed-Use Projects		✓	✓			✓	✓		✓	✓	✓	High
5.5.1.1 Develop and Implement Strategies to Improve Transit Service Delivery	✓	✓		✓	✓		✓	✓			✓	High
5.1.2.1 Research Appropriate Edmonton Trip Generation Rates	✓				✓		✓	✓	✓		✓	Med
5.1.2.2 Revise LOS Standards for Roadway Planning	✓			✓	✓		✓	✓	✓			Med
5.2.1.3 Work With School Boards and Partners on Policy & Programs To Support Walkability		✓		✓	✓		✓	✓		✓		Med
5.2.4.1 Set Standards for Maximum Area of a Single Land Use		✓	✓	✓			✓	✓	✓			Med
5.2.4.2 Establish Guidelines on Maximum Block Size		✓		✓			✓	✓	✓	✓		Med
5.3.1.1 Develop a Definition of Mixed-Use in Zoning Bylaw		✓	✓	✓				✓	✓	✓		Med

Solution Description	Walkability Elements Impacted										Impact (Lower, Medium, Higher)	
	Density	Destinations	Mixture of Uses	Connectivity	Transit Service	Parking Policy	Accessibility	Safety & Security	Standards & Tools	Dept. Integration & Operation		Funding & Monitoring
5.4.1.1 Establish Block Length Maximums		✓		✓			✓	✓	✓	✓		Med
5.4.2.1 Adopt Requirements for Walkable Design of Commercial Developments				✓		✓	✓	✓	✓	✓		Med
5.5.1.3 Implement Transportation Demand Management Programs	✓				✓	✓			✓	✓	✓	Med
5.1.1.2 Establish Minimum Residential Density Targets	✓	✓			✓			✓	✓			Med
5.1.3.1 Implement the Residential Infill Guidelines	✓	✓			✓			✓	✓			Med
5.2.2.1 Establish Mixed-Use Requirements for Large Infill Developments		✓	✓	✓			✓		✓			Med
5.4.1.2 Establish Limits on Culs-de-sac				✓			✓	✓	✓	✓		Med
5.4.1.3 Provide Pedestrian Walkway Connections to Culs-de-sac and Loops				✓			✓	✓	✓	✓		Med
5.5.1.2 Develop and Implement a Transit Assessment Policy		✓		✓	✓		✓				✓	Med
5.6.1.1 Establish Parking Maximums	✓				✓	✓			✓	✓		Med
5.7.1.1 Implement Ped Connections: A Strategy for Sidewalk Infrastructure in Edmonton				✓	✓		✓	✓			✓	Med
5.7.3.1 Improve Requirements for Safe and Accessible Pedestrian Routes and Access to Transit in Conjunction with Construction Projects				✓			✓	✓	✓	✓		Med
5.4.1.4 Create Mid-block Pedestrian Crossings along Long Blocks in Existing Neighbourhoods				✓			✓	✓	✓			Med
5.8.1.1 Support the Office of Traffic Safety Pedestrian Safety Initiatives							✓	✓		✓	✓	Med
5.2.1.1 Establish a Pilot Location Efficient Mortgage Program		✓	✓								✓	Low
5.2.1.2 Create 'Live Near Where You Work' Pilot Program		✓	✓								✓	Low
5.2.3.2 Establish Incentives Pilot Program for Neighbourhood Commercial Projects		✓	✓								✓	Low
5.3.1.2 Revise Planning Framework to Target Higher Levels of Mixed-Use		✓	✓						✓			Low
5.3.1.3 Provide Leadership for Investments in Mixed-Use Development		✓	✓								✓	Low
5.4.1.5 Allow Unconstrained Pedestrian Crossings On Local Streets				✓				✓	✓			Low
5.7.2.1 Increase Compliance With Existing Bylaws on Snow Removal							✓	✓	✓			Low
5.7.2.2 Initiate Community-Based Snow Removal Program							✓	✓		✓		Low
5.7.4.1 Assess Walking Speed Used for Intersection Signal Timings							✓	✓	✓			Low
5.8.1.2 Walkable Edmonton to More-Actively Participate in Existing Initiatives Focused on Personal Security					✓			✓		✓		Low
5.8.1.3 Promote Personal Security and Pedestrian Safety Initiatives							✓	✓		✓		Low

Solution Description	Walkability Elements Impacted										Impact (Lower, Medium, Higher)	
	Density	Destinations	Mixture of Uses	Connectivity	Transit Service	Parking Policy	Accessibility	Safety & Security	Standards & Tools	Dept. Integration & Operation		Funding & Monitoring
5.2.3.1 Partner with Development Industry in Research Program to Identify Successful Neighbourhood Retail and Service Developments		✓	✓									Low
5.11.1.1 Increase and Improve Collection of Pedestrian Data								✓		✓		Low



Future Park



North Saskatchewan