PROPOSED REVISIONS TO COUNCIL POLICY TP012
(AS AMENDED)

THE CITY OF CALGARY

CALGARY TRANSPORTATION PLAN

OCTOBER 2020

Notes to Reader

This document identifies proposed changes to the Calgary Transportation Plan.

Changes have been colour-coded as follows:

Current version (dark gray): Existing text that will remain after amendment

Deletion (red strikethrough): Text that will be removed after amendment

Addition (green): New text that will be adopted after amendment

Moved text (purple): Existing text that will remain after amendment, but will be located in a different part of the document. Strikethrough indicates the original location of the text.

Numbered figures and call-out boxes / sidebars:

Existing numbered figures and call-out boxes will remain after amendment unless otherwise indicated. These are not shown.

Proposed and revised figures and call-out boxes are shown in the document.

Figures and call-out boxes to be deleted after amendment are indicated in the document in their approximate location relative to policy text.

Policy and figure numbering may be subject to change.

Photos and graphical design that are not part of the formal content may be revised to improve readability and align with current City standards.

In some cases, the deleted version of sections may appear out of order from the original document. This is to provide clarity for comparison purposes.

~~Part 1 – Contributing to the Plan It Calgary Vision~~

~~1.1 Purpose of~~ The Calgary Transportation Plan

The decisions made today about where and what to build will affect Calgarians for 100 years or more – just as decisions made in the past affect us today.

The design of the transportation system has a significant impact on the urban form of the city. It contributes to the shape of ~~our~~ communities and employment centres, and it determines how ~~we~~**people** move within and among these places. It supports the economy by facilitating the timely movement of goods, services and people within the city and to regional or international destinations. It can either enhance or degrade the environment depending on how well it is integrated with its surroundings and the degree to which ~~we~~**people** depend on fossil fuels to reach ~~our~~**their** destinations. The decisions made today about where and what to build will affect Calgarians for 100 years or more – just as decisions made in the past affect us today.

Going forward, the transportation system must perform a wide variety of roles and consider the context of surrounding land uses, be they natural or manufactured. It must provide more choice for Calgarians – realistic choices that are convenient, affordable and attractive. These choices include walking, **wheeling (e.g. scooting, skateboarding and** cycling~~,~~**),** transit, high-occupancy vehicles (HOV or carpooling) and single-occupant vehicles (SOV). The needs of commercial vehicles (goods and services) and emergency services (police, fire, EMS and emergency management) must be considered in context.

Successful application of the ~~CTP~~ **Calgary Transportation Plan** policies will move Calgary towards a more sustainable future – for ~~our~~**the** economy, ~~our~~**the** environment and ~~our~~**for** citizens.

Part 1
Contributing to the Plan It Calgary Vision

1.1 Purpose of the Calgary Transportation Plan

The Calgary Transportation Plan (CTP) provides policy direction on multiple aspects of ~~the city's~~**Calgary's** transportation system.

To make the application of these policies as clear as possible, they are broken down into two categories:

Requirements

- contain the word "must~~"~~**".**
- these policies apply in all situations, without exception**.**

Recommendations

- contain the word "should~~"~~**".**
- these policies are to be applied in all situations, unless it can be clearly demonstrated to the satisfaction of The City that the policy is not reasonable, practical or feasible in a given situation**.**
- proposed alternatives must be to the satisfaction of The City with regards to design and performance standards**.**
- **"should" does not mean "optional".**

In each section, words shown in ~~*italics*~~**bold** (with the exception of sub-section titles) are defined in the glossary located in ~~Appendix C~~**Part 7**.

1.2 Linking to the Municipal Development Plan

The policies contained in the CTP are linked directly to the Municipal Development Plan (MDP **Volume 1**). In order to ~~meet the statutory requirements of the Municipal Government Act, and~~ provide additional context for the land use policies, the MDP contains a summary of the transportation objectives from ~~section~~**Part** 3 of the CTP. It also contains the Primary Transit Network and **Road** and **Street** Network maps. Some of the policy sections in the CTP also contain references to sections in the MDP **Volume 1** that need to be considered when planning transportation infrastructure in Calgary.

The MDP provides detailed policies for multiple land use areas known as typologies. The **Typology** section of the MDP contains detailed descriptions of each typology, along with land use, urban design and mobility policies. While the CTP provides a comprehensive policy framework for transportation in Calgary, transportation professionals should also familiarize themselves with each of the typology areas in the MDP to understand fully the differences in transportation priorities. The maps contained in the CTP show the key typologies, such as **the Greater Downtown and other Activity Centres**, ~~Corridors~~**Main Streets** and industrial areas, related to each transportation network.

The CTP has been included directly in the MDP as Volume 3. This enables the CTP to provide statutory requirements in conjunction with MDP Volume 1. As per section 1.4.4 in MDP Volume 1, if there is a conflict between Volume 1 and Volume 3 of the MDP, Volume 1 shall prevail.

~~1.3 Aligning with the Calgary Metropolitan Plan~~

1.3 Aligning with Calgary Metropolitan Region Growth and Servicing Plans

Policy plans approved by The ~~policies contained in~~ **City of Calgary, including** the CTP ~~align~~ **must be consistent** with the ~~goals and policy direction of the Calgary Metropolitan Plan.~~**Region Board (**~~**(**~~**CMRB**~~**)**~~ **Growth Plan.** The transportation networks identified in the CTP accommodate connections for multiple modes of transportation to adjacent municipalities (Rocky View County, ~~MD of~~ Foothills~~, Town~~ **County, City** of Chestermere) and the Tsuut'ina
Nation that will enhance the region's competitive advantage regionally, nationally and globally.

Investment decisions for Calgary's transportation infrastructure will consider the needs and impact on adjacent municipalities, and support long-range plans for regional transportation systems. Calgary will also participate in regional transit planning to provide effective transportation options that support long-range land use objectives in Calgary and the region.

1.4 The Sustainability Principles and Key Directions for Land Use **and** Mobility

In January of 2007, City Council adopted the **Sustainability** Principles for Land Use and Mobility. The Principles were derived from current City of Calgary policy direction, well recognized Smart Growth principles, and the direction of the Long Range Urban **Sustainability** Plan for Calgary (imagineCALGARY). The **Sustainability** Principles for Land Use and Mobility are:

1. Create a range of housing opportunities and choices.
2. Create walkable environments.
3. Foster distinctive, attractive communities with a strong sense of place.
4. Provide a variety of transportation options.
5. Preserve open space, agricultural land, natural beauty and critical environmental areas.
6. Mix land uses.
7. Strategically direct and manage redevelopment opportunities within existing areas.
8. Support compact development.
9. Connect people, goods and services locally, regionally and globally.
10. Provide transportation services in a safe, effective, affordable and efficient manner that ensures reasonable accessibility to all areas of the city for all citizens.
11. Utilize green infrastructure and buildings.

In November of 2008, City Council also approved the Key Directions for Land Use and Mobility for use in the development of the MDP and CTP. The Key Directions represent the strategic moves that need to be accomplished in order to guide Calgary towards the imagineCALGARY vision and the **Sustainability** Principles for Land Use and Mobility. The Key Directions for Land Use and Mobility are:

1. Achieve a balance of growth between established and greenfield communities.
2. Provide more choice within complete communities.
3. Direct land use change within a framework of nodes and corridors.
4. Link land use decisions to transit.
5. Increase mobility choices.
6. Develop a Primary Transit Network.
7. Create Complete Streets.
8. Optimize infrastructure.

1.5 Transportation Goals

Each section in the CTP indicates support for a combination of Council-approved Key Directions for Land Use and Mobility and the following transportation goals. The seven transportation goals give additional direction to all aspects of transportation in Calgary and provide more detail to the overall transportation goal contained in the MDP, which is:

To develop an integrated, multi-modal transportation system that supports land use, provides increased mobility choices for citizens, promotes vibrant, connected communities, protects the natural environment, and supports a prosperous and competitive economy.

Transportation Goal #1:
Align transportation planning and infrastructure investment with city and regional land use directions and implementation strategies.

City and regional land use directions are designed to reduce our ecological footprint and promote the conservation and responsible consumption of natural resources including land, energy and water. Commitment to these directions will achieve greater use of more sustainable travel modes such as walking, ~~cycling~~**wheeling** and public transit, while also reducing the average distance travelled by ~~automobiles~~**vehicles**.

Transportation Goal #2:
Promote safety for all transportation system users.

The City should ensure that all aspects of the transportation system are safe and secure, and enable prompt and effective emergency response. These objectives will be achieved through ongoing operations, maintenance and public education programs, as well as mobility management and land use strategies that will reduce vehicular travel and improve public safety and health.

Transportation Goal #3:
Provide affordable mobility and universal access for all.

Citizens must be provided with a range of affordable travel options regardless of income or ability, including walking, ~~cycling~~**wheeling**, public transit, and taxis. The built environment and transportation infrastructure should incorporate principles of universal access.

Transportation Goal #4:
Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.

An integrated strategy is required that includes substantial transit expansion, investment in new ~~pedestrian~~**walking** and ~~cycling~~**wheeling** infrastructure, transit-oriented land use and supportive **street** and parking policies. These strategies will reduce demands on the transportation system by reducing vehicle trip distances and making public transit, walking and ~~cycling~~**wheeling** more appealing mobility choices for more people.

Transportation Goal #5:
Promote economic development by ensuring the efficient movement of workers and goods.

The transportation system must foster economic development by facilitating the efficient movement of workers and goods by **roadway**, rail and air. Transportation facilities must provide access to major industrial and employment locations.

Transportation Goal #6:
Advance environmental sustainability.

The transportation system should be planned, designed, operated and maintained to reduce the impact of travel on the environment by curbing land consumption, protecting air and water quality and reducing energy consumption and greenhouse gas emissions.

Transportation Goal #7:
Ensure transportation infrastructure is well managed.

Sound management of all transportation infrastructure will promote efficiency, infrastructure preservation and value, safety and a healthy environment.

1.6 Public and Community Engagement

The increasing complexity of issues faced by "city builders" requires that all disciplines work together to achieve outcomes that would not be possible for any one discipline acting alone. Involvement of b**road** stakeholder groups will also be important in the planning, design and operation of the transportation system.

Collaborative processes should be undertaken when planning new transportation infrastructure, upgrading existing infrastructure, or evaluating the impacts of new developments. Impacted stakeholder groups, including but not limited to community residents and associations, local businesses and the development industry should be engaged early in planning processes to build understanding of transportation issues, and ensure that infrastructure meets the needs of all users and adjacent properties.

Fully understanding the perspectives and expectations of users is fundamental to any efforts to improve and enhance Calgary's transportation system. In order to better support The City's service-based business-planning and budgeting model, the Transportation Department should take steps to engage in an ongoing and meaningful way with the users of the services it provides. Through more meaningful engagement comes a better understanding of users' needs and expectations, ensuring that their voices are part of every service planning and management decision.

Figure 1: Council-Approved Transportation Plans And Guides 2009-2018

1.7 Amending the CTP

Like the MDP, the CTP is a living document and will be kept current by reviewing, updating and amending it as required. ~~Any changes to policies, maps or appendices in the CTP as proposed by Administration will require approval by resolution of Council. Amendments to the CTP may also be triggered by amendments to~~ **Amendments to the CTP will be undertaken in accordance with Section 1.5 of** the MDP.

1.8 Implementation

~~All policies contained in~~**As a volume of the MDP,** the CTP ~~are in effect immediately upon the date specified through approval~~ **becomes effective following Third Reading** by ~~resolution of~~ Council~~.~~**, on the date set by Council in the bylaw.** Over time, updates to existing transportation plans and guidelines ~~would~~ **will** align to the contents of the CTP (such as **Street** classifications and nomenclature).

~~A companion~~ **Implementation of the plan is a continual process that does not live within one location or team. Success will be achieved through a number of paths, including:**

- **Development, maintenance and** implementation ~~plan will contain the 10-year actions necessary~~**of supportive strategic plans.**
- **Strategic infrastructure investment that complements MDP priorities and is developed collaboratively.**
- **Alignment of operational budgets** to **support plan outcomes.**
- **Principles for considering new opportunities for the transportation system.**
- **Ongoing dialogue and discussion on how to best** achieve the **plan outcomes.**

The content and policies ~~contained in~~**of** the CTP~~, and will indicate the phasing and resource~~ **establish the high-level structure and principles that enable more-focused planning and service implementation. Since the approval of the CTP by City Council in 2009, a number of supporting strategic plans and guides have been developed; Figure 1 illustrates the Council-approved plans and guides in place as of December 2019. This collection of plans may change over time, depending on service implementation** requirements ~~associated with the actions. The implementation plan~~ **.**

Aligned decision-making

The resources available to The City with which to implement the CTP will be limited due to funding constraints. In order to maximize the benefits that result from achieving CTP outcomes, investment decisions must be thoughtfully considered as to how they advance achievement of the transportation goals of the CTP and Triple Bottom Line outcomes, and how they support the goals of the MDP. Decisions that advance multiple goals should be ~~updated with each three-year~~**favoured over decisions that only advance a single goal. As part of** business ~~cycle to maintain alignment with the growth, planning and investment objectives contained in the MDP and CTP.~~ **case development, candidate projects should be presented in the context of which goals they are advancing, and which goals may be compromised by the decision.**

Where and when investments are made in transportation infrastructure is a critical component of the overall CTP implementation strategy. Part 2 of the CTP contains implementation policies to align infrastructure investment with the goals and objectives of the CTP and MDP.

Policy plans approved by The City of Calgary, including the CTP, must be consistent with any IDP covering the same land area. In the case of any inconsistency, the provisions of the IDP would prevail.

Part 2
Implementation Through Strategic Investment

Objective

Align transportation planning and investment decisions with strategic corporate growth policies in order to increase municipal fiscal sustainability.

Discussion

The MDP contains a process and policies to guide growth decisions in Calgary, called the Strategic Framework for Growth and Change (referred to as the MDP Framework for Growth and Change in this document). The MDP Framework for Growth and Change contains a variety of policies to address key growth challenges in Calgary, and ensures the best possible social, environmental and economic **(a.k.a. "Triple Bottom Line")** outcomes for citizens both now and in the future.

The decision making process described in the MDP Framework for Growth and Change contains criteria for selecting growth areas in both developed and greenfield areas of the city. It also more clearly links land use planning and infrastructure investment decisions back to the long-range plan contained in the MDP, and consequently the CTP as well.

~~This new process~~**The MDP Framework for Growth and Change** has several policy implications for the provision of ~~transportation~~ infrastructure in Calgary:

- Infrastructure **Calgary ~~(IC)~~, established by The City in 2016, has a corporate mandate to coordinate city-wide infrastructure investment for the purpose of achieving the most value for citizens. Infrastructure Calgary is responsible for the stewardship of The City's Capital Infrastructure Investment Principles and Capital Investment Plan (CIP). Accordingly, the Principles, CIP, and associated infrastructure decision and** management ~~programs will~~**processes must** be designed to support ~~the~~ **achievement of the long-term goals and** objectives of the MDP~~;~~ **and the CTP.**
- **The MDP Framework for Growth and Change must inform Infrastructure Calgary's decisions regarding the capital budget timing of growth- related infrastructure investments. In providing strategic support to Infrastructure Calgary's infrastructure prioritization and budgeting processes, Calgary Growth Strategies should apply the MDP Framework for Growth and Change policies.**
- **Limits on the capital funding available to The City for infrastructure investment should be addressed through Infrastructure Calgary's city-wide infrastructure investment planning process, ensuring that the potential cost/ benefit implications for The City of alternative infrastructure funding scenarios are identified and communicated comprehensively as part of budget deliberations by City Council.**
- Municipal capital investment in infrastructure (including new and maintenance/refurbished) should be prioritized in the following ~~manner~~**order**:

i. **Investments that** support intensification of Developed Areas of the city~~;~~**.**

ii. **Investments that** expedite the completion of communities in Planned Greenfield Areas of the city (as defined on the MDP Urban Structure Map).

iii. **Investments that support** the development of Future Greenfield Areas.

~~• Align The City's capital planning programs, such as the Transportation Infrastructure Investment Program, the Emergency Response Infrastructure Investment Program, the Culture, Parks and Recreation Infrastructure Investment Program, etc., to support the direction of the MDP and CTP.~~

- Upon adoption of a new ~~Local~~ **local** ~~Area~~ **area** ~~Plan~~ **plan** (as defined in the MDP), all relevant maps in the MDP and CTP must be updated.

~~Future~~ Transportation planning **priorities** and investment ~~activities~~**recommendations** need to align with the MDP Framework for Growth and Change in order to achieve the goals of the MDP and CTP. However, ~~transportation investments~~**they** must also take into account the ongoing infrastructure management needs of existing facilities and additional priorities in the CTP that are beyond the scope of the MDP Framework for Growth and Change (such as improvements to the Primary Goods Movement Network described in section 3.4). The following transportation policies address these issues.

Policies

a. Transportation planning priorities and investment decisions must be ~~aligned~~**based on an understanding of the strategic priorities of The City** and ~~coordinated~~**overall fiscal limitations, requiring alignment and coordination** with the MDP Framework for Growth and Change, and the CTP transportation goals.

b. The highest priority for transportation capital and operating investment should be the Primary Transit Network and supporting infrastructure (including walking and ~~cycling~~**wheeling** infrastructure and **Complete Streets**) in **Activity Centres** and ~~Corridors~~**Main Streets**.

c. Transportation capital and operating investments that will enhance the reliability and safety of goods movement should be given increasing priority.

d. Ongoing operating and maintenance costs must be considered in the approval process for transportation infrastructure projects.

e. New **sources of stable and predictable** funding ~~sources~~ should be identified and pursued to fund both transportation capital and operating costs.

f. The capacity and life-cycle of existing transportation infrastructure should be optimized before investing in new infrastructure in existing areas.

g. The infrastructure and implementation strategies identified in the CTP **and transportation strategic plans such as RouteAhead, Step Forward, Goods Movement Strategy, etc.** should be reviewed and prioritized within the context of The City's current and future financial capacities.

h. The City's capital management and investment planning processes must be designed to support achievement of the long- term goals and objectives of the MDP and the CTP.

i. Through its management of The City's capital portfolio, Infrastructure Calgary should ensure that the matching of available funds from external sources (e.g. other levels of government, industry) is optimized relative to the impacts or trade-offs resulting from non- investment in high priority projects/programs in other areas of the portfolio.

Part 3 – Transportation Policies

The following sections outline the transportation policies that work in conjunction with the land use policies of the MDP. The CTP policy areas that contribute most to achieving the Key Directions for Land Use and Mobility and the transportation goals are:

- Transit
- Complete Streets

Given their importance, these two sections contain more extensive background information and policies to aid implementers in achieving the desired outcomes.

All maps referred to in the following sections are located in ~~Appendix D~~**Part 8**.

3.1 Transportation Choice

Objective

Maintain automobile, commercial goods and emergency vehicle mobility in Calgary while placing increased emphasis on **more** sustainable modes of transportation (**including but not limited to** walking, cycling and transit).

Supports

- **Key Direction #5**: Increase mobility choices.
- **Key Direction #7**: Create **Complete Streets**.
- **Transportation Goal #3**: Provide affordable mobility and universal access for all.
- **Transportation Goal #4**: Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.
- **Transportation Goal #5**: Promote economic development by ensuring efficient goods movement and labour force mobility.

Discussion

Calgary's current transportation system is focused primarily on **roadways** and the efficient movement of motorized vehicles. With the exception of transit service to the Downtown **Core**, other modes of transportation (such as walking and ~~cycling~~**wheeling**) have **historically** been given less priority. ~~This has happened largely out of necessity.~~ Over the last 50 years, land uses have been increasingly segregated, with homes located further and further away from jobs and amenities. Population growth has gone almost entirely to the edges of the city, while employment continues to cluster in the **Greater Downtown** and east industrial areas~~. With trip distances increasing each year, the private automobile has naturally become the preferred travel choice~~.

The CTP and MDP represent a new direction for transportation in Calgary. The more compact form of development envisioned in the MDP will bring homes, jobs, services and amenities closer together.

This will make non-automobile modes of travel more convenient, and therefore give Calgarians choices when travelling around the city. More choice means that Calgary's transportation system will:

- Improve overall mobility~~;~~**.**
- Better withstand rising energy costs or other economic shocks~~;~~**.**
- Reduce energy use and emissions~~;~~**.**
- Provide travel options for all Calgarians, regardless of age or income~~; and~~**.**
- Increase Calgary's competitive advantage in the global marketplace.

In ~~most~~**some** cases, it ~~will~~**may** not be practical to accommodate all modes of travel equally in every part of Calgary. Decisions ~~will~~**may** need to be made on which modes should be emphasized in ~~each part~~**different parts** of the city. **Increasingly, travel will consist of using combinations of modes, making the integration of modes and user experience critical.** Sustainable modes of transportation should be emphasized where they can provide convenient and realistic travel choices. The Transportation **Sustainability** Triangle in Figure ~~1~~2 shows the relative sustainability of each transportation mode, with walking being the most sustainable. **Walking, wheeling and transit are all more sustainable modes because:**

~~Walking, cycling and transit are all more sustainable modes because:~~

- They require less energy~~;~~**.**
- Need less infrastructure and typically cost less to build~~; and~~**.**
- Are available to almost all Calgarians.

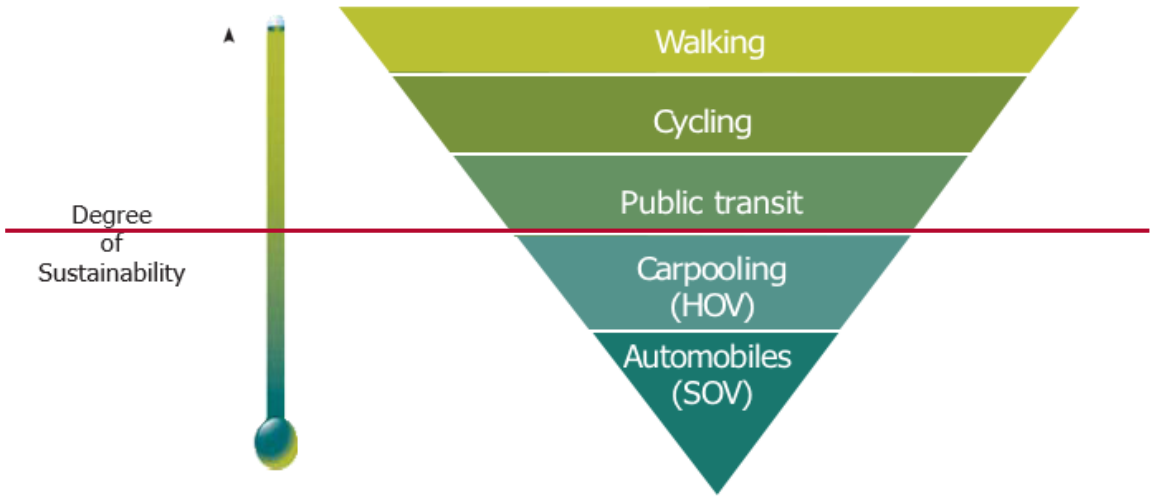
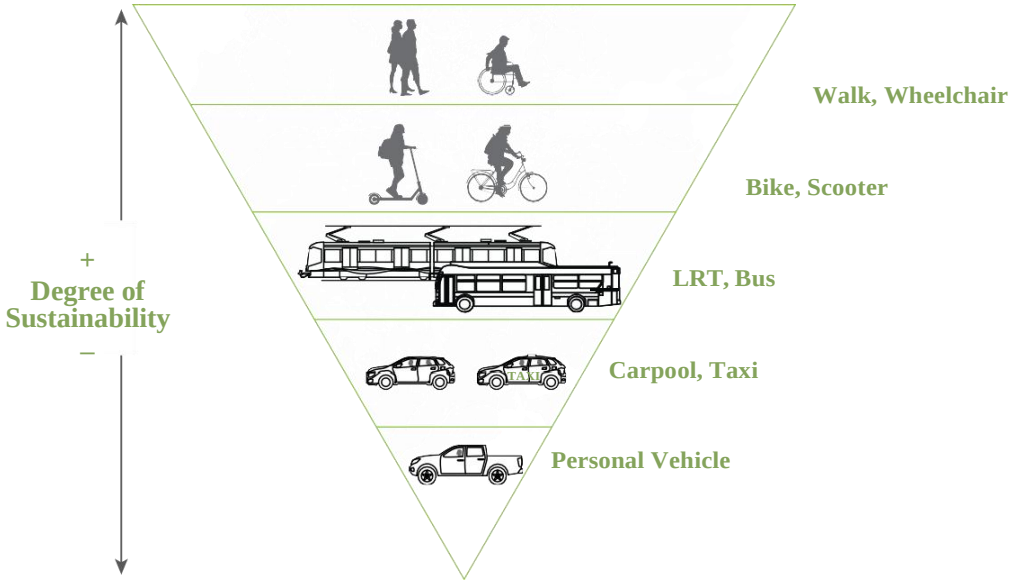


Figure 2 - The Transportation Sustainability Triangle



Commercial vehicles are also a critical element of Calgary's economy, and must be accommodated in most parts of the city, with emphasis on ~~several~~ key areas ~~(~~such as the airport, industrial areas, intermodal rail terminals, and on heavily used goods movement corridors such as Deerfoot Trail and the Ring **Road**~~)~~.

Emergency services (police, fire, ambulances) are not explicitly shown in Figure ~~1~~2 because they are unique users of the transportation system and operate in all parts of the city. Access to emergency services must be considered in the planning, design and operation of the transportation system.

Although walking, ~~cycling~~**wheeling** and transit are more sustainable modes of transportation, the majority of daily trips are expected to continue to be made by private vehicles. Figure ~~2~~3 shows the travel choices for all trips today compared to projected travel choices ~~60~~ **50** years in the future based on the recommended land use patterns and transportation systems contained in the MDP and CTP. **The expected increase in trips will need to consist of a greater share of walking, wheeling and transit trips for the transportation system to function adequately. The recommended direction will need to be reviewed should future technologies, such as self-driving cars, become prevalent once there is a fuller understanding of their role and use in travel.**

It is clear that private vehicles will continue to be the most common travel choice, particularly in outlying areas of the city where most destinations are too far to reach by walking and ~~cycling~~**wheeling**, and where transit service is not as frequent or efficient as a vehicle. Transportation networks will be designed to manage the demand for vehicle use, and will be optimized using a wide range of tools and technologies.

Increased walking and ~~cycling~~**wheeling** activity will occur primarily in the **Greater Downtown and other Activity Centres** and ~~Corridors~~**Main Streets** located across the city. Homes, jobs, services and amenities will be located in close proximity to each other in these locations. The needs of ~~pedestrians~~**Calgarians who walk** and ~~cyclists~~**wheel** should therefore be given the highest priority in **the Greater Downtown and other Activity Centres** and ~~Corridors~~**Main Streets**. Well designed infrastructure and direct connections between destinations will allow walking and ~~cycling~~**wheeling** to be the most convenient way to travel in these locations.

Transit service will offer the most convenient choices to people travelling between **Activity Centres** and along the ~~Corridors~~**Main Streets** that connect them. Priority measures will enhance the reliability of transit services within and between these strategic locations, making transit competitive and an attractive option to private automobiles.

The increasing variety of transportation choices made by Calgarians in the future can be effectively accommodated by putting the right type of infrastructure in the right place. Figure ~~3~~4 in section 3.7 of the CTP shows how the ~~new~~ **Road** and **Street** Palette provides a range of **road** and **street** types that emphasize different transportation modes. The CTP recommends that the majority of the **roads** and **streets** built in Calgary be types that emphasize private vehicles and goods movement.

This reflects both the existing infrastructure that has been built in Calgary, and the transportation needs for much of the city in the future.

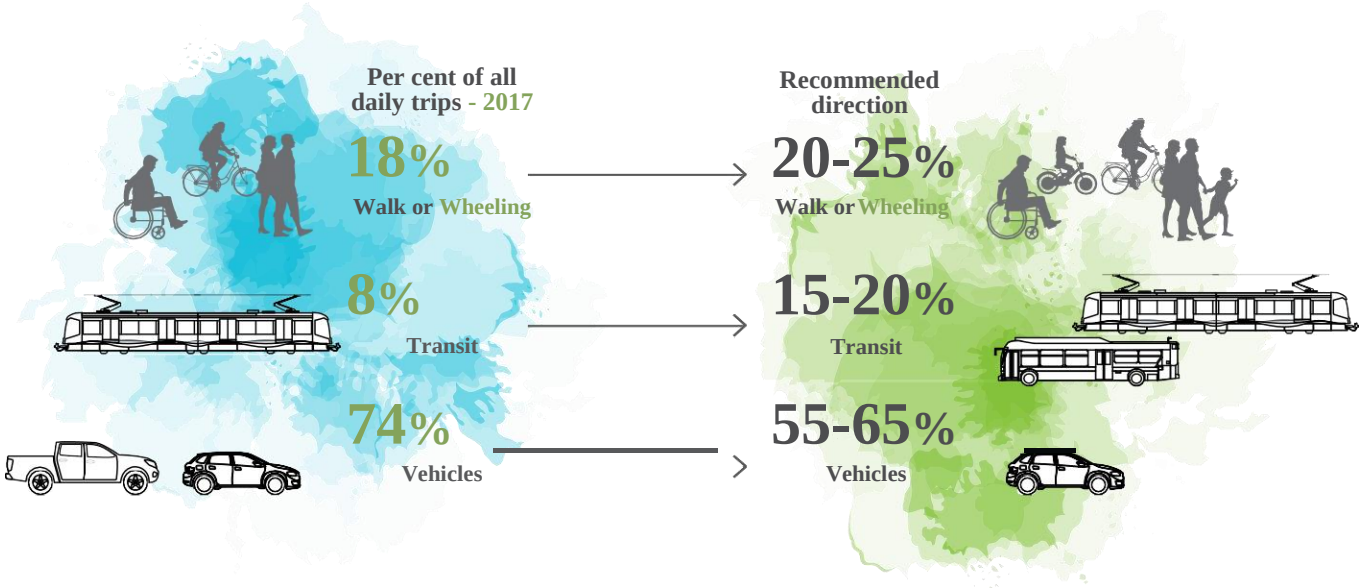
Specialty **streets** that emphasize walking, cyclingand transit will comprise a lesser amount ofthe **Road** and **Street** Network. However, these **streets** will be strategically located in **the Greater Downtown Activity Centres** and ~~Corridors~~**Main Streets** where the majority of walking, cycling and transit activity is expected to occur.

In conjunction with other transit and ~~cycling~~**wheeling** infrastructure, this combination of **road** and **street** designs will make it possible to meet the increasingly diverse travel needs of Calgarians now and in the future.

Mode of Transportation	Per cent of all daily trips	
	Current	Recommended Direction
Walk/Cycle	14%	20% - 25%
Transit	9%	15% - 20%
Vehicles (SOV & HOV)	77%	65% - 55%

Figure 2 – Current and future travel choices

Figure 3 - Current and future travel choices



Policies

a. The needs of sustainable modes of transportation (walking, ~~cycling~~**wheeling** and transit) ~~should~~**must** be considered in all transportation planning projects.

b. Pedestrians and cyclists should be given the highest priority in the planning, design, operation and maintenance of transportation infrastructure in **the Greater Downtown and other Activity Centres** and ~~Corridors~~**Main Streets**.

c. Along the Primary Transit Network, priority should be given to transit in the planning, design, operation and maintenance of the transportation system, with the goal of minimizing person delay rather than vehicle delay.

d. Emphasis should be placed on the efficient movement of commercial vehicles in industrial areas, along corridors defined as part of the Primary Goods Movement Network, and to access the airport or intermodal rail facilities

e. In areas where walking, ~~cycling~~**wheeling** and transit cannot provide convenient and reliable travel choices, emphasis should be placed on mitigating **the negative effects of** congestion ~~and improving capacity for private vehicles.~~ **and the efficient movement of private vehicles and goods.**

f. The needs of emergency vehicles and large-scale evacuation equipment must be considered in the planning and design of all transportation infrastructure.

g. The needs of emerging modes of transportation (~~meaning modes not commonly used today~~**e.g. urban-mobility devices such as electric-powered scooters**) should continue to be monitored, ~~and~~ planned for**, and supported operationally** as necessary~~.~~ **to advance CTP goals and objectives.**

h. On facilities where multiple users compete for priority, a balanced approach should be used to address the trade-offs and risks of various design decisions.

3.2 Walking and ~~cycling~~**Wheeling**

Objective

To make walking and **wheeling (e.g., scooting, skateboarding and** cycling**)** attractive and convenient through the provision of additional or enhanced infrastructure, and through land use planning that brings homes, jobs, services and amenities closer together.

Supports

- **Key Directions #2**: Provide more choice within complete communities.
- **Key Directions #5**: Increase mobility choices.
- **Key Directions #7**: Create **Complete Streets**.
- **Key Directions #8**: Optimize infrastructure.
- **Transportation Goal #2**: Promote safety for all transportation system users.
- **Transportation Goal #3**: Provide affordable mobility and universal access for all.
- **Transportation Goal #4**: Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.
- **Transportation Goal #5**: Promote economic development by ensuring efficient goods movement and labour force mobility.
- **Transportation Goal #7**: Ensure transportation infrastructure is well managed.

Discussion

Walking

Walking is the simplest type of transportation; it offers health and wellness benefits, costs very little and is available to almost everyone, regardless of age, gender, ability or income. It is quiet, doesn't pollute and fosters social interaction. ~~Pedestrians include all persons walking or jogging, using wheelchairs or mobility aids, walking their dogs, people with children's strollers or wheeled carts, in-line skaters and skateboarders.~~**Cities that have invested heavily in walkability and the public realm have been found to attract and retain new residents that choose the city first, then their career. In general, the following key principles can be applied to projects of any scale to ensure that Calgarians who walk are well served:**

~~Like any mode of transportation, people will choose to walk if it is a convenient way to travel. Making walking a convenient, year-round option for more Calgarians requires:~~

- **Create** direct~~ and convenient~~**, simple** connections to **nearby** destinations~~;~~**.**

~~sufficient unobstructed space~~- **Create well-designed, interesting spaces** to walk ~~comfortably;~~**in.**

~~well-maintained routes~~- **Consider scale and make sure spaces, street blocks, etc. are the right size for people to use (not too big or too small).**

- **Start** with ~~character that feel safe~~**people** and ~~secure;adequate separation from traffic;~~**where they want to walk** and **put parking, loading and storage out of people's way.**

~~round-the-clock pedestrian activity.~~- **Manage conflict between users rather than blocking off pedestrians.**

- **Match feelings of safety to actual safety.**

Public places such as **streets** and plazas should have high-quality urban design elements wherever possible. Pedestrians should be provided with different views, a positive ambiance, public art and spaces for rest and play. Section 3.7 on **Complete Streets** provides additional information regarding urban design and other pedestrian requirements in relation to surrounding land uses.

Since virtually all people walk for at least a short distance to take transit, there must also be continuous, consistently maintained pedestrian routes to transit stops. The design of transit stops and stations must place high priority on pedestrian movement, waiting and comfort, as well as convenient access for transit vehicles arriving at those stops.

Physical Activity, Urban Form and Obesity

Between 2004 and 2015, the prevalence of obesity amongst Alberta's population aged two years and up increased by 24 per cent. Amongst adults 18+, the most extreme forms of obesity (where body mass index exceeds 40 or more) increased by 31 per cent.

Statistics Canada: Canadian Community Health Survey - Nutrition (2004, 2015)

In 2019, 68 per cent of Calgarians reported participating in enough physical activity to achieve health benefits.

Centre for Active Living, 2019 Alberta Survey on Physical Activity

Walkable, transit-supportive built environment patterns have been associated with higher amounts of active transport and more physical activity overall. Less walkable, vehicle-dependent built environments have been correlated with higher body weights, obesity, and their associated chronic diseases.

Dr. Larry Frank, The Built Environment and Health: A Review

The needs of pedestrians, including those who use mobility aids, are considered throughout the CTP. Access to transit, the design of pedestrian-friendly **streets** and providing more direct connections between destinations in ~~new~~ communities and **Activity Centres (including the Greater Downtown)** are key pedestrian-oriented initiatives in the CTP.

~~Cycling~~Wheeling

Wheeled mobility devices like scooters, skateboards and bicycles are more than recreational tools. They are efficient human-powered machines that improve health and enable travel ~~five times faster than walking. Due to the relatively low cost, cycling is also available to almost everyone. Cyclists include persons riding any cycle, whether propelled by human effort or a power-assisted device.~~**faster than walking. Due**

~~While cyclists are allowed on almost all Calgary streets, additional guidance can be provided through signs or by designating extra space on streets to increase cyclist comfort and safety. Cycling can be accommodated on low-volume, low-speed streets or in wide curb lanes, bike lanes or separate on-street bicycle lanes. Off-street cyclists can also travel on walkways, pathways, trails and, in the future, cycle tracks (an off-street bicycle lane next to the vehicle lanes).~~

to their relatively low cost, wheeled devices are also available to almost everyone. The Traffic Bylaw allows a variety of mobility devices on pathways and bikeways. Pathways have been inclusive of a variety of users for years. People using kick scooters, inline skates, skateboards and shared e-scooters are now allowed to use dedicated bike lanes.

Making ~~cycling~~**wheeling** a convenient, year-round option for Calgarians requires:

- Smooth travelling surfaces free of obstacles~~;~~**.**
- Well-maintained, clear routes~~;~~**.**
- Connected and continuous routes that give ~~cyclists~~**people** the ability to maintain speed~~;~~**.**
- ~~bicycle~~**Wheeled device** parking and amenities at destinations~~;~~**.**
- Routes with character that offer safety and a feeling of security~~; and~~**.**
- Education and enforcement for all transportation system users.

Connecting ~~bicycle~~**walking and wheeling** trips to transit service enables longer **or cross-city** trips, enlarges transit catchment areas, ~~enables cyclists to bypass topographical barriers~~**helps people navigate challenging hills and busy roadways** and increases transit ridership. Examples of integration measures include**:**

- Safe and secure bicycle parking at transit stations~~,~~**.**
- Allowing bicycles **and other wheeled mobility devices** on trains and buses~~ and improvements to bicycle routes and transit station access~~.
- ~~Cycling is supported in the CTP through policies for the introduction of new types of cycling facilities, improved design of future and redeveloped streets~~**Enabling bike** and ~~through the provision of better~~**e-scooter share for first and last kilometre trips.**
- **Ensuring pathway and bikeway** connections ~~in new communities and Activity Centres. A new Primary Cycling~~**to transit stops and stations are provided.**

The Always Available for All Ages & Abilities (5A) Network ~~has also been designated for Calgary. This~~

The existing pathway and bikeway network creates a skeletal network across Calgary, serving recreational users and confident and dedicated cyclists. In updating the 2000/2001 Calgary and Area Pathway and Bikeway Plan, The City heard from Calgarians that they are looking for something different for the network of the future, with connections to local destinations like schools, shops, recreation centres and workplaces. They want accessible pathways and bikeways that are well lit, easy to navigate and have few barriers.

The 5A Network will ~~connect major destinations such as Activity Centres, Corridors and major institutions. Each segment of the network~~ **be a city-wide mobility network consisting of off-street pathways and on-street bikeways. It** will ~~include the best possible cycling infrastructure that can reasonably be accommodated. Connections~~**provide accessible, affordable, year-round options for transportation and recreation and** will be ~~as direct as possible, making cycling between these locations direct and expedient, while also safe and appealing.~~ **accessible by people of all physical abilities due to:**

- **Fewer barriers like off-set gates**
- **Smoother surface materials**
- **Fewer routes on steep hills**

The following 5A Network principles shift the focus of the pathway and bikeway network to create more community connections and welcome a variety of users.

- **Separate people by their speed**
- **Improve visibility**
- **Make it reliable**
- **Be accessible for everyone**
- **Make it easy to use**

The 5A Network principles will improve safety and create a reliable experience for Calgarians. Children, seniors and people with mobility challenges will be able to walk and wheel on a safe, accessible and connected network. Low-income individuals and vulnerable populations will have affordable and reliable options for year-round transportation and recreation.

In order to make this a year-round alternative to travel in Calgary, the ~~Primary Cycling~~**5A** Network must have high priority for maintenance and be kept clear of debris, snow and ice. Where the ~~Primary Cycling~~**5A** Network incorporates pathways, the needs of both recreational users and commuters should be considered carefully in the design and operation of those facilities.

The 5A Network is shown in Map 1 in Part 8.

~~The Primary Cycling Network does not outline all future bicycle routes. Instead, it defines high-priority bicycle routes where the most concentrated activity will occur. All other existing and future bicycle routes will be identified through periodic updates of the Calgary bikeway and pathway maps.~~

~~The Primary Cycling Network is shown in Map 1 in Appendix D.~~

~~The following policies, and associated design considerations contained in Section 3.7, comply with existing legislation regarding the operation and control of bicycles on public rights-of-way. However, updates and improvements to existing legislation should be endorsed to further promote safe and convenient bicycle operation on city streets.~~

Policies

a. ~~Pedestrian and bicycle routes should~~**Walking and wheeling routes must** be provided throughout the city.
b. The type of ~~cycling~~ **pathway and bikeway** facilities implemented on the ~~Primary Cycling~~**5A** Network should be based on the surrounding land uses and right-of-way restrictions. ~~Cycling~~ Facilities should also be enhanced as redevelopment of corridors along the ~~Primary Cycling~~**5A** Network occurs.
c. The amount, directness, connectivity, accessibility, comfort, character and safety of ~~pedestrian~~**walking** and ~~bicycle~~**wheeling** routes should be increased.
d. The quality of ~~pedestrian~~**walking** and ~~bicycle~~**wheeling** environments should be emphasized in all transportation studies and **must be emphasized** in all future development or redevelopment plans for **the Greater Downtown and other Activity Centres**, ~~Corridors~~**Main Streets**, **Transit-oriented Development (TOD)** sites and residential communities.

e. Walking and ~~cycling~~**wheeling** must be integrated with transit services and improve intermodal opportunities at the community, city and regional scales.

f. Design of facilities, public education and law enforcement should be used to increase acceptance, understanding and decrease conflicts among all users of the roadway, ~~pedestrian~~**walking** and ~~bicycle~~**wheeling** networks.

g. Safe, barrier-free walkways ~~and~~ pathways **and bikeways** should be provided in community designs to reduce ~~pedestrian~~**walking** and ~~bicycle~~**wheeling** distance to transit service and community amenities.

h. Bicycle parking should be provided at destinations in the Greater Downtown and other Activity Centres, ~~Corridors~~Main Streets, TOD sites, employment centres and parks and open spaces.

i. A full range of strategies such as traffic signal optimization, pedestrian scramble crossing signal priority measures and pedestrian countdown timers should be used to improve convenience for pedestrians and cyclists at locations where high volumes of pedestrians and cyclists already exist or are expected in the future.

j. Disruptions to pedestrian walking and bicycle wheeling travel should must be minimized during construction.

k. The Transportation Department and Parks Business Unit must co-ordinate the design, operation and maintenance of all pathways (including snow clearing) that form part of the Primary Cycling5A Network to accommodate the needs of both recreational users and commuters.

3.3 Transit

Objective

To provide a safe, accessible, customer-focused public transit service that is capable of becoming the preferred mobility choice of Calgarians.

Supports

- **Key Direction #2**: Provide more choice within complete communities.
- **Key Direction #3**: Direct land use change within a framework of nodes and corridors.
- **Key Direction #4**: Link land use decisions to transit.
- **Key Direction #5**: Increase mobility choices.
- **Key Direction #6**: Develop a Primary Transit Network.
- **Key Direction #8**: Optimize infrastructure.
- **Transportation Goal #1**: Align transportation planning and infrastructure investment with city and regional land use directions and implementation strategies.
- **Transportation Goal #2**: Promote safety for all transportation system users.
- **Transportation Goal #3**: Provide affordable mobility and universal access for all.
- **Transportation Goal #4**: Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.
- **Transportation Goal #5**: Promote economic development by ensuring efficient goods movement and labour force mobility.
- **Transportation Goal #6**: Advance environmental sustainability.

Discussion

High-quality public transit service is an essential requirement for the creation of attractive, vibrant and economically competitive cities. Investment in transit improvements ~~can~~ significantly ~~improve~~**improves** the social, economic and environmental health of communities by:

- Enabling citizens to participate in the social and economic life of the community~~;~~**.**
- Providing lower-cost mobility options for transportation users and society by reducing the need for and expense of new **roadway** and parking infrastructure and operation of private vehicles~~;~~**.**
- Improving air quality and reducing energy demands and greenhouse gas **(GHG)** emissions that are contributing to global climate change~~;~~**.**
- Helping to shape and create more intense, mixed-use development within walking distance of public transit stops and stations which, in turn, will generate increased transit use~~; and~~**.**
- Ensuring labour force mobility to support economic development.

Creating a New Transit Vision for Calgary and Region

People will choose to use transit if it satisfies their mobility needs. Substantial improvements in the frequency, speed, comfort, reliability, convenience and safety of transit service are necessary to make transit an appealing mobility option. These actions must be supported by complementary **Complete Street** and parking strategies. In order to substantially increase transit ridership and enable transit to shape land use changes, all of the following success factors for transit must be achieved:

Make transit a convenient and comfortable travel alternative through the development of a Primary Transit Network

Continued development of the Primary Transit Network ~~will make~~**makes** transit appealing by connecting major travel destinations more directly, making these connections faster and more reliable by expanding the use of transit priority measures and increasing the frequency of service so that customers can "show up and go" without having to consult a transit schedule. The Primary Transit Network will also be integrated with other city, regional and inter-city transit services.

Link land use decisions to transit

Compact, mixed-use development and pedestrian-friendly designs are required along the existing and future Primary Transit Network. ~~This~~**Increased development densities in proximity of the Primary Transit Network** will be supported by timely
investment in new transit lines and improved transit service levels to support land use intensification.

Integrate transit with civic life

It is essential that transit service is centrally located and effectively integrated with surrounding land uses. Transit infrastructure must also be designed and maintained to a high standard to provide a safe, clean and comfortable environment where transit riders feel welcome and valued.

Incorporate new transit technologies and innovations

Opportunities exist to incorporate advancements in transit vehicle technology, traffic engineering and customer information systems (e.g., real- time schedule information) to improve customer experience and enhance transit efficiency. **For example, the Primary Transit Network provides for
integration with multi-transit modes including on-demand, shuttle and specialized services.**

Sustain fleet and infrastructure

~~Invest~~**Supporting essential lifecycle maintenance activities preserves transit service levels by ensuring that vehicle, stations, tracks and other facilities remain
in good repair. This ensures that transit services remain safe, reliable and comfortable. Investment** in new maintenance infrastructure to support transit system expansion ~~and undertake essential life-cycle maintenance to sustain existing operations~~**remains essential**.

Expanding the Calgary Transit Network

The CTP ~~proposes the creation of~~**identifies** an integrated ~~family of transit services~~**service delivery model**, including (1) a Base Transit Service, to provide good coverage and a basic level of service to all areas of the city, and (2) a Primary Transit Network, which will provide a ~~well-connected,~~ high frequency route network to support the framework of **Activity Centres** ~~and Corridors~~**(including the Greater Downtown) and Main Streets**.

The CTP transit strategy represents a transit service commitment to Calgarians that will guide the allocation of financial resources for service expansion in future years.

Base Transit Service

Base Transit Service includes a comprehensive range of transit services (e.g., feeder routes, mainline and cross-town transit services) that will support the Primary Transit Network by providing comprehensive community coverage. Base Transit Service may also augment the Primary Transit Network by meeting additional needs (e.g., cross-town travel, local circulator services within the ~~Centre City~~**Greater Downtown** and **Activity Centres**) that involve high ridership but not necessarily full Primary Transit levels of service.

Base Transit Service will provide a comfortable and safe environment and be integrated with the Primary Transit Network to enable convenient transfers. It will extend far enough to ensure that at least 95 per cent of development is within a five-minute walk from transit service (i.e., 400 metres). Development served by the Base Transit Service should also have a sufficient intensity of population and employment to achieve the ~~minimum Council-approved~~ performance policies for transit service.

Primary Transit Network

The Primary Transit Network is defined by level of service - not by mode. It comprises a permanent network of high-frequency transit services ~~(i.e., LRT, Bus Rapid (BRT), streetcars/trams and frequent bus service)~~ that will operate every 10 minutes or less ~~over an extended operating period~~**at least 15 hours a day**, seven days a week. The Primary Transit Network will form the foundation of the transit system and incorporate the highest standards with regard to level of service, operating speed, connectivity and amenities to attract new customers.

The proposed Primary Transit Network concept plan is shown in Map 2 in ~~Appendix D~~**Part 8**. Proposed transit service for ~~Centre City~~**the Greater Downtown** is shown in Map 3. For ease of understanding, two types of Primary Transit service have been identified:

1. A skeletal network of existing and proposed **Light Rail Transit (**LRT**)** lines which form the backbone of the Primary Transit Network and which operate in dedicated or semi-exclusive rights-of-way, separate from auto traffic.

2. A network of other radial and cross-town transit services that will operate in dedicated rights-of-way, ~~High~~**high**-occupancy vehicle (HOV) lanes and mixed traffic, with priority over automobiles at signalized intersections. Transit service in these corridors will begin with bus service and may eventually evolve into higher-order rail service based on future corridor development and travel demand.

The Primary Transit Network will be developed in phases over the next 30 years and will be monitored closely based on five key measures of transit service quality. The measures are:

Frequency

During core operating periods, combined service frequency will be every 10 minutes or better for all modes of Primary Transit. This level of service will enable seamless connections between transit services and make it possible for people living near these services to make spontaneous trips along the transit corridors without consulting a transit schedule.

Span of service

Core operating periods on the Primary Transit will be at least 15 hours a day, seven days a week. Less frequent service will continue to be provided outside the core operating period. This is important in ensuring that all types of trips can be accommodated on the Primary Transit Network – not just work and school commuting.

Speed and directness

Route directness and operating speed are critical to the success of the Primary Transit Network since most travellers will choose the fastest mode when planning their trips. A range of transit priority measures will be implemented, with a “transit first” philosophy along the Primary Transit Network.

Service reliability

Service reliability is one of the critical measures of transit service quality. Users can expect the Primary Transit Network to operate on a reliable schedule to minimize customer wait times. All Primary Transit services should operate within three minutes of scheduled arrival times.

Increased transit capacity

The Primary Transit Network will be closely monitored to ensure that sufficient capacity is available to accommodate ridership demand. Improved frequencies and selection of appropriate transit vehicles will be necessary to provide adequate capacity for a comfortable ride. Strategically located **Activity Centres** and ~~Corridors~~**Main Streets** will also support more efficient use of transit by supporting more balanced, two-way passenger flows on the Primary Transit Network.

The development of the Primary Transit Network is key to the success of the MDP and the CTP, and continues to require prioritized operating and capital investments.

Regional Transit

~~The Calgary Regional Partnership (CRP) has identified enhanced regional transit services within and between its communities, integrated with growth corridors and nodes, as a cornerstone of the proposed Calgary Metropolitan Plan.~~

~~The short-term regional transit goal is to implement an integrated, regional Bus Rapid~~ **The City of Calgary supports collaborating with regional partners on the development of an integrated, high capacity regional transit service. This may include the development of** ~~(BRT) service that would provide two-way service between key destinations within The City of Calgary and adjacent regional communities. These services would be connected through~~ a network of Transit Mobility Hubs. Transit Mobility Hubs are ~~a place~~ **places** of connectivity where different modes of transportation (i.e., walking, ~~cycling~~**wheeling**, bus and rail transit) come together seamlessly, and where there is an attractive, intensive and diverse concentration of housing, employment, shopping and other amenities around a major transit station. Regional transit hubs ~~will~~**should** be located to support other medium- and longer-term transit investments such as inter-city commuter rail and LRT services.

~~The City of Calgary supports the development of an integrated, high capacity regional transit service, and will identify and acquire mobility corridors within Calgary for future regional and inter-city transit services. The City will also take a leadership role in the coordinated planning and development of regional transit services in collaboration with CRP communities.~~

~~The conceptual vision for regional transit service is shown in Map 4 in Appendix D.~~**Effective regional collaboration has the potential to minimize costs and duplication among partners, with a goal of a seamless transit system where users are largely unaware of jurisdictional boundaries (enhancing the user experience).**

New Transit River Crossings

To improve transit connectivity, speed and service reliability, new river crossings of the Bow River and the Elbow River for Primary Transit Service may be required in the future, on the west side of the city, to respond to increased traffic volumes in major transportation corridors such as Glenmore Trail, Sarcee Trail, Crowchild Trail and Bow Trail. These connections would enable the creation of priority transit connections linking proposed **Activity Centres** at the University of Calgary, Mount Royal College, Chinook Centre and the southeast industrial area and prevent transit vehicles from getting 'stuck in traffic'. If feasible, the new transit river crossings could also incorporate provision ~~for pedestrians, cyclists and emergency services to improve Police, Fire and EMS response times and provide new pedestrian and bicycle connections.~~ **for walking, wheeling and emergency services to improve police, fire and emergency medical services (EMS) response times and provide new walking and wheeling connections.**

Before planning any new river crossings, other strategies should be implemented to optimize the operation of existing transportation corridors for Primary Transit and emergency services operation. See sections 3.5 and 3.6 for further information on tools and techniques that can be used to optimize existing transportation infrastructure.

Detailed technical analysis and community engagement will be required to establish the location, design and cost of any new river crossings. Some key stakeholders have indicated that new river crossings may be acceptable for transit, walking, ~~cycling~~**wheeling** and emergency services if ~~there is a persuasive and demonstrable need, and if they are located and designed to successfully mitigate environmental and community impacts. Principles and design considerations for river crossings are outlined in Appendix B.~~ **there is a persuasive and demonstrable need, and if they are located and designed to successfully mitigate environmental and community impacts. Principles and design considerations for crossings of watercourses are outlined in Part 6.**

Linking Transit and Land Use

~~Today, a small percentage~~**In 2016, about 15 per cent** of all population and ~~less than~~**about** one-third of jobs ~~are~~**were** located within 400 metres walking distance of LRT service, which is the only transit mode that currently operates near Primary Transit service levels. The strategic location of **Activity Centres** and ~~Corridors~~**Main Streets** along existing and future Primary Transit corridors will significantly increase the people and jobs within walking distance of the Primary Transit Network.

Policies

Regional transit service

a. ~~In collaboration with the Calgary Regional Partnership and other stakeholders,~~ The City should take a leadership role in the planning and co-ordination of an integrated regional transit system that supports ~~the strategic directions of the Calgary Metropolitan Plan~~**and informs long-range plans for regional transportation networks**.

b. **Right-of-way** requirements for future regional and Primary Transit services must be identified and opportunities to acquire additional right- of-way should be investigated if necessary.

c. In collaboration with the Calgary ~~Regional Partnership~~**Metropolitan Region Board** and other stakeholders, The City should participate in the coordinated planning and development of a system of Transit Mobility Hubs for interconnection of Primary Transit services and regional and inter-city passenger transport modes.

Expanding the Calgary Transit network

d. Base Transit Service should be provided to facilitate convenient access to developments that have a sufficient intensity of population and employment, in order to achieve minimum ~~Council approved~~ performance standards for transit service.

e. A Primary Transit Network of high-frequency transit routes should be developed to improve transit access to the ~~Centre City~~**Greater Downtown** and support **Activity Centres** and ~~Corridors~~**Main Streets**.

f. Urban design principles that respect existing communities and utilize environmental best practices should be used in the design and construction of the Primary Transit Network.

g. Timely investment in new transit lines and improved transit service levels, focusing on the Primary Transit Network, should be ~~provided to support existing higher intensity areas and encourage intensification of new, priority growth areas.~~ **provided to support existing higher-intensity areas and encourage intensification of new, priority-growth areas.**

h. Community design should minimize pedestrian **street** walking distance to transit service (i.e., a bus zone or LRT station) to 400 metres or less in all areas of the city. In recognition of unusual circumstances, up to five per cent of the area population (i.e., dwelling units) may be located beyond 400 metres **street** walking distance from transit service.

Improving transit speed and reliability

i. A full range of strategies such as transit signal priority, intelligent priority and information systems, ~~High~~**high**-occupancy vehicle (HOV) lanes, queue-jump lanes and bus stop consolidation should be utilized to optimize transit travel times **with an emphasis along Primary Transit Network corridors**.

Passenger comfort and convenience

j. All transit infrastructure should be designed, operated and maintained to provide a safe, clean and comfortable environment and ensure ease of transfer between transit services and with other modes ~~of transportation.~~ **of transportation.**

k. Advancements in transit vehicle technology and Intelligent Transportation Systems (ITS) should be used where appropriate, along with best operating practices to improve passenger information, amenities, transit capacity and operating efficiency.

Integration with other modes

l. Other modes of transportation, specifically walking, ~~cycling~~**wheeling**, private vehicles, rail and air, should be integrated with transit services.

m. Transit Mobility Hubs should accommodate efficient transit access, comfortable passenger waiting areas and safe, direct, unobstructed routes for pedestrians and cyclists.

Social considerations

n. A range of affordable, accessible, fixed-route and specialized door-to-door transit services should be provided to address the mobility needs of persons with disabilities and low income Calgarians who depend on public transit for their mobility.

River crossings

o. Planning and design of any new river crossings must consider the principles and design considerations documented in ~~Appendix B~~**Part 6** of the CTP.

3.4 Goods Movement

Objective

To recognize the important economic role of goods movement by providing a safe, efficient and connective goods movement network that supports the Calgary International Airport, the Canadian National (CN) and Canadian Pacific (CP) intermodal facilities, transportation and distribution districts and goods movement routes, while also minimizing impacts on surrounding communities.

Supports

- **Key Direction #5**: Increase mobility choices.
- **Key Direction #7**: Create **Complete Streets**.
- **Key Direction #8**: Optimize infrastructure.
- **Transportation Goal #1**: Align transportation planning and infrastructure investment with city and regional land use directions and implementation strategies.
- **Transportation Goal #2**: Promote safety for all transportation system users.
- **Transportation Goal #5**: Promote economic development by ensuring efficient goods movement and labour force mobility.
- **Transportation Goal #7**: Ensure transportation infrastructure is well managed.

Discussion

Calgary has proven itself to be a global economic leader by offering a full range of multi-modal services and solutions. The city is a major part of the east-west trade corridor in Western Canada and is a key distribution point for movement of Asia-Pacific- related imports and exports. ~~Calgary is currently home to 500,000 jobs in a variety of areas, including 50,000 jobs related to~~ The transportation ~~sector. Approximately two out of every five employees in Calgary work in wholesale~~, warehousing~~, distribution~~ and ~~storage.~~ **wholesale trade sectors directly accounted for nearly eight per cent or $9 billion of the Calgary region's gross domestic product (GDP) in 2015. These sectors in turn support other economic activity, yielding a combined GDP impact of more than $14.5 billion in 2015. They also directly and indirectly supported up to 134,000 jobs in the Calgary region.**

As import/export traffic grows, there will be direct benefits to Calgary in terms of employment and the local economy. **However,** as urban goods ~~movement has~~**movements have** grown, so has associated congestion, energy consumption and safety concerns. A proactive approach is required to develop strategies that will ensure the city remains competitive economically on the local, national and global stage. The City must also work in conjunction with the provincial and federal governments to create a sustainable goods transportation system that addresses local, regional, national and international needs.

An effective and reliable goods movement network will be required to support some of the key industrial areas and ~~projects emerging from~~**commercial vehicle traffic generators in** the Calgary area, including:

- the northeast and southeast industrial areas~~;~~
- the Shepard Industrial Area~~;~~
- **the northwest aggregate resources**
- expansion plans for CN and CP intermodal facilities~~; and~~
- the Calgary International Airport ~~expansion.~~**(a.k.a. "YYC")**

The Significance of Air and Rail Goods Movement

~~Via airplane, c~~**C**argo shipments of ~~134,000~~**155,820** tonnes passed through the Calgary International Airport **via airplane** in ~~2007~~**2019**, with continued growth expected. Through Canada's two major rail companies, ~~both~~ CN and CP~~, transport 330,000 20-foot equivalent units (TEUs)~~ **360,000 containers** combined **are transported** annually. Both companies have plans to expand facility capacity~~ that could bring total volumes up to over 700,000 TEUs per year~~.

Calgary is a significant distribution hub in Western Canada. Combined with the goods movement network utilizing trucks and other commercial vehicle modes, Calgary will continue to be a competitive centre in the distribution of goods to Canada and the U.S.

In order to sustain a vibrant economy in Calgary, it is important to consider all of the goods movement modes in any major planning process. The three primary modes responsible for goods movement in the Calgary region are air, rail and ~~truck~~**roadway**. Each of these modes plays a distinct role in goods movement, and they must be capable of working together in order to drive the economy.

Air

Airports are a critical component of Calgary's transportation infrastructure. Air cargo demand is increasing, along with continued growth of passenger air transportation. Air cargo is one of the fastest growing modes of transportation for high-priority, time-sensitive shipments. Aircraft maintenance and manufacturing is also an important part of the aviation industry in the Calgary region. In addition, logistics and aviation training is provided at several post-secondary institutions in Calgary.

The Calgary International Airport ~~is one of only two Canadian airports with~~ **has** direct **air** cargo connections to Asia**, the United Kingdom, Mexico** and Europe**, and cargo can be shipped from Calgary to anywhere else in the world within 48 hours**. With no curfews or noise restrictions, the Calgary International Airport operates 24 hours a day, seven days a week. In addition, the Calgary International Airport has award-winning, first-class cargo facilities and services, a premier livestock handling facility, **and** on-site refrigeration facilities~~ and 17~~**. The YYC Global Logistics Park occupies over 330** acres of ~~runway-side warehouse~~**land** and ~~logistics lands~~**connects commercial, airside and logistic businesses**. Aviation logistics also provides support for energy management and banking industries in Calgary.

Rail

Rail transportation is a key component of the logistics and distribution sector in the Calgary Region, serving as a critical link in the supply chain for many businesses. CN and CP both have major rail intermodal facilities in ~~southeast~~**the** Calgary **region**.

Calgary is a major redistribution point for goods destined to Western Canada and the United States (U.S.) arriving by rail via Vancouver's seaports~~, with 40 per cent of all inbound shipments from Vancouver redistributed through Calgary. Goods movement by rail accounts for 27 per cent of imports to and 23 per cent of exports~~**. In 2014, rail carried nearly 30 per cent of goods by**

weight into and out of the Calgary region. In 2016, 220,000 containers transporting 2.8 million tonnes of cargo were moved to Calgary by rail, and 140,000 containers transporting 1.7 million tonnes were moved from Calgary.

Trains operating in urban areas sometimes cross **roadways**, and the need for safer infrastructure arises from the interaction between railway and **roadway** users. There are numerous level rail crossings within Calgary city limits. In order to mitigate the risks and traffic delays associated with level rail crossings, The City will continue to review the need for grade separation of rail from **roadways** in key corridors.

~~Truck~~Road

Within Alberta, trucking is the primary mode for the movement of goods. Calgary plays an important role as a trucking hub with major highway connections passing through the city. Highway 2 (Deerfoot Trail) ~~is the~~**and Highway 201 (Stoney Trail) are** major north/south ~~route~~**routes** as part of the CANAMEX highway system~~; it also provides connectivity to the~~**, helping move people and products across** Alberta ~~oilsands~~**and enhancing access to markets** in the ~~northeast part of the province~~**United States and Mexico** . The Trans-Canada Highway (16th Avenue North) is the major east/west route providing connectivity across Canada. ~~Once~~**The** completed~~,~~ portions of the Calgary Ring **Road** ~~will~~ also play ~~a central~~**an important** role in facilitating goods movement to every quadrant of the city.

~~Goods movement by truck accounts for 46 per cent of imports to and 64 per cent of exports from Calgary. There were over 265,000 commercial vehicle trips per day in 2006, accounting for 12 per cent of vehicle kilometres travelled (VKT) in Calgary and the surrounding region. Of these commercial vehicle trips, nearly 80 per cent had origins/destinations within the city limits, with the remaining 20 per cent travelling to/from the surrounding Calgary area. Only three per cent of commercial vehicle trips bypass Calgary.~~

In 2014, about 70 per cent of all goods by weight entered and exited Calgary by truck. In 2015, approximately 120,000 truck trips were made within Calgary on a daily basis, according to City estimates.

The City is responsible for the design and review of the truck route network within Calgary, including high load and dangerous goods routes. In determining appropriate network connections, The City must balance the needs of goods and services movement with the needs of residential communities impacted by truck routes. Impacts on adjacent municipalities should also be considered. Ultimately, the truck routes within Calgary are reviewed through Council-approved goods movement transportation policies, and designated routes are provided in goods movement bylaws. As per City bylaw, trucks over a certain weight must stay on designated routes while travelling within Calgary city limits. Trucks may only deviate from assigned routes to access their destinations using the shortest path to and from designated truck routes.

The CTP includes a ~~new~~ Primary Goods Movement Network that will facilitate the movement of goods and services in Calgary. The Primary Goods Movement Network does not outline all future truck routes, but defines high-priority goods movement routes where the most concentrated activity ~~will occur.~~ **will occur and therefore where improvements are anticipated to be warranted on the basis of safety and economic benefits. The location of a candidate investment project on the Primary Goods Movement Network will be addressed during the evaluation and prioritization of transportation**

Trucks Versus Commercial Vehicles

Commercial vehicles are responsible for goods and services movement and include heavy trucks, medium truck, and light vehicles that are used for commercial purposes. Heavy and medium trucks are covered by The City's bylaws, requiring them to use designated truck routes during transportation. Light commercial vehicles (e.g., small couriers, electricians, cable providers) provide small-scale goods and services movement, making up 50 per cent of the distance traveled for all commercial vehicles.

It is critical for businesses to have a reliable network of roadways where light commercial vehicles and larger trucks can all travel efficiently between stops.

infrastructure investment projects. Significant investments in roadway capacity and access control improvements (e.g. grade separated interchanges) may be approved for locations on Main Goods Movement Corridors. On Supporting Goods Movement Corridors a greater emphasis will be placed on operational improvements (i.e. efficiency) and compatibility with adjacent land uses. Emerging Goods Movement Corridors identify road segments of increased interest on the part of industry stakeholders. More detailed information can be found in the Goods Movement Strategy (GMS).

All existing and future truck routes, including high load and dangerous goods corridors, will be identified on an ongoing basis through regularly issued bylaw updates.

The Primary Goods Movement Network is shown in Map 5 in ~~Appendix D~~**Part 8**.

Increasing transportation options, and therefore reducing automobile use, will mitigate the impact of congestion on commercial vehicle movements. Additional transportation tools and techniques outlined in Section 3.6 will optimize the flow of traffic in Calgary and further increase reliability and capacity for goods movement.

Developments in the e-commerce and transportation technology sectors (e.g. drone delivery service testing, automated commercial vehicles) have the potential to disrupt traditional patterns of goods movement in Calgary in the next twenty years. However, there is a great deal of uncertainty associated with transportation technology at the current time.
Additional policies outlined in Section 3.14 will ensure that The City will be prepared to respond as the implications of new technologies become clearer.

Policies

a. The importance of intermodal facilities and a connected goods movement network should be recognized to ensure reliable goods movement and land accessibility.

b. The City, regional partners and other stakeholders should co-ordinate the development of **roadway** connections in the city and region, with consideration for the location of industrial land uses.

c. The integrity of major goods movement routes should be protected by ~~limiting direct driveway access to roadways that form part of the Primary Goods Movement Network, while encouraging appropriate~~**coordinating** adjacent land use planning with **the provision of** adequate truck accessibility.

d. Intelligent Transportation Systems (ITS) should be used to improve traffic flow and travel time reliability on the Primary Goods Movement Network.

e. The retention and expansion of existing railway corridors within city limits should be supported.

f. The City should consider the impact of goods movement routes on **roadways** in adjacent municipalities.

g. The City should study ways to improve the operational efficiency of the existing Goods Movement Network for commercial vehicles, including the feasibility of implementing commercial vehicle priority measures along corridors (e.g. dedicated lanes) and at intersections (signal priority).

3.5 High-Occupancy Vehicles (HOV)

Objective

Optimize the person-moving capacity of the transportation system by increasing average vehicle occupancy and reducing reliance on single-occupant vehicles for commuting in Calgary, and improve operating speeds and reliability of transit service by creating priority along Primary Transit corridors.

Supports

- **Key Direction ~~#~~ 4**: Increase mobility choices.
- **Key Direction ~~#~~ 7**: Create **Complete Streets**.
- **Key Direction ~~#~~ 8**: Optimize infrastructure.
- **Transportation Goal ~~#~~4**: Enable public transit, walking and cycling as the preferred mobility choices for more people.
- **Transportation Goal ~~#~~6**: Advance environmental sustainability.

Discussion

A ~~H~~high-occupancy vehicle (HOV) is **currently** defined in Calgary as a bus, any motor vehicle with two or more occupants, including taxis, or a bicycle. HOV lanes can take many forms, including lanes restricted for use by carpoolers, **low or zero-emission vehicles,** transit-only lanes, ~~bus-only shoulders~~**dedicated shoulder lanes** and queue jumps. **HOV lanes exist in Calgary in several locations, including segments of Centre Street North, 9th Avenue S.E., 17th Avenue S.E. and 14 Street S.W**. HOV lanes are most successful when supported by complementary infrastructure, such as dedicated carpool parking stalls, as well as public awareness campaigns and regular enforcement.

Providing HOV lanes supports strategic goals to reduce reliance on single-occupant vehicles and helps make public transit more appealing by improving transit travel speeds and service reliability. HOV facilities can also help improve air quality, reduce energy demands and ~~greenhouse gas~~**GHG** emissions and support more land use intensification by linking **the Greater Downtown, Activity Centres** and ~~Corridors.~~ **Main Streets.** A comprehensive and interconnected HOV network will help to manage transportation demand efficiently by optimizing the use and people-moving capacity of existing **roadway** infrastructure.

The CTP defines a Primary HOV Network that effectively connects major destinations throughout the city. Further evaluation of some HOV facilities is required to determine their configuration (e.g., transit only, carpool only) and implementation opportunities (e.g., widening, lane reversal, lane conversion).

The Primary HOV Network is shown in Map 6 in ~~Appendix D~~**Part 8**.

A variety of factors were considered to determine HOV corridors, including:

- alignment with the Primary Transit Network~~;~~
- projected transit volumes and operations~~;~~
- projected carpool volumes~~;~~
- congestion~~;~~
- corridor characteristics~~;~~
- adjacent land uses~~; and~~
- strategic context~~.~~

HOV Lanes in Calgary

Calgary's first HOV lane is located on Centre **Street** North between 20th Avenue North and 3rd Avenue South. During weekday rush hours, the curb lane in the peak direction is reserved for vehicles with two or more occupants, buses and cyclists. The HOV lane operates in conjunction with a lane reversal system that designates three of the four Centre **Street** traffic lanes for peak direction travel.

The Centre Street HOV lane is one of approximately two dozen arterial HOV facilities currently operating in Canada.

The proposed HOV network totals approximately 220 kilometres (440 lane-km), excluding potential ~~P~~ **p**rovincial HOV corridors and will be implemented over the next ~~10 to 60~~**50** years. Other corridors may be identified in the future for inclusion in the Primary HOV Network.

Policies

a. **A** network of HOV lanes and supportive infrastructure should be ~~developed that are appropriate to~~ **implemented in order to support progress toward achievement of** the ~~current~~**goals and objectives of the MDP, CTP** and ~~future needs of Calgarians~~**(particularly) the Climate Resilience Strategy**.

b. HOV priority measures should be implemented during new construction, improvement or widening projects on City- owned **roadways** shown on the Primary HOV Network, unless such measures are demonstrated to be inappropriate at that time or place.

c. The provincial government, The City and other municipal governments should work collaboratively to develop an inter-municipal network of HOV lanes and supportive infrastructure to serve regional transportation goals.

d. HOV lanes and supportive infrastructure such as designated carpool parking lots should be developed in tandem to move people more effectively.

3.6 Quality of Service **and User Experience**

Objective

To provide **a** high-quality service for all modes of transportation ~~using effective and cost-efficient transportation management tools and techniques~~**while addressing the travel experience for all users**.

Supports

- **Key Direction #5**: Increase mobility choices.
- **Key Direction #6**: Develop a Primary Transit Network.
- **Key Direction #7**: Create **Complete Streets**.
- **Key Direction #8**: Optimize infrastructure.
- **Transportation Goal #1**: Align transportation planning and infrastructure investment with city and regional land use directions and implementation strategies.
- **Transportation Goal** ~~#4: Enable public transit, walking and cycling as the preferred mobility choices for more people~~**2: Promote safety for all transportation system users**.
- **Transportation Goal #3: Provide affordable mobility and universal access for all.**
- **Transportation Goal 4: Enable public transit, walking and wheeling as the preferred mobility choices for more people.**
- **Transportation Goal 5**: Promote economic development by ensuring efficient goods movement and labour force mobility.
- **Transportation Goal #7**: Ensure transportation infrastructure is well managed.

Discussion

Calgary, like most North American cities, has placed the highest priority on accommodating private vehicle use over the last 50 years. Significant investments have been made to develop a **Road** and **Street** Network capable of moving high volumes of vehicular traffic over long distances. However, despite these investments in vehicle-oriented infrastructure, congestion and delays have continued to increase in Calgary and every growing major city in North America. In large part, this is because of the separation between residential communities, employment centres and services. This separation has increased the distances people are required to travel, making private vehicles the most convenient option.

Evaluation of transportation networks has focused traditionally on peak morning or afternoon rush hour and the associated traffic congestion. The anticipated traffic volume relative to the capacity of a **roadway** or intersection has, therefore, been the primary measure of service levels. The shift in emphasis to all modes of transportation requires us to broaden our definition of service to include walking, ~~cycling~~**wheeling**, transit, goods movement and carpooling. When levels of human activity increase in a growing city, it also becomes important to consider the entire day rather than just peak travel times. This means evaluating the overall quality of service for all modes of transportation, rather than just peak-hour traffic congestion. As well, the expectations of citizens in a city of 2.3 million people can be very different from those in a city of one million people, just as the expectations of **the residents of a** small town ~~dwellers~~**can** differ significantly from those ~~living~~ in **a** mid-sized ~~cities~~**city**.

Assessing Quality of Service for Proposed Developments

The Transportation Impact Assessment (TIA), which has been used to determine the impact of large developments on Calgary's transportation network, has traditionally focused heavily on automobile use and mitigating additional traffic through roadway improvements. Assessment of mobility impacts in areas within walking distance of Primary Transit needs to focus on transit- oriented improvements, enhanced walking and wheeling environments, the optimization of more sustainable transportation modes and vehicle trip reduction programs.

An assessment of the transportation impacts of Transit-oriented Developments (TODs) will generally include:

- **An assessment of the alignment of proposed development with the most important components of Transit-oriented Development.**
- **Analysis of street infrastructure layout and design that supports efficient transit service.**
- **Alignment with City plans for adjacent Primary Transit corridors and Base Transit Services.**
- **Analysis and plan to improve walking and wheeling routes.**
- **Analysis and plan for parking supply and demand, including park and ride facilities.**
- **Analysis and plan for vehicle and truck access and circulation.**
- **Community and stakeholder engagement, identification and assessment of mobility issues.**
- **Phasing of development for large projects.**
- **Identification of appropriate trip reduction programs.**

Quality of Service

Evaluating quality of service also means that we must consider both quantitative and qualitative measures. Efficiency and reliability must be considered in conjunction with attractiveness and impacts on surrounding communities. For example, transit quality of service depends on reliability, frequency, speed, convenience, cleanliness and safety. The level of traffic congestion is only one of many factors influencing the quality of service perceived by transit customers.

Quality of service for pedestrians and cyclists can best be measured by evaluating how far people are willing to walk or ~~cycle~~**wheel** to reach different destinations. This means assessing how direct the connections are between homes, schools, community centres, leisure facilities, parks and jobs. Equally important, although difficult to measure, is the attractiveness and safety of the routes available for pedestrians and cyclists.

Vehicles will continue to be a popular mode of transportation in the future. Many businesses rely on light commercial vehicles to deliver goods and services throughout Calgary. However, by making other modes of transportation realistic choices for many of the trips in Calgary, automobile use per person will be reduced over time and mitigate the impact of congestion on those people or services that must drive.

There are a variety of tools and techniques that can be used to mitigate the effects of congestion for all modes of transportation and improve the flow of traffic. These include:

Travel Demand Management (TDM)

TDM uses policies, programs, services and products to encourage a shift in travel behaviour from single-occupant vehicles to more sustainable modes of travel, including walking, ~~cycling~~**wheeling**, transit and carpooling. Examples include car sharing, universal transit pass programs for post-secondary educational institutions, promoting working from home and changing the time of day people travel. TDM saves people time by helping them travel more efficiently, and it improves health by promoting both physical activity and more environment- friendly travel that reduces ~~greenhouse gas~~**GHG** emissions and other air pollutants. It benefits employers by increasing productivity, reducing parking costs and helping to attract and retain workers. It promotes economic development by reducing congestion and enhancing worker mobility.

Transportation System Management (TSM)

TSM involves cost-efficient measures that focus on improving the operational efficiency and effectiveness of transportation infrastructure to reduce overall delay for all users. Many TSM measures involve traffic control changes and small- scale **roadway** improvements, and they provide benefits for multiple modes of transportation.
Reversible lanes are one example of how TSM measures have been used in Calgary. TSM projects, which may cost from a few thousand to several hundred thousand dollars, may delay or even eliminate the need for multi-million dollar capital construction projects. And while major infrastructure projects can take years to plan and build, most TSM projects can be implemented much more quickly.

Intelligent Transportation Systems (ITS)

~~TS~~ **ITS** is the application of advanced technology to improve transportation operations, including the control and management of traffic flow and communication of relevant information to travellers and service providers so they can respond to changes in travel conditions or times as necessary. These technologies can enhance all forms of personal mobility, as well as goods movement, protective services and parking facilities.

Incident management

Incident management involves a set of actions to manage traffic during unplanned incidents such as motor vehicle collisions or planned events such as construction detours. Effective management of incidents increases the reliability of the transportation network, which provides direct economic benefits with regard to goods movement and worker mobility, and helps to maintain transit schedules. Increased reliability of travel time has even been found to be more important than total travel time for commuters.

Responding to Traffic Congestion

The CTP recognizes that actions which improve vehicle mobility will continue to be important to Calgarians. Land use changes that reduce our dependence on vehicles, thereby enabling more trips to be made by active modes or transit, will have the greatest impact on travel times in Calgary. Reduced vehicle use, over the long term, will minimize the impacts of congestion for those who choose to drive.

Every **street** in Calgary is designed to move vehicles. The **Road** and **Street** Palette described in section 3.7 provides a wider variety of **street** types; some put more emphasis on vehicles, while others place a high priority on other modes of transportation. Mobility for vehicles and all other modes of transportation will be facilitated by putting the right type of **street** in the right place.

Improving both traffic flow and the reliability of the transportation system, now and in the future, will provide direct benefits to motorists in Calgary. Some improvements will require the construction of new infrastructure such as **roadways** and interchanges. However, many traffic problems impacting cars can be mitigated through less costly and more efficient transportation management tools.

Transportation pricing

The use of pricing (i.e., charging a fee to use a transportation facility) as a transportation management tool can help optimize the use of the transportation system. This approach should be considered where new infrastructure construction is not possible or desirable. Revenues from pricing initiatives should be reinvested back into the transportation system.

Effectively combining these tools and techniques will have a variety of benefits for Calgarians, including:

- improving mobility options on existing infrastructure, reducing overall delay for all transportation modes~~;~~.
- improving the speed and reliability on goods movement corridors~~;~~.
- managing traffic more efficiently during planned events or unplanned incidents~~;~~.
- reducing the need for costly infrastructure improvements~~; and~~.
- providing motorists and transit users with better information that helps them to make effective travel choices.

User Experience

Providing a positive user experience is essential to achieving the vision outlined in the CTP and the MDP. A user's travel experience includes all phases of a trip, from pre-planning to the walk up to the door at a final destination.

The Transportation Department is committed to addressing the travel experience for all of the users of Calgary's transportation system through actions to identify issues and opportunities related to safety, accessibility, information and reliability for all of the services it provides. This commitment has several policy implications:

- **Transportation should develop and communicate a comprehensive vision and goals for the experience of users of Calgary's transportation system.**
- **Service teams should ensure that a comprehensive and meaningful customer engagement process is established to ensure that the "voice of the user" informs service planning and operational decision-making. To be "meaningful", Calgarians who use the service should be engaged and have the opportunity to influence plans and decisions before they are finalized.**
- **Informed by user feedback, the Transportation Department should produce a "user-experience action plan" identifying existing and new/potential initiatives to be undertaken within the next four-year budget cycle.**
- **Evaluating the impact to user experience resulting from the projects and plans identified through a "user-experience action plan" requires systems and processes to measure progress relative to objectives – where any gaps exist, service teams should develop the key performance indicators (KPIs) and metrics necessary to enable effective evaluation.**

Policies

a. TDM strategies should be implemented first to reduce or eliminate the need for new links in the transportation system, and must be integrated into all municipal approval processes to promote more sustainable travel choices.

b. Incentives should be provided to developers to make sustainable travel options such as walking, ~~cycling~~**wheeling**, transit and carpooling integral to all **TOD** projects.

c. Appropriate TSM, ITS and incident management strategies should be used to mitigate congestion, improve safety, increase travel time reliability for all modes of transportation and to better manage competing demands for right-of-way space between different transportation users.

d. The reliability of the transportation system should be maintained by actively managing planned events or unplanned incidents.

e. Ongoing educational opportunities should be provided to the public regarding their role in minor traffic collisions, and first responders should be trained to manage traffic effectively during incidents.

f. Strategic improvements should be identified on the transportation network that would benefit response times for emergency services.

g. Transportation system maintenance, construction- related lane closures and detours should be managed to reduce ~~vehicular~~ congestion **(all modes)** and minimize rerouting of traffic, and restrictions on HOV/transit lanes should be adhered to during incidents to ensure reliable service for those modes.

h. Transportation pricing tools that take into account the economic, environmental and social costs of travel should be considered in order to achieve more efficient use of existing and future transportation infrastructure.

i. The unique travel characteristics of higher-density, mixed-use developments, such as **the Greater Downtown, Activity Centres**, ~~Corridors~~**Main Streets** and **TODs**, must be recognized by adjusting mobility requirements to support and promote all modes of transportation.

3.7 Complete Streets

Objective

Increase the attractiveness, convenience and safety of all modes of transportation by creating a ~~new~~ selection of multi-modal streets that emphasize different modes of transportation, incorporate elements of ~~green~~**natural** infrastructure and function in the context of surrounding land uses.

Supports

- **Key Direction #2**: Provide more choice within complete communities.
- **Key Direction #5**: Increase mobility choices.
- **Key Direction #6**: Develop a Primary Transit Network.
- **Key Direction #7**: Create **Complete Streets**.
- **Key Direction #8**: Optimize infrastructure.
- **Transportation Goal #2**: Promote safety for all transportation system users.
- **Transportation Goal #3**: Provide affordable mobility and universal access for all.
- **Transportation Goal #4**: Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.
- **Transportation Goal #5**: Promote economic development by ensuring efficient goods movement and labour force mobility.
- **Transportation Goal #6**: Advance environmental sustainability.

Discussion

What is a **Complete Street**? It is a **street** that:

- Moves people, by foot, bike, bus and car**.**
- Is a place where people can live, work, shop and play**.**
- Supports the natural environment**.**
- Facilitates movement of trucks and service vehicles, and supports ~~our~~**the local** economy**.**

The main function of a **street** is to provide a connection between origins (i.e., where ~~we~~**people** are) and destinations (i.e., where ~~we~~**people** want to go). Building multi-modal **streets** that do not focus exclusively on vehicles creates options for people who want to walk, ~~cycle~~**wheel** or take transit. This, in turn, increases the capacity of the overall transportation system and mitigates traffic congestion by reducing the number of unnecessary automobile trips on the transportation system. Creating more mobility choices also maximizes accessibility and the ability to travel for all Calgarians.

Roads and **streets** also provide space for all of the various utilities that are necessary to support adjacent land uses. These include shallow utilities like gas and phone lines, and deeper utilities like water pipes and sewers.

Streets, along with the vehicles and people that use them, have a direct impact on the environment. They contribute to traffic noise, degradation of air and water quality and ~~greenhouse gas (~~GHG~~)~~ emissions. In 2005, 30 per cent of GHG emissions in Calgary came from transportation sources~~.~~**; in 2018, 34 per cent of GHG emissions were from transportation sources.** These sources also impact water quality through the deposition of air pollutants, oil spills and **roadway** de-icing. Many of these impacts can be mitigated and/

Creating a Complete Street

Mixed land use development with a pedestrian-friendly streetscape will support Primary Transit, and strong urban design elements will enhance the public realm to create a safe, vibrant, and attractive street.

The Road and Street Network shown in Map 7 in Part 8 identifies a number of corridors that are envisioned to become Urban Boulevards.

Wide sidewalks allow for comfortable and unobstructed movement of pedestrians. Adjacent land use development will be integrated with the street, providing continuous building façades and windows onto the street that will improve pedestrian comfort. Inclusion of natural infrastructure (such as trees and additional buffer planting) will reduce the impacts of vehicle traffic on pedestrians.

~~17 Avenue SE~~**Example corridor** (before)

~~17 Avenue SE~~**Example corridor** (after, concept only)

Credit: Design Centre for **Sustainability**, SALA, UBC

Design Speed and Traffic Calming

Traffic calming measures are used to mitigate the conflict between mobility and placemaking, and lower operating speeds on streets in Calgary communities.

A traffic speed study was undertaken on the Collector **streets** in a newer residential community, and showed 85th percentile speeds in the range of 70 km/h. The posted speed limit on these **streets** is 50 km/h. Traffic calming measures have recently been approved to retrofit several **streets** in an effort to reduce these operating speeds.

Research shows that intersection and driveway density, pedestrian activity, onstreet parking, median design, roadside development, traffic signal density and adjacent land uses all have an effect on vehicle speed. Selecting appropriate elements in the initial design to achieve desired operating speed may preclude the eventual need for traffic calming measures.

or eliminated through sustainable design, particularly by implementing ~~green~~**natural** infrastructure design approaches.

Streets also have a major role in placemaking – creating places where people can meet, live, shop, work and play. Traditionally, **streets** were the centre of civic life, creating focal points for communities and businesses. In the past 50 years, more emphasis has been put on moving large numbers of vehicles at high speed over long distances. Greater emphasis on the public realm can create economic and social benefits for communities, business owners and the city as a whole.

Not every **street** in Calgary will be able to meet the needs of all users. Different types of **streets** have different functions, so their design should fit with the ~~community context. By building a fully integrated, balanced, con- nected transportation network that minimizes conflict between different functions of the street (mobility, the environment and placemaking) we can meet the needs of Calgarians now and in the future.~~ **context. The CTP has established a road and street typology addressing context and the provision of mobility for a range of users. The role of the Complete Streets Policy and Guide, in conjunction with the updated Design Guidelines for Subdivision Servicing, is to provide comprehensive guidelines for the incorporation of Complete Streets concepts into the planning, design and construction of new streets, and the reconstruction of existing streets.**

In the future, new river or creek crossings will be required to increase **roadway** capacity as strategies to optimize operation of the existing infrastructure are exhausted. Also, new river or creek crossings may be necessary to provide **roadway** connectivity either city-wide as part of the **road** and **street** network, or to connect locally by Residential **Streets** in the community. In those cases, the principles outlined in ~~Appendix B~~**Part 6**, must be applied during the planning and designing process of any **road**,~~**street** and Residential **Street**, respecting natural ecosystems and adjacent communities.~~
street and Residential **Street**, respecting natural ecosystems and adjacent communities.

The Road and Street Palette

The ~~new~~ **Road** and **Street** Palette has been developed to differentiate between more traditional "**roads**," which primarily serve long-distance vehicle trips and provide limited access to adjacent land uses, and "**streets**," which serve a b**road**er range of transportation modes and interact directly with adjacent land uses.

Figure 4 – The Road and Street Palette

*Includes light commercial vehicles, waste and recycling vehicles, etc.
*Emergency services, fire trucks to be accommodated on all street classifications.

Accommodated with high standards
Accommodated with variable standards
Not required, or poor performance is acceptable

The street is the river of life of the city, the place where we come together, the pathway to the center.

William H. Whyte, an American sociologist and journalist

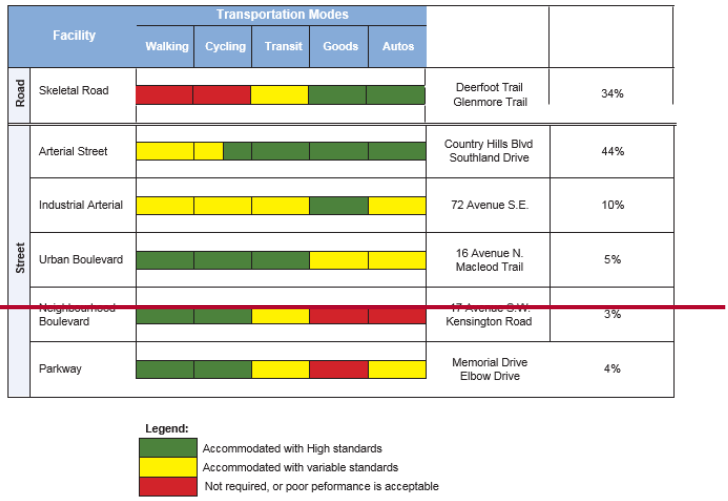
Streets and **roads** should provide mobility for a wide range of users, facilitate the movement of goods and services to support the economy and incorporate elements of ~~green~~**natural** infrastructure to enhance the environment. However, **streets** also contribute to placemaking, while the primary role of **roads** is the movement of people and goods over long distances at higher speeds.

The priority level for each transportation mode (walking, ~~cycling~~**wheeling**, transit, goods movement and vehicles) is clearly defined for each type of **road** and **street** in Figure ~~3~~**4**.

Each is strongly linked to the adjacent land use context within the applicable typologies, as described in the MDP. The examples provided in Figure ~~3~~**4** represent transportation facilities where land uses are expected to evolve over time to support the proposed **street** type (e.g., ~~MacLeod Trail~~**49th Street N.W.** as an Urban Boulevard). Actual design parameters and operational processes for each facility reflect the priorities assigned to each mode of transportation in Figure ~~3~~**4** (appropriate **Complete Streets** handbooks and guidelines will provide design information in detail).

Every **street** should create an environment that is comfortable for all transportation modes, but **streets** in Figure ~~3~~**4** that prioritize walking and ~~cycling~~**wheeling** require careful attention to design elements that support placemaking and the public realm. These **streets** are locations where large numbers of people will spend time walking, ~~cycling~~**wheeling**, shopping, and socializing. **Public realm** policies are contained in the MDP, and highlight important design considerations for these **streets**.

Roads and **streets** that focus on the movement of private vehicles and commercial vehicles will make up ~~88~~**78** per cent of the future network, while the remaining ~~12~~**22** per cent will be composed of **streets** that emphasize pedestrians, cyclists and transit~~. The purpose of all six road and street types can be summarized as follows~~.



Note: Access to emergency services and incorporation of emergency evacuation routes must be considered in the design of all *road* and *street* types.

Figure 3 – The *Road* and *Street* Palette

~~Roads~~

~~***Skeletal Roads*** promote the movement of vehicular traffic over longer distances. They typically operate at high speeds and have little direct access and interaction with adjacent land uses. Ideally, they should be spaced approximately three to five kilometres apart to form a grid across the city. Skeletal~~

~~Roads may present opportunities to implement green infrastructure in order to maximize water infiltration, slow, detain and filter roadway runoff, and preserve and enhance biodiversity.~~

~~Note: Roads equate to "expressways" and "freeways" from previous classifications.~~

~~Streets~~

~~***Arterial Streets*** provide a high quality environment for all modes of transportation, and are the most common type of street in the transportation system. They have varying degrees of interaction with adjacent land uses, but on average allow for greater connectivity than Skeletal Roads. Arterial Streets are not destinations themselves but provide a reasonably direct connection between multiple communities and major destinations. Ideally, they should be spaced approximately 800 metres to 1600 metres apart. Green infrastructure strategies might include, among others, vegetated swales, rain gardens, filter strips, and native vegetation.~~

~~***Industrial Arterials*** are located in industrial areas throughout Calgary. Their first priority is the efficient movement of heavy trucks, but, as streets, they still accommodate all modes of transportation. They tend to be lower speed streets with a high percentage of truck volume, which often represents up to 30 per cent of all traffic. The level of connectivity provided is dependent on a number of factors, including the size of adjacent industrial lots.~~

~~***Urban Boulevards*** form the backbone of higher density Corridors and Activity Centres. They give the highest priority to walking, cycling and transit, butaccommodate reasonably high volumes of vehicular traffic. These streets are destinations, both locally and regionally. They are fully integrated with adjacent land uses (see the Urban Corridor typology in the MDP) and provide high levels of connectivity to surrounding communities or destinations. High quality urban design and green infrastructure are critical components of Urban Boulevards. Snow clearing should be handled in such a way that it does not interfere with pedestrian and bicycle movement.~~

~~***Neighbourhood Boulevards*** are similar to Urban Boulevards, but on a smaller scale. These streets support retail and medium density residential Corridors. Pedestrians and cyclists have the highest priority on Neighbourhood Boulevards. These streets are destinations, but primarily for the local communities surrounding them. They are fully integrated with~~

adjacent land uses(see the Neighbourhood Corridor typology in the MDP) and provide the highest level of connectivity of all street types. High-quality urban design and green infrastructure strategies are incorporated into Neighbourhood Boulevards. Snow clearing should be handled in such a way that it does not interfere with pedestrian and bicycle movement.

Parkways focus on integration with natural areas. Natural vegetation and new forms of stormwater management are integrated with the street. Adjacent land uses would include large natural parks, waterways or special public institutions. Parkways present many opportunities to maximize water infiltration, slow and detain rainfall, filter roadway runoff, enhance the urban forest, preserve and enhance biodiversity and increase habitat connectivity between adjacent land uses. Parkways focus on pedestrian and cyclist movements (both recreational and commuting) but accommodate all modes of transportation.

Note: All of the above street types equate to "MajorStreets" from previous classifications.

Residential Streets are a seventh classification that is not shown in Figure 3 since they are smaller-scale streets that do not serve a city-wide role. They are streets that serve primarily residential areas, although they can also be found in Activity Centres. Residential Streets include several sub-categories, including Collector Streets, Local Streets and alleys.

These streets generally have narrower rights-of-way than the streets identified in the Road and Street Palette (Figure 3). They are designed to maximize access to homes and local amenities, and focus on the needs of pedestrians, cyclists, private automobiles and on-street parking. Given the relatively low traffic volumes they are intended to accommodate, Residential Streets may offer significant opportunities to implement green infrastructure strategies, such as reducing effective impervious surfaces, maximizing infiltration, slow and detain runoff and enhancing the urban forest. Equivalent street types can be found throughout industrial areas, but are designed primarily to accommodate the needs of commercial goods movement and access to industrial buildings.

Additional cross-sections will need to be developed for Residential Streets in order to further clarify transportation mode priorities, align with the Complete Street policies, and to take full advantage of green infrastructure design elements.

The **Road** and **Street** Network, composed of these seven facility types, is shown in Map 7 in Appendix D**Part 8**.

The **Road** and **Street** Palette applies to all parts of the city, with the exception of Centre City**the Greater Downtown** (the downtown and Beltline), where a unique set of **street** classifications were developed through the Centre City Mobility Plan. The **streets** that connect into Centre City**the Greater Downtown** on the city-wide **Road** and **Street** Network map have been classified to align closely with the design and function of the **streets** within Centre City**the Greater Downtown**.

Green infrastructure**Natural Infrastructure**

*Green***Natural infrastructure** refers to an interconnected network of green spaces and natural corridors that perform numerous environmental services in urban environments. For green**natural** infrastructure to be fully integrated throughout parks, open spaces, **streets** and other natural corridors, it must become part of the underlying framework that is used to guide future development patterns. A proactive approach enables green infrastructure to be considered in advance of development and in conjunction with growth and development planning. **natural infrastructure to be considered in advance of development and in conjunction with growth and development planning. Consideration must also be given to protecting existing natural infrastructure.**

Providing opportunities for more sustainable modes of transportation, and the associated infrastructure, is one way of protecting the environment. Another way is to apply green**natural** infrastructure, which is targeted primarily toward reducing negative impacts on air, water and habitat, and also contributes to the aesthetic value of the **road** or **street**.

Additional background information on green**natural** infrastructure and environmental policies can be found in The MDP.**City's Stormwater Management Strategy and the Parks Urban Forestry Strategic Plan.** More detailed information of the green**natural** infrastructure application to **roads** and **streets** design will**can** be incorporated**found** in appropriate**the Complete Streets** handbooks and guidelines.**Guide and the Design Guidelines for Subdivision Servicing (DGSS).**

Public Realm

Public realm in **streets** is generally focused on the area between travel lanes and adjacent land uses. This space can contain a combination of privately- owned land and public domain. Improving the public realm design of **streets** improves compatibility with adjacent land uses, creates attractive pedestrian environments, provides public space for activities and art, ~~and~~ **provides space for trees,** provides space for business activities **(**such as shop kiosks or patios~~,~~**) and street furniture (benches, garbage receptacles, bike racks, etc.),** all of which enhance Calgarians' quality ~~of life.~~ **of life.**

The MDP contains a set of urban design and public realm policies that should be followed when designing **streets** to function in the context of the surrounding environment. **Maintenance and life-cycle considerations should also be addressed.**

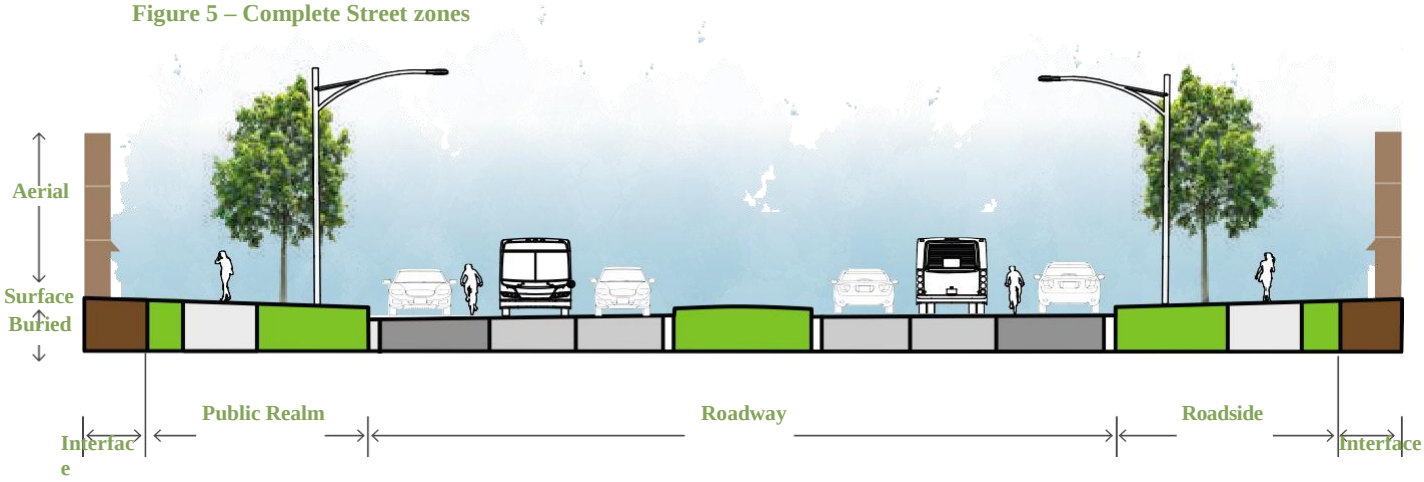
High Stormwater Flow Rates Impacts Local Rivers

In Calgary, **roads**, **streets** and parking areas represent over 24 per cent of all impervious land area. This contributes to higher storm flow volumes and pollutant loads to urban stormwater than any other source area in urban development.

Street design can have a powerful impact on stormwater quality, both by generating large areas of impervious land coverage and by collecting non-point source pollutants from automobiles and associated transportation infrastructure.

Streets are also almost always directly connected to an underground stormwater system.

Figure 5 – Complete Street zones



Complete Streets Zones

~~Traditionally, the elements within the right-of-way (e.g., travel lanes, medians, sidewalks, underground utilities, streetlights) have been the main focus of transportation planning and design. However, the right-of-way is only part of the overall Complete Street. Complete Streets include not only transportation and utility components but also green infrastructure and public realm elements. How each of these elements is combined depends on the surrounding land use context and on the expectations for how people will use the street. Adjacent land uses might range from parks and green space to intense corridor development with a mix of commercial and residential buildings.~~

Complete Streets consist of horizontal and vertical ~~environments~~**zones**, as shown in Figure ~~4~~**5**.

~~The horizontal environment of a Complete Street consists of a right-of-way (roadway and roadside zones) and the interface zone with adjacent buildings and uses within them. The roadway zone provides travel and parking lanes for motorized vehicles and bicycles in a mixed traffic environment. The roadside zone includes the green infrastructure, street furnishings, and travel lanes for pedestrians and cyclists. The interface zone includes pedestrian-oriented land use and design. The vertical environment consists of aerial, surface and buried zones.~~

~~The green infrastructure and public realm elements are present in both horizontal and vertical zones. Tree plantings, one of the green infrastructure strategies, may be a component of all zones, but it also contributes to the public realm. Tree canopy, (which may be part of all three horizontal zones) reduces the urban heat island effect and improve air quality. Shallow utilities and tree roots may share space in a buried, interface zone. Tree planting strips provide an additional buffer between the pedestrians and vehicles, enhance the aesthetics of the streetscape and encourage walking and public transit use.~~

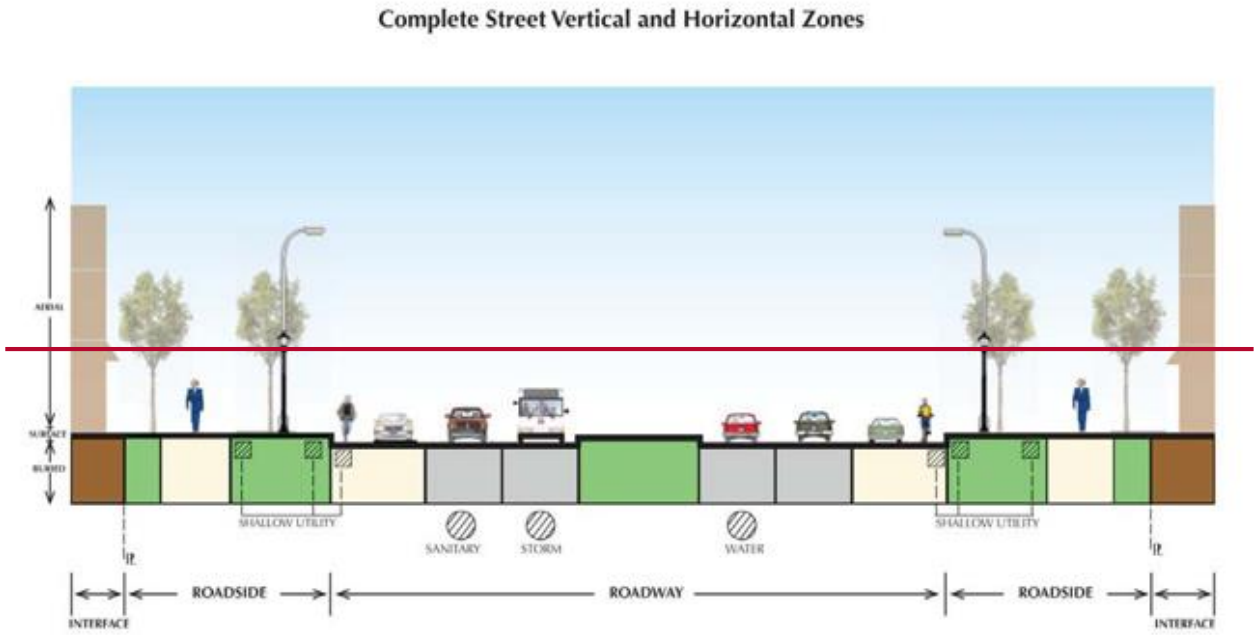


Figure 4 - *Complete Street* zones

Zone	Interface	Roadside			Roadway		
	Frontage	Through	Furnishing	Edge	Auxiliary Lanes	Travel Lanes	Median
Aerial	Building Overhang Tree *Canopy*	Tree *Canopy*	Lighting Tree *Canopy*	Lighting Tree *Canopy*	Lighting Tree *Canopy* Signal Heads Signs	Signs Signal Heads	Lighting Signal Heads Signs
Surface	Awnings Entries Plantings	Sidewalk Urban Braille Multi-use pathways	Lights, Utility Poles Transformers Pedestals Hydrants Transit Shelters Containers Bike Racks Benches Plantings	Curbs Metres Signs Shoulders Bollards	Transit Lane Shared Lane Turn Lanes Bike Lane Parking Loading Zones Curb Extensions	Through Lanes	Raised Plantings Flush Depressed Turning Lane
Buried	Parkades Plant Trenches Shallow *utilities*	Shallow *utilities*	Plant Trenches Shallow *utilities*		Shallow *utilities*	Deep *utilities* Manholes	Tree Trenches Shallow *utilities*

Figure 5 – *Complete Street* zone details

~~The Complete Street design elements for each zone should be selected based on the transportation facility function, adjacent land use context and the priorities set out in the Road and Street Palette.~~ Elements of each horizontal and vertical zone are shown in Figure 5.

~~It is important to understand that the zone elements in a Complete Street are related. Some elements will need exclusive use of space (such as travel lanes – on the surface in the roadway zone), while others could potentially share space in designated zones (e.g., shallow utilities and vegetation). The interface zone between Complete Streets and adjacent land uses is crucial in order to maximize accessibility between the two.~~

Not all elements of the mobility corridor, ~~green~~**natural** infrastructure or public realm will be used in a design of a **Complete Street**, especially in a retrofit situation (i.e., available right-of-way could be a limiting factor).

~~Mobility and accessibility for goods and services is an essential function of Skeletal Roads, which means they have little need for pedestrian-oriented public realm improvements. However, they may have elements of green infrastructure. Conversely, on Neighbourhood Boulevards, wide sidewalks and high-quality aesthetic elements are crucial for supporting adjacent shops and public spaces.~~ Ensuring the right balance between mobility, ~~green~~**natural** infrastructure and public realm will result in **roads** and **streets** that effectively meet the goals of CTP.

Street or Road Classification Review

Street and road classifications are initially established through local area plans, and are based on transportation network studies typically conducted in support of area planning initiatives (e.g. Area Structure Plans, Regional Context Studies). As the classification of an existing street or road is tied to the functionality and design elements required to achieve the objectives of a local area plan, any street or road classification review must be conducted as part of a transportation network study. Street and road classifications are subject to periodic review; classification changes that result require local area plan amendment.

Policies

Planning, design and maintenance of Complete Streets

a. The **road** and **street** design parameters and operational processes must adhere to the priorities set out in the **Road** and **Street** Palette for each mode of transportation, as shown in Figure ~~3~~4 of the CTP.

b. **Roads** and **streets** must be designed with consideration for the context of surrounding land uses, and should incorporate universal access principles.

c. The **road** and **street** design must consider which elements are appropriate in each **Complete Street** zone based on the function of the transportation facility and adjacent land use context.

d. Design speed (and resulting operating speed) should be selected based on the function of the transportation facility and adjacent land use context. All other **road** and **street** design elements must be set to complement intended operating speed.

e. **Note: Policy deleted.**

f. Intersections should be designed to accommodate the needs of all users safely.

g. All new and retrofit bridges and interchanges on facilities Arterial **Streets** and lower ~~should~~**must** be designed and built to accommodate ~~pedestrian~~**walking** and ~~bicycle use~~**wheeling**.

h. Planning studies for Urban Boulevards and Neighbourhood Boulevards should seek to mitigate operational impacts on adjacent communities by including **streets** and connections at least one-and-a-half blocks to either side of the Boulevard.

i. Snow clearing should be ~~handled~~**planned and implemented** in such a way that it does not interfere with ~~pedestrian~~**walking** and ~~bicycle~~**wheeling** movement on Urban Boulevards, Neighbourhood Boulevards and Parkways, once these **streets** have been upgraded to meet the design guidelines for their classification. **Clarification of, or adjustments to, maintenance responsibilities among City business units should be undertaken as warranted to optimize quality of service and user experience.**

j. Appropriate transitions for **road** and **street** cross-sections should be developed where City infrastructure connects to infrastructure in surrounding municipalities.

Adaptability

k. Existing rights-of-way **within Activity Centres, along Main Streets and for Parkways** should be protected to allow for future upgrading of existing **streets** defined as Urban Boulevards, Neighbourhood Boulevards and Parkways, and opportunities to acquire **any** additional right- of-way **required to achieve the requirements** should be investigated where necessary.

~~l.Future right-of-way width should complement the priorities set out in Figure 3 of the CTP for each mode of transportation and allow for flexibility and adaptability to accommodate travel changes~~

l. **Land that was previously acquired by The City or identified as part of a required setback for the purpose of future transportation facilities or improvements should not be effectively sterilized in the interim timeframe, particularly in the Greater Downtown and on Main Streets, where public realm integration is critical. Interim uses for the land that enhance public realm, support active modes or** act as natural infrastructure elements should be encouraged, with recognition that any associated improvements are subject to potential removal when the right-of-way becomes required for its intended purpose.

Access

m. Driveway accesses on existing **streets** designated as Urban Boulevards, Neighbourhood Boulevards and Parkways should be consolidated as redevelopment occurs over time, in order to minimize impacts on ~~pedestrian~~**walking** and ~~cycling~~**wheeling** facilities, while respecting access needs.

n. All new and retrofit **roads** and **streets** should provide adequate access for emergency vehicles, waste and recycling, **street** maintenance and other city services to meet their legislative policy requirements.

~~Green~~Natural infrastructure

o. All new and retrofit **road** and **street** designs should incorporate ~~green~~**natural** infrastructure strategies to contribute to the environmental health and visual aesthetics of the urban fabric.

p. In all designs, natural processes should be maintained and re-established by conserving, protecting and restoring habitat quantity and quality. **Watersheds** should be protected by filtering **roadway** run-off.

q. Native vegetation and a layered tree canopy should be incorporated within corridors to reduce the urban heat island effect**, to improve stormwater retention** and improve air quality.

Public realm

r. The public realm design for **streets** should adhere to the public realm policies set in ~~Parts 2 and 3~~**Volume 1** of the MDP.

Utilities and line assignments

s. The priority alignment and placement for shallow utilities infrastructure (trenches and above-ground equipment) should be as follows:

i. in back alleys and lanes~~;~~**.**

ii. in shallow utility easements on private property~~;~~**.**

iii. within right-of-way, placed in the roadside zone~~; and~~**.**

iv. within right-of-way under the roadway (i.e., parking, shared or bike lanes or paved shoulders).

t. Deep utilities should be located so that manholes and ~~appurtenances~~**other related equipment** do not interfere with the movement of pedestrians, cyclists and vehicles.

River and creek crossings

u. Planning and design of any new river or creek crossings must consider the principles and design consideration documented in ~~Appendix B~~**Part 6** of the CTP.

Collaboration and public engagement

v. Residents, businesses and other stakeholders should be engaged and encouraged to actively participate in the development of **street** design and landscaping standards in order to foster a community's sense of place and the ownership of **Complete Streets** over time.

Residual right-of-way

w. Upon completion of the scope of a comprehensive improvement project in the Greater Downtown or in a Main Streets area, City land holdings in the project area that were previously acquired or identified as part of a required setback for the purpose of transportation right-of-way that have not been incorporated into the project should be reviewed for potential relinquishment/release.

x. A comprehensive review of land previously acquired, reserved or identified as required by The City for future right-of-way should be undertaken by the Transportation Department, in accordance with the Corporate Land Management Framework.

3.8 Local Transportation Connectivity

Objective

Create better connectivity in future communities**, the Greater Downtown** and Activity Centres for walking, ~~cycling~~**wheeling** and street networks, while also increasing access and reducing response times for emergency services.

Supports

- **Key Direction #2**: Provide more choice within complete communities.
- **Key Direction #5**: Increase mobility choices.
- **Transportation Goal #3**: Provide affordable mobility and universal access for all.
- **Transportation Goal #4**: Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.

Discussion

Connectivity describes all the different ways we can get from one place to another, by ~~foot, bicycle~~**walking, wheeling,** transit or car. Within residential communities**, the Greater Downtown** or **Activity Centres**, all of this movement happens on the local transportation network. The elements of the network can be combined in a wide variety of patterns and have a significant impact on how people choose to travel.

Research completed by Plan It Calgary and many other cities shows that increased connectivity has a number of benefits, including:

- enhancing public safety by reducing response times for emergency services~~;~~**.**
- improving the health of citizens by making walking and ~~cycling~~**wheeling** viable options for travelling to work or other daily needs~~;~~**.**
- improving accessibility to the regional **street** system and reducing delays for motorists entering or leaving developments~~;~~**.**
- reducing walking distances to transit stops and improving routing for City services such as Calgary Transit and Waste & Recycling Services~~;~~**.**
- building communities that have the ability to adapt over time~~; and~~**.**
- increasing social interaction between residents.

Most Calgary communities built prior to the 1970s ~~(such as Brentwood and Glamorgan)~~ use 'modified grid' networks that allow people to move easily within their communities, and many provide the benefits listed above. ~~Several more recent communities provide similar levels of connectivity.~~ However, most communities built in the last ~~30~~**40** years ~~(such as Chaparral and Hawkwood)~~ use 'curvilinear' networks which are more convoluted and therefore provide limited connectivity. This has resulted in increased emergency response times, reduced walking and ~~cycling~~**wheeling** opportunities, and increased congestion for residents entering or leaving their communities. **More recent communities have been making improvements in connectivity.** Future ~~Greenfield~~ communities should ~~therefore~~**continue to** be designed in ways that achieve the higher levels of connectivity, and associated benefits, already present in many Calgary communities today.

Increasing opportunities for walking and ~~cycling~~**wheeling**, as well as improved transit circulation, is even more important in higher-density, mixed-use **Activity Centres**~~.~~ **and in the Greater Downtown.** The close proximity of homes, jobs, services and amenities will make walking and ~~cycling~~**wheeling** very convenient, as long as high levels of **street** and walkway connectivity are provided.

Effective design of local transportation networks, in Calgary and other North American cities, has shown that the land requirements for transportation infrastructure can be minimized using a variety of different **street** networks, while enhancing connectivity relative to recent curvilinear designs. Typical modified grid networks in Calgary use an average of 26% of the total land area for **streets**, and plans for proposed modified grid communities in Calgary require as little as 22%. Typical curvilinear communities require a similar amount of land at 23% to 25%. This clearly demonstrates that ~~well-connected~~ communities can be built without an excessive increase in land required for transportation infrastructure.

Within future ~~Greenfield~~ communities, concerns about traffic on residential **streets** can also ~~be~~**be mitigated** through the proper design of **streets** to manage the flow of traffic and discourage undesirable driver behaviour.

~~A separate "Connectivity Handbook" will outline the methodology and associated design targets that can be used to improve connectivity in Future Greenfield communities and Activity Centres. Such measures would not apply to existing communities, although opportunities to enhance connectivity (particularly for walking and cycling) may be explored if community support exists.~~

Policies

a. **Connectivity** should be maximized for pedestrians, cyclists, emergency vehicles and private vehicles in all future ~~Greenfield~~ communities**, the Greater Downtown** and **Activity Centres**. Limitations caused by natural topographic features, waterways and other obstructions (such as adjacent Skeletal **Roads**) must be taken into account when planning connected **street** and walkway networks.

b. ~~All Outline or Subdivision Plans for Future Greenfield communities and Activity Centres must provide quantitative measures demonstrating the degree of connectivity that is achieved for pedestrians, cyclists, emergency vehicles and private vehicles~~ **Note: Policy deleted.**

c. **Street** and walkway configurations should be designed to maximize accessibility to major destinations and transit facilities within future ~~Greenfield~~ communities**, the Greater Downtown** and **Activity Centres**, while also minimizing the impact of traffic on other users, adjacent businesses and residents.

d. Residential **street** block lengths should be minimized in order to facilitate the movement of pedestrians, cyclists and transit within future ~~Greenfield Communities~~**communities, the Greater Downtown** and **Activity Centres**.

e. Access into and out of future ~~Greenfield~~ communities, new major commercial developments and industrial developments should be maximized to improve emergency response times and reduce congestion.

f. Evacuation route plans should be established for all future developments and identify at least two evacuation routes connecting to at least two different **streets** that lead away from those developments.

g. **A minimum of** two access points (defined as intersections or roundabouts that provide direct access into or out of an area for vehicular traffic) must be provided to any new residential, commercial or industrial area once homes or businesses begin to be occupied. The second access point could be **at** a temporary **location accessible to the public. It may be permitted for this second** access **point to be** exclusive to emergency vehicles ~~if two full~~**provided that access is maintained year round by the developer until permanent public access is provided. The minimum number of** access points ~~are not practical~~**for an area may increase based upon the proposed land uses and anticipated build out**. All temporary and permanent access points should also be designed to serve as emergency evacuation routes.

3.9 Parking

Objective

Manage parking in ~~Centre City~~**Greater Downtown**, Activity Centres, ~~Corridors~~**Main Streets** and TODs to support an affordable and diverse housing mix, promote development, consider business vitality, increase densities, encourage using all modes of transportation, improve air quality and reduce the environmental footprint of the city.

Supports

- **Key Direction #3**: Direct land use change within a framework of nodes and corridors.
- **Key Direction #4**: Link land use decisions to transit.
- **Key Direction #5**: Increase mobility choices.
- **Key Direction #7**: Create **Complete Streets**.
- **Key Direction #8**: Optimize infrastructure.
- **Transportation Goal #1**: Align transportation planning and infrastructure investment with city and regional land use directions and growth management strategies.
- **Transportation Goal #4**: Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.
- **Transportation Goal #6**: Advance environmental sustainability.

Discussion

The availability of parking is an important factor in what modes of transportation people choose to use. Traditionally, cities have required ample amounts of parking to alleviate parking congestion. However, an abundance of free parking encourages vehicle use, consumes useful land and is expensive to construct and maintain. Solving this problem by providing additional parking further increases parking demand, perpetuating the cycle.

The move towards more **Complete Streets** that support walking, ~~cycling~~**wheeling** and transit requires complementary parking management strategies. The Downtown Parking ~~Strategy has~~**Strategies have** been highly successful at managing traffic flow into the core, increasing transit use, managing the total number of long-stay stalls and creating a dynamic Downtown **Core**. Continuing these strategies and expanding them to other key locations served by the Primary Transit Network throughout Calgary over time will continue to shift the focus from providing an abundance of free parking to a more managed approach to parking.

Downtown Parking

Calgary has taken an active role in the planning of Downtown Core parking since 1966. At that time, the Downtown Master Plan identified strategic locations for parking. In the 1970s the cash-in- lieu program was created to collect monies to build shared parking in these strategic locations. Current cash-in-lieu parking requirements are for only 50% of required parking to be provided on site. The combination of these initiatives helped foster a strong relationship with transit (7th Avenue) and the pedestrian (8th Avenue). The 1995 GoPlan also identified the relationship of parking and transit ridership. The GoPlan policies helped Calgary achieve a 45% transit mode split to the Downtown Core in 2006.

The policies identified in the CTP continue to respect the important relationship of parking and transit use.

Park and Ride

Historically, park and ride facilities have been developed in strategic locations, generally beyond a five kilometre distance from the ~~Centre City~~**Greater Downtown**. These facilities intercept vehicles at the earliest opportunity and help to reduce congestion closer to ~~Centre City.~~**Greater Downtown.** This also helps to protect established inner city communities from undesirable traffic problems.

However park and ride facilities must be planned in concert with other transit access modes (e.g., feeder buses, walking, ~~cycling~~**wheeling** and passenger drop-off). Excessive parking detracts from the goal of maintaining an effective feeder bus service and may limit opportunities for **TOD**. For these reasons, the determination of park and ride requirements has been based on consistent application of Council- approved guidelines.

The ~~current~~ park and ride strategy should ~~be reviewed to~~ consider current and future needs for park and ride, as well as the overall parking strategy for **TOD** nodes. Alternatives such as sharing parking with complementary developments (e.g., shopping centres, movie theatres, churches), structured parking and flexible guidelines for park and ride for **Activity Centres** and ~~Corridors~~**Main Streets** should be considered in order to reduce the footprint of park and ride development in strategic locations.

Parking and ~~green~~Natural Infrastructure

Parking lots and urban water run-off are closely linked. **Streets** and parking areas represent over 24 per cent of the impervious land area in Calgary, contributing higher storm flow volumes and pollutant loads to urban stormwater than any other source area in urban development. Parking design can have a powerful impact on stormwater quality, both by generating large areas of impervious land coverage and by collecting non-point source pollutants from vehicles and **roadway** surfaces.

Three key methods to reduce impervious surfaces are:

- retaining natural landscape~~;~~**.**
- minimizing pavement~~;~~**.**
- promoting natural infiltration to the soil~~; and~~**.**
- pervious pavement.

Once these are accomplished, appropriate design solutions should be applied. Section 3.7 provides guidance to planners, engineers and other specialists to include ~~green~~**natural** infrastructure into the planning and design of **roads** and **streets**. The same strategies should be applied to parking lots.

Policies

a. The Downtown Parking ~~Strategy is a~~ **Strategies contained in Calgary Parking Policies are** key ~~element~~**elements of The City's approach** to ~~manage downtown~~**management of** traffic ~~demand~~**congestion**, and **they** should continue to be ~~aligned with long-term~~**used to encourage** transit~~-mode split targets for Centre City~~**, walking and wheeling as other desirable travel options to the Downtown Core**.

b. Funds collected from parking fees and levies should be ~~used for funding related transportation~~**reinvested to support community** improvements**, as well as transit, walking, and wheeling amenities, where possible**.

c. Long-stay parking in **the Greater Downtown and other Activity Centres** and ~~Corridors~~**Main Streets** should be limited where high-quality alternative modes of travel are in place~~(~~**,** such as LRT or **bus rapid transit (**BRT).

d. Technology, time restrictions and pricing should be used for addressing parking demand issues instead of increasing supply in existing areas of the city.

e. **Parking facilities** should be encouraged to provide priority, high-quality parking locations and/or rates for "preferred parkers" (carpool parkers, car-sharing vehicles, cyclists, teleworkers, motorcycles**, electric vehicles** and scooters).

f. The design of **Parking facilities** should consider adaptability for future uses that may or may not be related to parking.

g. Shared parking should be used to optimize existing facilities and park and ride lots.

h. Park and ride development must be managed strategically to optimize the development of the transit market~~ and~~**,** minimize the land area used**, and facilitate the transition of station- area lands to desired development**.

i. ~~Green~~**Natural infrastructure** principles should be integrated into the design of parking facilities.

3.10 Transportation Safety

Objective

Continue to enhance safety for all users of the transportation system, accommodate increased walking, ~~cycling~~**wheeling** and transit use by addressing the safety concerns of network users, and support emergency management processes.

Safety and Public Transit

Cities with higher transit ridership have fewer traffic fatalities per capita, including fatalities involving transit, automobiles and pedestrians. Increased transit ridership also improves transit user safety and security.

Todd Litman: Evaluating Public Transit Benefits

Supports

- **Key Direction #5**: Increase mobility choices.
- **Key Direction #7**: Create **Complete Streets**.
- **Transportation Goal #2**: Promote safety for all transportation system users.
- **Transportation Goal #4**: Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.

Discussion

The transportation system in Calgary supports community safety, security and vitality. By providing connections between communities, safe routes to schools, accessible rapid transit and more, the transportation system is a catalyst for community health, safety and security. Safety in the system is critical, and safety is one of the overarching transportation goals in the CTP.

A user's perceived safety is important. People may spend a lot of time on the transportation network during the course of a day, so they need to feel comfortable when they use it. If users feel unsafe, they may not use elements of the transportation network even if they are physically able to. Calgary's transportation network must be safe and feel safe for all users, whether they are walking, ~~cycling~~**wheeling**, riding transit or driving.

~~A city's approach to safety is framed in terms of risk. Risk depends on the likelihood of something occurring and the impact or consequences if it occurs. Whether as individuals or as a group, when we make decisions, we decide risks are:~~

- ~~acceptable;~~
  ~~acceptable, but~~

- ~~acceptable, but only with risk management to minimize exposure to the risk (to keep the likelihood of occurrence low) and/or to minimize the impact; or~~

- ~~unacceptable.~~

Engagement, engineering, education, enforcement and evaluation all play a role in developing an integrated approach to safety for all users.

- **Engagement Interacting** with **stakeholders and the public to build trust and achieve** effective ~~monitoring;~~**dialogue.**
- **Engineering** Using elements of design to influence travellers' behaviour.
- **Education Providing information to the public through a variety of media.**
- **Enforcement** Ensuring adherence to laws, bylaws and regulations.
- **Evaluation Undertaking evidence-based assessments of improvements and strategies.**

Risk Management

Risk management is a critical consideration in all transportation planning, design and operational decisions. A significant improvement in transportation safety comes from changing travel behaviour to minimize exposure to traffic collisions. Shifts from private vehicle use to public transportation have been shown to reduce injuries and fatalities. To encourage this shift, the real and perceived safety of users of the public transportation system must be addressed.

As more people are encouraged through supportive land use to walk, bike and use public transportation, a proactive approach to safety on **roadways**, pathways and sidewalks is needed. Changes to the way **roads** and **streets** are used by drivers, pedestrians and cyclists involve risk. Individuals and communities often react by citing the risks as obstacles (e.g., increased pedestrian/ vehicle conflicts). The CTP includes policies that address these risks. ~~Engineering, education, enforcement, enhancement and encouragement all play a role in developing an integrated approach to safety for all users.~~

Vision Zero

Vision Zero is a traffic safety policy, developed in Sweden in the late 1990s and based on four elements: ethics, responsibility, a philosophy of safety, and creating mechanisms for change.
The Swedish parliament voted in October 1997 to adopt this policy and since then several other countries have followed suit.

In the past, the approach to road safety was generally to put the onus on the road user. In Vision Zero, this is replaced by an outlook that has been used with success in other fields. Its two premises are that: human beings make errors; there is a critical limit beyond which survival and recovery from an injury are not possible.

- World Health Organization (2004)

Sweden has the lowest number of fatalities among children aged 0-17 per 100,000 compared to all countries that report to the International Road Traffic Accident Database (IRTAD) for 2004-2008. In the 1960s and 1970s, between 100 and 200 children died in traffic in Sweden every year. Now this figure is 2 to 3.

- Swedish Transport Administration

It could be said that the most radical aspect of Vision Zero is not its ambitious end goal – but the actual paradigm shift. Moving the responsibility for safety from the road users to those who actually build the systems.

- Hanna Lindberg, How dreams can become reality – Vision Zero 20 Years

- ~~**Engineering** Using elements of design to influence travellers' behaviour.~~

~~**Education** Reaching out to the public through a variety of media.~~

- ~~**Enforcement** Ensuring adherence to laws, bylaws and regulations.~~

~~**Enhancement** Addressing safety issues through physical improvements.~~

~~**Encouragement** Addressing users' perceived level of safety by encouraging use of new public facilities.~~

Emergency Management

In addition to promoting and enhancing safety on the transportation system during normal operating conditions, The City must be prepared for unforeseen emergencies that require swift and coordinated responses. The Emergency Management Agency has responsibility for pre-planning and organizing City responses to emergency situations that require evacuation of large urban sectors in Calgary. They are supported by the Calgary Fire Department, Calgary Police Service, the Transportation Department, Disaster Social Services and many other support services. Transportation plays an important role in developing operational procedures that facilitate the efficient and orderly movement of people away from disaster locations (including traffic signal coordination and provision of transit services). Continued involvement by Transportation is crucial in the successful development of emergency response plans.

Dangerous goods movement

The movement of dangerous goods (materials that pose a risk to public health, property or the environment when transported in quantity) is necessary for some business functions in Calgary. The risk posed by the movement of these goods must therefore be mitigated, or prevented if possible. Through regular bylaw updates, the Transportation Department must evaluate and ~~identify specific roadways that can be used to move dangerous goods while minimizing these risks.~~ **identify specific roadways that can be used to move dangerous goods while minimizing these risks.**

Policies

a. Transportation safety issues should be identified and resolved on a priority basis through **engagement,** engineering, **education,** enforcement, ~~education, enhancement~~ and ~~encouragement~~**evaluation**.

b. The transportation system should be planned and operated in a manner that promotes safety for all users and ensures ~~the~~ **The** City is able to sustain that safety during unforeseen emergencies that require swift and coordinated responses.

c. Emergency management considerations, should be incorporated into the planning and design of all transportation infrastructure.

d. Statistics on community transportation safety must be kept and recorded to identify progress in reducing injuries and fatalities.

e. The Transportation Department should work with the Emergency Management Agency and its members to prepare emergency evacuation plans for individual sectors of the city (e.g. square-mile residential grids, the Downtown **Core**).

f. Streets in neighbourhoods must be designed to achieve reductions in operating speeds for the purpose of preventing collisions and improving the safety of all users, without a reliance on speed enforcement.

3.11 Universal Access

Objective

Ensure access and freedom of mobility for all Calgarians, providing all citizens with the opportunity to travel and participate in public life.

Supports

- **Key Direction #5**: Increase mobility choices.
- **Key Direction #6**: Develop a Primary Transit Network.
- **Key Direction #7**: Create **Complete Streets**.
- **Transportation Goal #3**: Provide affordable mobility and universal access for all.
- **Transportation Goal #4**: Enable public transit, walking and ~~cycling~~**wheeling** as the preferred mobility choices for more people.

Discussion

The transportation system should offer choices for all people, regardless of their income, age, literacy, mental and physical ability or cultural background. An accessible transportation system that incorporates walking, ~~cycling~~**wheeling**, transit, carpooling, private vehicle use and other options offers all citizens the opportunity to participate in the economic and social activities of the city.

Universal design makes the transportation system, and the places it connects, accessible to everyone. **Universal design** also benefits people without disabilities, such as older adults, people with temporary injuries, parents with strollers, individuals with wheeled grocery or luggage carts and delivery people with numerous boxes in hand.

Transportation infrastructure and services can be designed and operated in a way that meets the needs of all citizens. By reducing barriers that exclude individuals from participating in the community, all Calgarians will be able to move freely and engage in economic, social and cultural life.

Policies

a. Affordable mobility choices should be provided to Calgarians.

b. **Universal design** principles **and The City's Access Design Standards** should be applied in the planning, design, operation and maintenance of all transportation infrastructure and services.

c. The Primary Transit Network, including all vehicles and supporting infrastructure (such as sidewalks and buildings), should be designed and built to accommodate the needs of all citizens.

d. Directional wheel chair ramps with functional connections to active mode networks should be provided at the corners of all roadway intersections.

3.12 Environment and Transportation

Objective

Protect air, land, water and biodiversity in the planning, design, operation and maintenance of all transportation infrastructure.

Supports

- **Key Direction #7**: Create **Complete Streets**.
- **Key Direction #8**: Optimize infrastructure.
- **Transportation Goal #6**: Advance environmental sustainability.

Discussion

~~The Calgary~~**In 2017, Calgary's** Ecological Footprint ~~for 2008 stood at 9.4 global hectares (~~**(a measure of resource consumption) was reported to be 7.5** gha~~)~~ per capita, ~~which is~~**well** above ~~the~~**a** national average of ~~7.1~~ **3.6** gha per capita. ~~The transportation system~~ **Transportation** contributes ~~11 per cent~~ to the city's Ecological Footprint~~.~~ **through vehicle fuel consumption, land utilization and energy consumed during construction and maintenance activities; in 2008 this represented 11 per cent of the total overall.**

The transportation system interacts with the environment in multiple areas, including pollution control, invasive weed control, waste material diversion, and biodiversity preservation and enhancement (see Figure 6).

Increasing emphasis on more sustainable modes of transportation can help reduce Calgary's impact on the environment, and mitigate consequences such as:

- degradation of air quality ~~and increasing greenhouse gas~~ **GHG** emissions~~;~~**.**
- impairment of water quality associated with deposition of air pollutants~~;~~**.**
- increased traffic noise~~; and~~**.**
- impacts from oil spills, de-icing and other transportation activities.

Many of these impacts can be mitigated and/or eliminated through sustainable design and the application of best practices. Examples are Ride the Wind (public transit based on 100 per cent wind energy) and ~~green~~**natural** infrastructure (protecting water quality by greening **streets**capes and reducing impervious surfaces).

The application of an environmental sustainability lens to the design, development, operation and maintenance of the transportation system is key to minimizing adverse effects and identifying opportunities for resource conservation and enhancement. The appropriate application of environmental management systems, technologies and practices is instrumental to the protection of air, land, water and biodiversity.

Greenhouse Gas Emissions

In 2009, the Calgary Climate Change Accord established The City's commitment to pursue reductions in community GHG emissions. Nonetheless, between 2005 and 2019 Calgary's overall GHG emissions increased (see Figure 7).

Calgary's Climate Resilience Strategy: Mitigation & Adaptation Action Plans, approved by City Council in 2018, established three main goals stipulating the key aspects to achieve over time to reach The City's GHG emissions reduction target of 80 per cent below 2005 levels by 2050:

- **Reduce vulnerabilities and risks to severe weather and long-term climate effects.**
- **Improve energy use and reduce GHG emissions.**
- **Support the low-carbon economy.**

Figure 6 – Environmental Policy Implementation

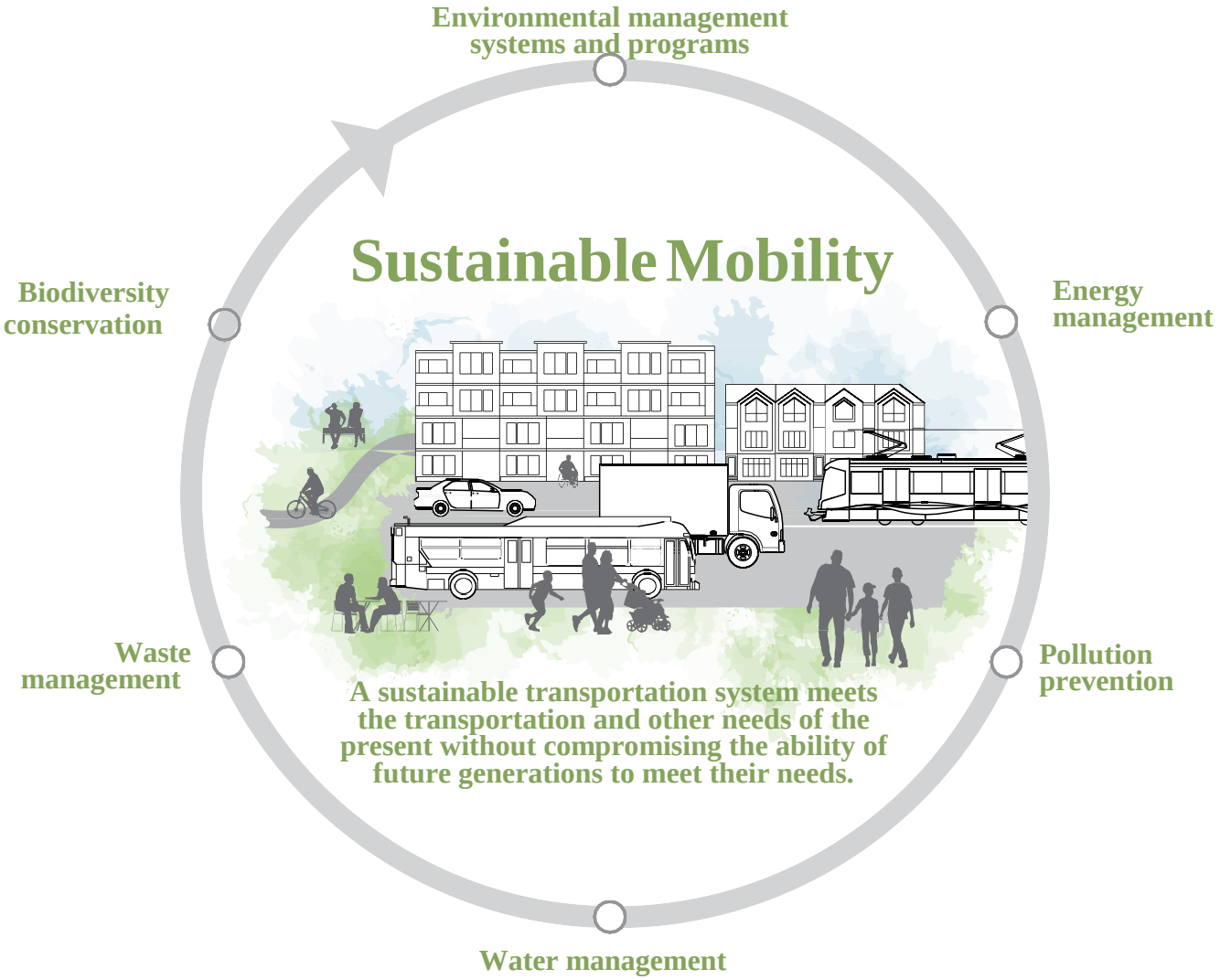
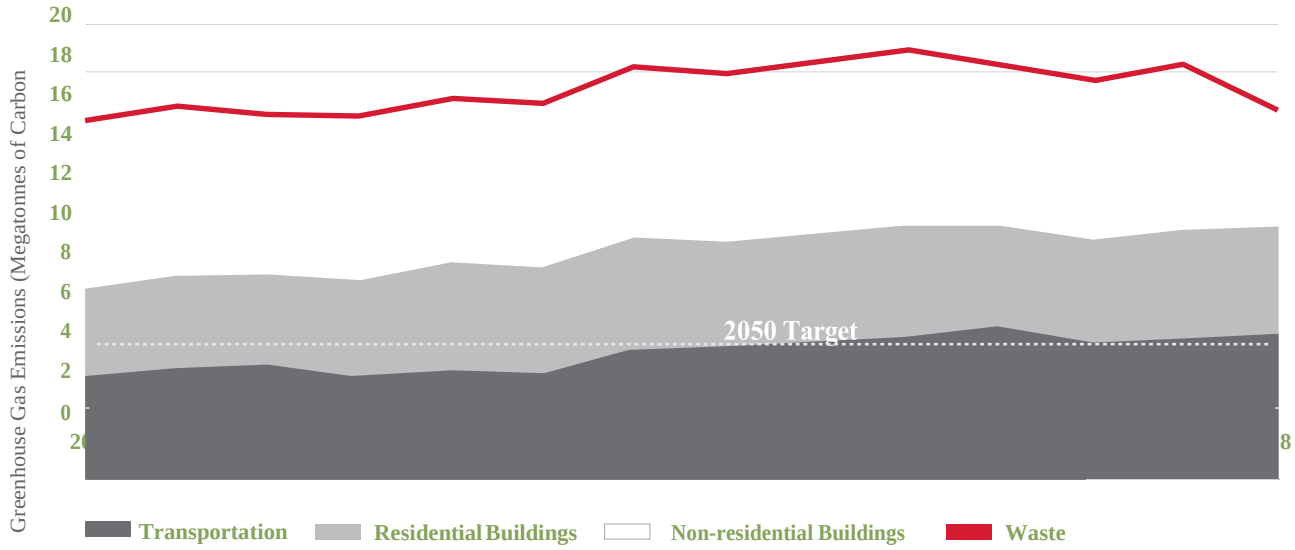


Figure 7 – Historical Calgary Community-wide GHG Emissions by Sector (2005-2019)



GHG emissions from transportation sources currently account for one-third of the city- wide total, primarily through the use of diesel and gasoline by motor vehicles.

Economics and emissions-modelling work completed by the University of Leeds, the University of Calgary, and The City has shown that an economically and technologically-feasible transition path to the 2050 GHG emissions reduction target exists.

Achievement of the goals and objectives established by the Calgary Transportation Plan in 2009 is estimated to represent 15 megatonnes of reduction in carbon dioxide equivalent emissions (CO_2e) by 2050. In addition to the CTP reduction (accounted for in the Baseline scenario above), The City's Climate Mitigation Action Plan identifies further transportation-sector reductions required to meet The City's 2050 target, estimated at between 63 and 70 megatonnes of CO_2e (cumulative total) and to be achieved through the following actions.

- **A reduction of 60 megatonnes CO_2e resulting from the transition to zero or low-emission vehicles by private owners and commercial fleets (see section 3.14 for further information on vehicle electrification), incorporating an anticipated reduction in the GHG intensity of Alberta's electrical grid corresponding to the phase out of coal generation by 2030.**
- **A reduction of three megatonnes CO_2e resulting from a shift in travel behaviour to low or zero- emissions modes (i.e. a 25 per cent increase in transit service coverage), increased rates of walking, wheeling and car-pooling beyond Council approved actions in the CTP, RouteAhead and the strategic plans for active modes.**
- **A reduction of seven megatonnes CO_2e resulting from the integration of climate change considerations into land-use and transportation planning decisions, strategies, plans and processes (with a corresponding $9 Billion net savings in infrastructure) beyond Council approved targets in the MDP.**

Vehicle Electrification

Electric vehicles reduce local air pollution, noise and GHG emissions from transportation activities, making contributions today towards GHG reductions that will increase as Alberta's electric grid transitions away from coal-fueled generating facilities. Electric vehicles are already less expensive to operate and maintain today than a comparable gasoline-powered car, with a driving range of

Figure 8 – 2018 City-wide Greenhouse Gas Emissions by Sector

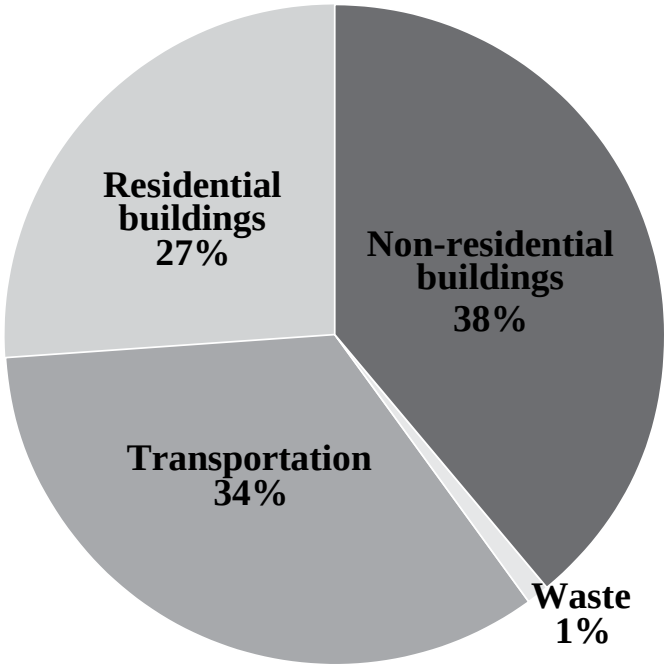
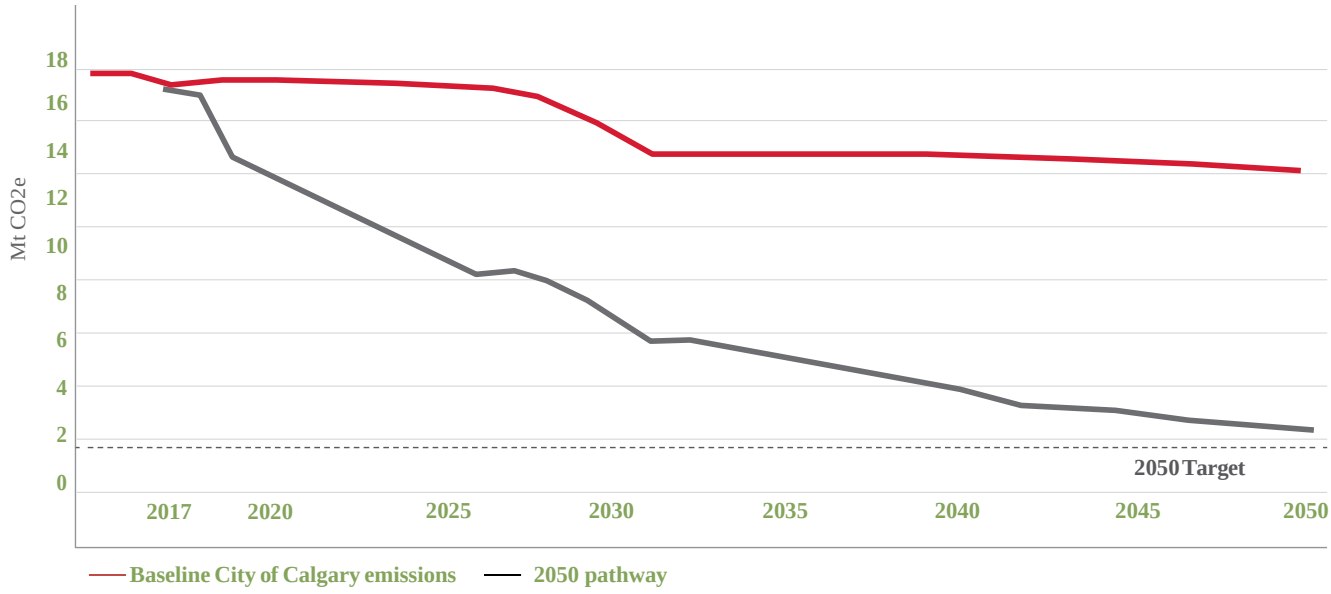


Figure 9 – Calgary's Potential Future Emissions under the Baseline and Carbon Reduction Scenarios



approximately 400 to 500 kilometres on a single charge. Average electric vehicle range is expected to increase significantly as new models become available in the early 2020s, and the initial purchase pricing for small- to mid-size electric passenger vehicles are expected to be directly competitive with gasoline-powered cars by the mid-2020s. In response, the adoption of electric vehicles is projected to increase exponentially.

~~**In response, the adoption of electric vehicles is projected to increase exponentially.**~~

One of the current barriers to electric vehicle adoption is "range anxiety", a fear of running low or out of power prior to reaching an intended destination. Many studies have shown that the strategic placement of public charging stations can reduce the range anxiety of electric vehicle drivers. Helping to provide citizens with an effective public EV charging network is a key role cities can play to support EV adoption. Municipal governments can link potential charging-station sponsors with organizations and venues that want to install charging infrastructure.

The following policies support integrated design strategies contained in the CTP that are aimed at eliminating, reducing or mitigating the environmental impact of the transportation system.

Policies

a. Protect the quality and quantity of water in urban environments by mimicking natural hydrology in the design and operation of transportation infrastructure.

b. Improve the air quality on and around mobility corridors by increasing vegetation, decreasing impervious surfaces**, supporting the shift to zero-emission vehicles,** and supporting the use of renewable energy and other techniques to mitigate climate change.

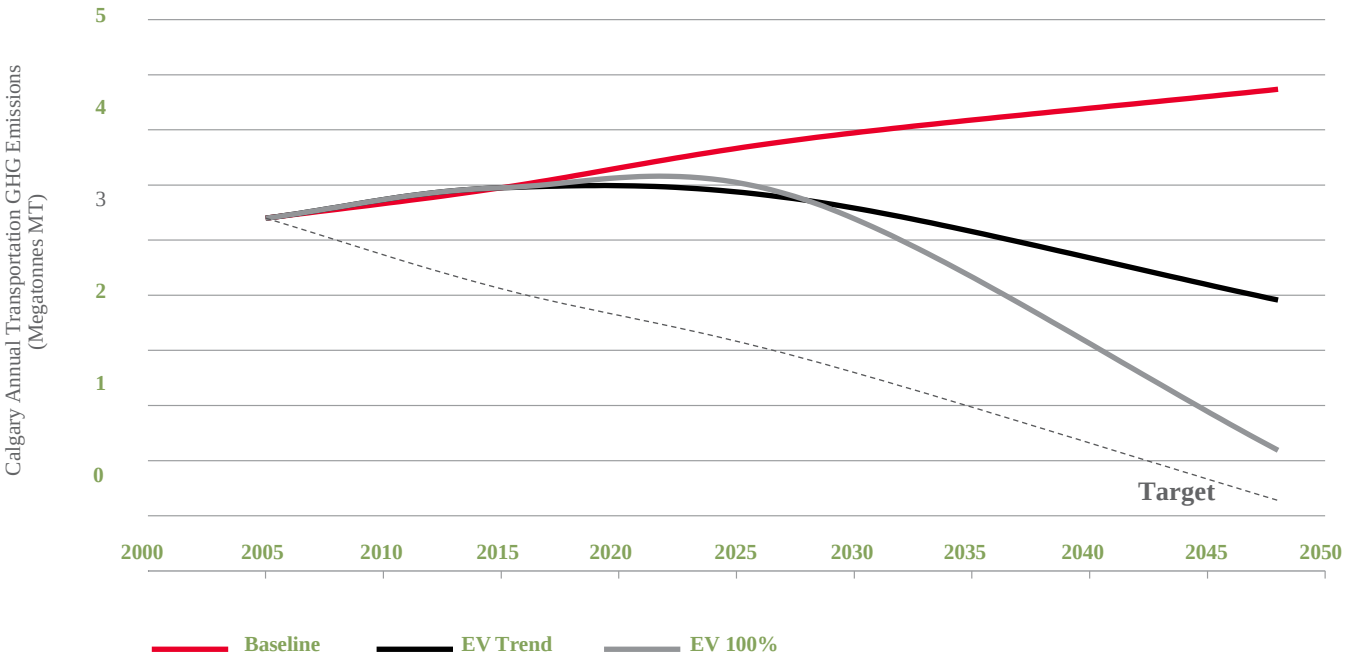
c. Preserve and enhance biodiversity to support the natural environment in and around mobility corridors.

d. The City should participate in and promote initiatives aimed at expanding the availability of publicly accessible electric vehicle charging stations.

e. The City should take steps to achieve a transition of the entire fleet of vehicles in Calgary to zero-emissions vehicles by 2050.

f. The City should develop methodologies to integrate GHG reduction potential into growth management decisions and transportation assessments.

Figure 10 – Change in Calgary Annual Transportation GHG Emissions (Megatonnes MT)



3.13 Infrastructure Management

Objective

Use best infrastructure management practices to keep Calgary's transportation infrastructure safe and reliable, and minimize future expenditures by optimizing the life-cycle of existing and future facilities.

Supports

- **Key Direction #8**: Optimize infrastructure.
- **Transportation Goal #7**: Ensure transportation infrastructure is well managed.

Discussion

Like other cities in North America, Calgary's transportation infrastructure is reaching a point where much of it will start to require additional maintenance, refurbishment or replacement as a result of its age. However, sufficient funding is unavailable to support all of the new infra- structure requirements of Calgary's current pattern of growth in addition to the increasing costs associated with managing Calgary's existing infrastructure. As a result, many transportation projects remain unfunded, resulting in an infrastructure gap. Additional priority will now also need to be given to the management of walking, ~~cycling~~**wheeling** and transit infrastructure.

In general, infrastructure management includes all work that preserves the integrity and value of transportation infrastructure. This includes all work associated with operating and maintaining the infrastructure in a reasonable condition so that it is able to deliver its intended duration and level of service to The City and to Calgarians.
Along with operations and maintenance, timely rehabilitation and refurbishment of infrastructure has been shown to delay the need for more costly replacements of existing infrastructure, thus optimizing the use of limited available resources. In addition, proper infrastructure management can help to improve capacity and quality of service for all modes of transportation and enhance the **streets**capes that beautify our city by keeping The City's transportation infrastructure in safe and reliable condition.

It has become increasingly evident that The City cannot afford to continue expanding outwards and increasing linear infrastructure while supporting built infrastructure. The problems of rapid growth are compounded by the desire for increased service levels in the maintenance and replacement of existing infrastructure. The combination of these two issues results in considerable strain on available funding for infrastructure management.

The City ~~and the Transportation Department have~~ **has** already initiated asset management programs aimed at addressing these issues.

Policies

a. Existing and future transportation infrastructure should be managed (through operations, maintenance, refurbishment and replacement) in a manner that ~~en-sures~~**ensures** that infrastructure is safe, reliable and achieves its optimum life-cycle.
b. A life-cycle costing and management program should be used to optimize the recommendations for infrastructure investment, which should be aimed at improving the overall condition of the transportation infrastructure and minimizing the overall life-cycle cost.
c. New construction or redevelopment projects within transportation rights-of-way should be coordinated with planned maintenance projects to minimize the impact on the transportation infrastructure, the duplication of repair efforts, the premature shortening **of infrastructure life and the impact on the natural environment.**
d. Primary networks for the movement of cyclists, transit, and goods (as depicted in CTP Maps 1, 2 and 5) should be given high priority for clearing of snow, ice or gravel and debris.
e. Environmental best practices must be incorporated into all infrastructure management activities to minimize impact on the environment and integrated ~~green~~**natural** infrastructure.
f. Transportation infrastructure should be designed to ensure that assets can be operated and maintained as efficiently as possible, contributing in a positive manner to meeting quality of service and user-experience expectations.

3.14 New Transportation Technologies

To monitor the development and deployment of new transportation technology, and to plan for coordinated and timely responses that optimize the benefits of the technology at acceptable levels of cost and risk.

Supports

- **Key Direction 5: Increase mobility choices.**
- **Key Direction7: Create Complete Streets.**
- **Key Direction 8: Optimize infrastructure.**
- **Transportation Goal 3: Provide affordable mobility and universal access for all.**
- **Transportation Goal 4: Enable public transit, walking and wheeling as the preferred mobility choices for more people.**
- **Transportation Goal 6: Advance environmental sustainability.**
- **Transportation Goal 7: Ensure transportation infrastructure is well managed.**

Discussion

Rapid advances in transportation technology have demonstrated the potential to change the way that transportation and logistics services are provided to, and utilized by, the general public. The widespread adoption of internet-enabled smartphones and in-vehicle navigation systems, the mass-production of electric vehicles, and the rise of electronic commerce are just three examples of technological developments that are already impacting travel user behaviour and market demand for mobility options. Self-driving vehicles, drone-based delivery networks, and new forms of shared-use mobility are additional examples, each with the potential to influence future travel patterns and the long-term vision for Calgary.

The City of Calgary has been pro-active in its efforts to identify and prepare for the impacts of new technology through strategic planning and active participation in the field of Intelligent Transportation Systems (ITS). The City benefits from being prepared to respond to public adoption of new technology with an understanding of how/if it should be regulated, and how it fits into the long- term vision for Calgary as a sustainable city that is articulated in the MDP, CTP and other City policy documents (e.g. provision of more mobility choices, optimizing infrastructure).

Many of the transportation technologies currently under development may take years before becoming broadly available to the public. As a result, their implications to society and to Calgary's development may be uncertain for an extended period of time. For each technology, The City will have to assess the potential benefits resulting from early action (e.g. service innovation, a positive public perception, job creation) against the potential risks (e.g. ill-timed regulation, opportunity costs associated with premature investments in enabling infrastructure), as a result, ongoing monitoring will be necessary.

However, the direction and availability of a number of technological developments are sufficiently clear to inform a number of actions on the part of The City today:

- **Increasing levels of automation and electrification in the vehicles available to the general public.**
- **The arrival and operation in Calgary of shared mobility services (e.g. dockless bikes/scooters, ride-sharing services).**

- **The continued spread of digitally-interconnected consumer items (i.e. the "Internet of Things") including smart phones, "wearables", and vehicles, with connectivity essentially enabling or supporting the other transportation technology developments.**

Curb Space Management

Demand is increasing for the utilization of curb space by multiple modes and activities. Dedicated on-street facilities for active modes, street cafes, parking spaces for shared mobility services, and electric-vehicle charging stations are existing examples; the development of automated vehicles is expected to result in a significant future demand for curbside drop-off and pick-up locations. All of the activities have associated costs and benefits that should be evaluated alongside those associated with traditional uses: vehicular travel lanes, on-street parking, taxi stands, etc.

Road Pricing

The existing sources of funding available to The City of Calgary to support the capital costs of constructing, operating and maintaining Calgary's transportation system are very limited in number; of these, only fuel-tax revenue and property taxes have been relatively predictable. However, fuel tax is anticipated to decline over time as a result of improvement in vehicle fleet fuel-consumption performance and a new vehicle market shifts towards hybrid and electric drivetrains.

The rise of digital connectivity in vehicles has enabled the introduction of road pricing (i.e. vehicle kilometres travelled pricing) as a potential alternative source of funding for high-priority transportation network investments in the future. Road pricing would establish the "direct user pay" costs of travel, responding to time, location, type of vehicle and even the level of congestion present along the route. In addition to providing stability and reliability as a funding source, road pricing can improve safety, traffic congestion and environmental performance outcomes.

Data Management

The future of transportation will rely heavily on the use of information and technology, with data-driven networks becoming as important to the operation of the transportation system as the sidewalks, pathways, streets and light rail lines. The City should prepare for this development by ensuring that the specifications/guidelines and capacity for comprehensive transportation data management and sharing with public and private entities will be in place to meet public demand.

A data-sharing and system-integration model would realize the potential for mobility payment, pricing and trip planning to be integrated and centralized in various ways. Potential applications include:

- **Improved management of infrastructure through the leverage of data.**
- **Support for integrated mobility solutions (i.e. "Mobility as a Service" or "MaaS").**
- **Implementation and licensing of new mobility methods.**
- **Improved planning and expansion of access.**

Vehicle Electrification

See section 3.12 for more information on vehicle electrification

Shared-use Mobility Services

Shared-use mobility is the trend of people using services to travel on an "as-needed" basis instead of owning a personal vehicle. Shared mobility is enabled through digital connectivity, allowing for the sharing of transportation resources such as automobiles, "dockless" bicycles, electric scooters and ride-sharing capacity (e.g. Uber). Shared mobility services offer multiple benefits in the form of reduced user travel costs, fewer vehicle kilometres travelled (and therefore generally fewer emissions) and "first kilometre/last kilometre" service beyond the extent of public transit system operation.

A number of shared-mobility services currently operate in Calgary, with customers able to search their geographic area for a shared resource (i.e. bicycle, scooter, or vehicle) or to book a ride-sharing service on their smart-phone (tracking their ride in real time).

Policies

a. The City should continue to monitor developments in technologies that are expected to significantly change travel and land use patterns in the future.

b. A comprehensive curb-space management strategy should be developed to address current and future demands for shared use of the asset by different modes and activities.

c. In consultation with the Province of Alberta, The City should investigate the feasibility of road-pricing as a potential replacement for fuel tax with specific consideration given to conducting a trial.

d. Ensure that City of Calgary data management specifications and system capacity are sufficient to support the acquisition, use and protection of transportation trip and transaction data, including the protocols/ controls necessary to safely enable "Mobility as a Service" applications.

e. The City should support the operation within Calgary of shared-use mobility services, including involvement in pilot partnerships and parking incentive programs.

Part 4 – Monitoring and Reporting

Objective

Provide a basis for effective strategic decision making by monitoring and reporting on the progress made towards achieving the goals and objectives of the MDP and CTP.

Discussion

The MDP and CTP are not static documents. They establish strategic policy directions, but periodic progress checks must be undertaken to review whether progress is being made.

To evaluate progress toward the policy direction of the MDP and CTP, a broad spectrum of indicators and targets has been developed. The Core Indicators for Land Use and Mobility can be found in Figure ~~6~~**11**. These indicators are proxy measures for the social, environmental and economic performance of the MDP and CTP. They are intended to track the overall progress towards achieving the goals and objectives of the MDP and CTP. However, these indicators are not intended to be applied to individual local area plans and land use applications. It is important to note that no one or two measures in isolation can indicate progress. The full set of indicators should be measured and reported in order to provide a comprehensive picture.

Each of the indicators is accompanied by a target. The targets provide a desired performance outcome for an indicator over a specified period of time. The targets were based on benchmarking of other cities and engagement with stakeholders. The targets represent a direction that The City wishes to achieve through its planning and investment processes and through collaborative working with other orders of government, the public and stakeholders.

A monitoring and reporting program will be developed for the Core Indicators for Land Use and Mobility as part of the MDP/CTP implementation program. A regular cycle of reporting on the Core Indicators will provide performance information to Council, Administration and the public. Reporting will be conducted in advance of each ~~3-year~~ City business planning cycle and will assist in developing investment strategies and strategic growth decisions. The reporting process will also help ensure that implementation strategies and corporate processes are aligned with the long term goals of the MDP and CTP. In addition to evaluating progress towards the targets contained in this section, additional reports will look at current growth forecasts, market trends and The City's financial capacity.

A major review of the Core Indicators for Land Use and Mobility should occur on a ten year basis as part of the CTP policy review process (which will assess whether the policy direction remains appropriate or requires adjusting). Each metric and target will be evaluated to ensure that they align with the updated vision and policies of the MDP and CTP.

A regular cycle of reporting on the indicators will provide information for Council, administration and the public. This is supported by policy direction in the MDP, which states that:

- The City will ~~measure~~**monitor** the Core Indicators for Land Use and Mobility on a continuous basis and report to Council, Administration and the public regarding the progress towards the targets prior to each business planning cycle.

Figure 11 – Core Indicators for Land Use and Mobility

Core indicators for Land Use and Mobility (MDP)					
#	**Core indicators**	**Metric**	**Baseline**	**2018**	**60Year target**
1	**Urban Expansion**	Per cent of population growth from 2006 accommodated within balanced growth boundary.	-5.9% (2005)	9.7%	50%
2	**Density**	People per hectare	20 (2005)	24.7	27
		Jobs per hectare	11 (2005)	13.5	18
3	**Population / Jobs Balance**	Population/Jobs Northwest ratio	3.0	3.0	3.0
		Population/Jobs Northeast ratio	1.7	1.7	1.4
		Population/Jobs Southwest ratio	1.3	1.4	1.5
		Population/Jobs ~~South east~~**Southeast** ratio	1.2	1.5	1.5
4	**Mix Land use**	Land Use Diversity Index	0.53 (2008)	0.56	0.7
5	**Residential Mix**	Residential Diversity Index	0.19 (2008)	0.22	0.4
6	**Road and Street Infrastructure**	Roads to streets ratio	0.72 (42% Roads and 58% Streets)	0.61	0.57 (36% Roads and 64% Streets)
7	**Accessibility to Primary Transit Network**	Per cent of population within 400 m of Primary Transit Network	0%	37%	45%
		Per cent of jobs within 400 m of Primary Transit Network	0%	14%	67%
8	**Transit Service**	Annual transit service hours per capita	2.2	2.24	3.7
9	**Goods Access**	Per cent of intermodal and warehousing facilities within 1600 m (actual) of Primary Goods Movement Network	73% (2008)	73%	95%
10	**Transportation Mode Split**	Walking and Cycling Mode split (all purpose trips, 24 hours, city-wide)	14% (2005)	18%	20% - 25%
		Transit Mode split (all purpose trips, 24 hours, city-wide)	9% (2005)	8%	15% - 20%
		Auto Mode split (all purpose trips, 24 hours, city-wide)	77% (2005)	74%	65% - 55%
11	**Accessibility to Daily Needs**	Per cent of population within Major and Community Activity Centres, and 600 m of Urban and Neighbourhood Corridors	18% (2006)	21%	30%
12	**Watershed Health**	Per cent of impervious surface	33% (1998)	44%	10% - 20%
13	**Urban forest**	Per cent of tree canopy	7% (1998)	8.25%	14% - 20%
14	**District Energy**	Per cent of land area with densities supportive of district energy systems	1.8%	2.6%	1.7%

Core Indicators for Land Use and Mobility				
#	Core Indicators	Metric	Baseline	60-year Target
1	Urban Expansion	Per cent of population growth accommodated within developed area (2005 boundary area)	In 2005, the developed area of the city was losing 5% of population to greenfield area.	50%
2	Density	People per hectare	In 2005, Calgary had a population density of 20 people per hectare.	27
		Jobs per hectare	In 2005, Calgary had employment density of 11 jobs per hectare.	18
3	Population / Jobs Balance	Population/Jobs East/West ratio	In 2005, the population/jobs East/West ratio was 2.7.	1.7
		Population/Jobs North/South ratio	In 2005, the population/jobs North/South ratio was 1.9.	1.7
4	Mix Land use	Land Use Diversity Index	In 2008, land use mix diversity index was 0.53.	0.7
5	Residential Mix	Residential Diversity Index	In 2008, residential diversity index was 0.19.	0.4
6	*Road* and *Street* Infrastructure	*Roads* to *Streets* ratio	0.72 (42% *Roads* and 58% *Streets*)	0.57 (36% *Roads* and 64% *Streets*)
7	*Accessibility* to Primary Transit Network	Per cent of population within 400m of Primary Transit Network	LRT is the only transit service approaching Primary Transit levels of service in Calgary today.	45%
		Per cent of jobs within 400m of Primary Transit Network	LRT is the only transit service approaching Primary Transit levels of service in Calgary today.	67%
8	Transit Service	Annual transit service hours per capita	Currently, 2.2 transit service hours are provided for each resident in Calgary annually.	3.7
9	Goods Access	Per cent of *intermodal* and warehousing facilities within 1600m (actual) of Primary Goods Movement Network	Currently, 73% of *intermodal* and warehousing facilities are located within 1600m of Primary Goods Movement Network.	95%
10	Transportation *Mode Split*	Walking and Cycling *Mode split* (all purpose trips, 24 hours, city-wide)	In 2005, walk and bike trips contributed to 14% of all trips made.	20% - 25%
		Transit *Mode split* (all purpose trips, 24 hours, city-wide)	In 2005, 9% of all trips were made by transit.	15% - 20%
		Auto *Mode split* (all purpose trips, 24 hours, city-wide)	In 2005, 77% of all trips were made by car.	65% - 55%
11	*Accessibility* to Daily Needs	Per cent of population within Major and Community *Activity Centres*, and 600m of Urban and Neighbourhood *Corridors*	In 2006, 18% of all population was located within Major and Community *Activity Centres*, and 600m of Urban and Neighbourhood *Corridors*	30%
12	*Watershed* Health	Per cent of impervious surface	In 1998, 32% of land cover was impervious (made up of *roadways*, parking and buildings)	10% - 20%
13	*Urban forest*	Per cent of tree *canopy*	*Canopy* cover was 7% in 1998.	14% - 20%
14	District Energy	Per cent of land area with densities supportive of district energy systems	In 2005, only 0.3% of land area had densities supportive of district energy systems.	1.7%

Figure 6 - Core Indicators for Land Use and Mobility

~~**Appendices**~~

~~APPENDIX A~~ Part 5

Transit System Phasing and Design

The development and redevelopment of cities is an uncertain process. However, significant benefit can be achieved when a degree of certainty is provided to major stakeholders (e.g., developers, communities, infrastructure and service providers) with regard to where, when and how cities will grow. Decisions affecting the expansion of major municipal infrastructure and services such as water, waste water, transit and roadways help to shape the direction for growth within the Calgary Region and affect the social, environmental and economic health of communities.

~~Primary Transit service~~

~~The Key Directions for Land Use and Mobility recognize that, in order to move towards a sustainable city, land use and transit decisions need to be linked to ensure that the urban form supports quality transit service and that quality transit service is provided in a timely manner to support land use intensification. In this regard, the Primary Transit Network will be an organizing tool for transit planning and land use to ensure that each element supports the other.~~

~~The Primary Transit Network consists of an amalgamation of individual transit routes that operate in a specific corridor. One of the core elements of the CTP transit strategy is to commence upgrading major transit corridors (e.g., LRT and mainline bus service) to Primary Transit service levels within the next five years to 'lead development' and stimulate land use intensification of Activity Centers and Corridors.~~

The following criteria will be used to guide decisions about the phasing of transit investments in Primary Transit corridors to support strategic land use directions.

Ridership demand

Many proposed Primary Transit corridors (e.g., LRT corridors, Centre **Street**) carry heavy volumes of passengers and operate at frequencies of 10 minutes or less for extended time periods. These corridors are capable of being upgraded to Primary Transit service levels with a modest level of investment. Focusing investment in existing high-demand transit corridors will achieve the dual benefit of increasing transit capacity to attract new transit riders and providing incentives for more intensive, mixed use development.

Support growth in strategically located Activity Centres and ~~**Corridors**~~**Main Streets**

The Primary Transit Network serves as an organizing tool for both Transit and Land Use Planning to ensure that both elements support one another.
It is a commitment that quality transit service will be available if land use and **street** designs achieve good transit-oriented forms. Timely investment in improved transit service will help motivate market responses, focusing infill and greenfield intensification within walking distance of the Primary Transit Network.

Corridor completion

Ideally, specific route investments should align with Primary Transit corridors as much as possible to achieve the desired 10-minute service levels. These criteria may also result in rationalization of transit routes to align with proposed Primary Transit corridors.

Improve cross-town transit services

More emphasis and resources must be directed toward the upgrading of existing cross-town transit services to Primary Transit service levels and the creation of new cross-town transit connections.
These investments will enable Transit to attract a greater share of the substantial volume of cross- town work, school, shopping trips that are occurring between residential and employment areas in suburban areas, and it will support the development of new transit connections between proposed compact, mixed-use **Activity Centres** and ~~Corridors~~**Main Streets**.

New corridor development

~~It is anticipated that~~ Several major mainline and cross-town transit corridors will be upgraded to Primary Transit service levels within the next five to 10 years~~,~~**, provided that the required capital and operating investments are prioritized**. However, some components of the Primary Transit Network involve the creation of new transit corridors (e.g., new river crossings for transit, walking, ~~cycling~~**wheeling** and EMS) and may require an extended time period to develop to Primary Transit service levels, as they are not currently anchored or supported by **Transit-oriented Developments**.

Using the priorities and criteria described above will make frequent, direct, reliable transit service available to the greatest number of people and achieve a built form that will foster integration between land use/community design and transit service.

Transit implementation policies

Calgary City Council has approved macro level policies that provide a framework for the planning and implementation of transit service in Calgary. These policies encompass decisions relating to maximum walking distance for access to transit service and fare policy, as well as system and route level performance standards. Taken together, these policies drive decisions regarding route structure, level of service, phasing of service and cost of delivering transit service to the community.

The following guidelines should be used to guide the planning and implementation of transit services.

- Community design will minimize pedestrian **street** walking distance to transit service (i.e., a bus zone or LRT station) to 400 metres or less.
- In recognition of unusual circumstances, up to five per cent of the area population (dwelling units) may be located beyond 400 metres **street** walking distance from transit service (i.e., a bus zone or rail station). In site specific conditions, this guideline may be exceeded and compromises will be necessary.
- Council-approved route performance measures are used to ensure bus routes are operating efficiently:
  - » Regular bus – minimum of 20 to 25 boarding passengers per operating hour~~;~~**.**
  - » Community Shuttle – minimum of 12 to 15 boarding passengers per operating hour~~; and~~**.**
  - » Current policy requirements that Calgary Transit recover **between 50 to** 55 per cent of its operating costs (revenue-cost ratio) through transit fares and other sources of **system-derived** revenue.
- In accordance with the ~~above~~**preceding** policies, transit service will be extended to ~~developing~~**greenfield** areas as soon as possible subject to:
  - » The provision of **streets** adequately located and constructed for transit use~~; and~~**.**
  - » The location of the developing service area contiguous to existing service areas, so that service is provided in accordance with approved minimum ridership policies.
- Subject to the above policies and the individual characteristics of the service area, in response to customer demand, transit service within a service area will generally be staged as follows:
  - » Weekday a.m. and p.m. peak-period service~~;~~**.**
  - » Weekday service between the a.m. and p.m. peak periods~~;~~**.**
  - » Saturday service~~;~~**.**
  - » Evening service on all weekdays and Saturdays~~; and~~**.**
  - » Sunday service.
- The normal service delivery sequence may be altered in communities that have unusual service requirements.
- Bus and LRT service will operate within a schedule adherence range of ~~zero to less~~**not more** than ~~three~~**one minute early or five** minutes ~~of~~**later than** the design schedule. Buses or LRT will not depart a scheduled time-point early.

~~Regional transit phasing plan~~

~~The short-term regional transit goal is to implement an integrated, regional Bus Rapid Transit (BRT) service that would provide two-way service between key destinations within Calgary and adjacent regional communities. These services would be connected through the proposed network of Transit Mobility Hubs. Regional Transit Hubs will be located to support other medium and longer-term transit investments such as inter-city commuter rail and LRT services.~~

~~The future vision for regional transit service is illustrated in Map 4, in Appendix D, and includes:~~

- ~~Commuter rail service to Cochrane, Canmore and Banff (projected 60-year corridor population growth of 116,000).~~
- ~~Commuter rail service to Okotoks, High River and Nanton (projected 60-year corridor population growth to 121,000).~~
- ~~Commuter rail service to Airdrie (projected 60-year corridor population growth to 130,000).regional transit routes between communities outside of Calgary (e.g., Cochrane to Airdrie).~~

Transit Mobility Hubs

A Transit Mobility Hub is a place of connectivity where different modes of transportation (i.e., walking, cycling, and bus and rail transit) come together seamlessly and where there is an attractive, intensive and diverse concentration of housing, employment, shopping and other amenities around a major transit station.

Transit stations are the key point of contact between the traveller and the transit system; therefore, these facilities should be designed to enable efficient movement and stopping of transit vehicles, provide a safe, clean and comfortable environment for transit customers and contribute to the creation of attractive **Transit-oriented** Developments.

Some transit stations are particularly important because they are focal points for terminating transit lines or provide important connections between intersecting inter-city, regional and city transit routes. These stations will service the highest proportion of transit network trips and should be designed to provide comfortable, seamless connections for transit riders.

As a general principle, the first priority in the design of Transit Mobility Hubs should be to accommodate the requirements for efficient transit access, comfortable passenger waiting areas and safe, direct, unobstructed routes for pedestrians and cyclists. As discussed in section 3.1, transit, walking and ~~cycling~~**wheeling** are more sustainable modes of transportation in that they require less energy, need less infrastructure and are available to almost all Calgarians. Giving priority to these access modes will foster greater mobility choices and support the creation of attractive **Transit-oriented Developments**.

It is essential that Transit Mobility Hubs are designed and maintained to a high standard to provide a safe, clean and comfortable environment where transit riders feel welcome and valued. The following types of facilities should be incorporated:

- Bus layover spaces~~;~~
- Transit priority **roadways**~~;~~
- Taxi stands~~;~~ Stations that are comfortable, clean, attractive, safe and accessible and provide good interaction with adjacent land uses~~;~~
- Shaded areas to mitigate hot weather conditions and heated areas to provide a comfortable environment during cold weather conditions~~;~~
- Well-designed, amply-sized pedestrian walkways and customer waiting areas~~;~~
- Commercial/retail space, public washrooms and telephones~~;~~
- Secure storage facilities for bicycles~~;~~
- ~~•~~ **Pedestrian-oriented** lighting~~;~~
- Attractive public art~~;~~
- Way finding signage to direct people to their destinations~~;~~
- Real time schedule information~~;~~
- Fare purchase equipment~~;~~
- ~~Green~~**Natural infrastructure** to increase infiltration and perviousness and manage ~~storm-water~~**stormwater** run-off~~; and~~
- Park and ride, if provided, sized appropriately to the required access~~.~~

Three categories of Transit Mobility Hubs have been identified:

Regional/inter-city gateway hubs

~~i.~~

- Regional/inter-city gateway hubs are located at major regional and inter-city interchange~~points between the Primary Transit Network and other modes of public transportation. Regional/inter-city gateway hubs would be located at the following locations:~~ points between the Primary Transit Network and other modes of public transportation. **Regional/ inter-city gateway hubs would be located at the following locations:**

- » Calgary International Airport;
- » At connection points between the Primary Transit Network and future inter-city high- speed rail service (CP railway corridor and 96 Avenue N. and the "Rail town" **potential future rail-side** development at 9 Avenue and 8 **Street** S.E.);.).
- » At connection points between the Primary Transit Network and future regional commuter rail and bus rapid transit corridors; and
- » At connection points between the Primary Transit Network and inter-city bus services (e.g., Greyhound and Red Arrow Express).)

ii. Primary Transit hubs

- Primary Transit hubs are focal points for terminating primary transit lines or major transfer centres between intersecting Primary Transit lines. These stations will accommodate higher passenger volumes than other transit stations and, therefore, should include enhanced amenities to provide a pleasant customer experience and to accommodate expected ridership levels. Primary Transit hubs generally coincide with Major Activity Centres and Community Activity Centres (see the Urban Structure Map in the MDP), which will further increase transit demand and reduce single occupant vehicle use.

iii. Transit centres

- Transit centres are points between intersecting transit lines where there is significant passenger activity but not at the scale of a Primary Transit Hub. Transit centres are located at the intersection between Primary and Base Transit services (e.g., Sunnyside, Fish Creek Lacombe Station and Rundle Station).

~~APPENDIX B~~ Part 6

Principles and Design Considerations for Crossings of Watercourses

Within the Calgary Region, there are many crossings of **watercourses (e.g.** river, creek and ravine systems**)** by transportation infrastructure, including freight railways, major roadway corridors, Light rail transit lines and pedestrian bridges. This infrastructure provides essential mobility and connectivity between communities and external destinations, and it supports economic development by ensuring the efficient movement of people and goods at a city-wide and regional level.

Transportation crossings of rivers and creeks require the construction of culverts, piers and bridges, etc. and have the potential to affect riparian areas and river and creek habitats. For these reasons, the need for river and creek crossings must be balanced with impacts to the environment and be treated with the utmost environmental sensitivity.

During the next 30 years, components of Calgary's **roadway**, transit and pathway systems will require new crossings of river or creek systems, or widening or modification of existing bridge structures. **Watercourse** crossings may also be needed for electrical transmission, telecommunications, water or wastewater lines. In such projects, it is essential to balance the need for expanded infrastructure with the significance of the environmental areas and communities that may have to be crossed. When a crossing is deemed necessary, these facilities should be designed and constructed to protect the rivers, creeks and other natural ecosystems that will be affected.

The following discussion describes seven key principles that should be considered whenever a new or expanded river or stream crossing is contemplated.

Principle 1: Demonstrated need for the crossing.

A balanced triple bottom line framework should be used to assess the social, economic and environmental implications of the crossing and the corridor it serves and all alternatives, including the option of doing nothing.

Principle 2: Advanced planning for appropriate siting based on all relevant factors.

Several factors play a role when considering, planning, designing and constructing these crossings. These factors include:

- City-wide **street**, transit and utility connectivity to promote compact growth and public transit while reducing vehicle dependence.

- Use of river and stream corridors by people, fish, migratory birds and other wildlife and the sensitive integration of human development within watercourse ecosystems.
- Waterway constraints, such as hydrology (e.g., volume of water from droughts to floods), hydraulics (e.g., erosion power of moving water and ice) and channel morphology (e.g., meandering, braiding, entrenchment, etc.).
- Location and design of stream channel crossings.
- Bridge design principles (e.g., structural, aesthetic).

River crossing sites should only be chosen after careful determination of the least damaging crossing location – before the crossing and the associated infrastructure leading to it are designed.

Principle 3: Adherence to the recommendations of a comprehensive biophysical and social impact assessment.

The biophysical impact assessment should consider:

- plants and animals.
- seasonal and climate-related hydrological changes (droughts, floods, ice conditions etc.).
- conditions and functionalities before and after construction.
- hydraulic conditions and functions (e.g., erosion, scouring and deposition).
- connectivity of viable wildlife habitats.
- fish passage.
- long term impacts from operations.

The social impact assessment should build on the needs assessment (see Principle 1) and cover all relevant issues related to how the crossing, corridor or related infrastructure will affect people, their quality of life, their behaviour and the communities in which they live.

Principle 4: Successful minimization of impacts from construction, rehabilitation and ongoing operation and maintenance through engineering design and rehabilitation requirements.

Every effort should be made to avoid potential adverse impacts, and such efforts should be demonstrated prior to accepting mitigation as an option. To minimize the impacts of river crossings, the following standards should be implemented:

- Engineering design should follow best management practices, including the following:
  - » Provide the minimum **roadway** width necessary to service intended needs and adjacent land uses. An effect of a highly connected **street** system is an increase in impervious surfaces. Therefore, it is beneficial to narrow **streets**, which can decrease the amount of impervious paving.
  - » Wide **streets** and slope embankments can result in the need to disturb a significant length of the watercourse. By narrowing **street** and shoulder widths at watercourse crossings and by considering steeper embankments or clear span bridges, the total length of disturbed channel may be reduced.
  - » Use more habitat-friendly forms of river training such as bio-engineering to mimic natural armouring, instead of riprap and concrete.
    Replicate historical natural bank stabilization, rather than hard surfaces.
  - » A clear span bridge is usually the preferred type of crossing because it typically causes less impact to watercourse and flood plain functions.
  - » When combining utility crossings with bridges, any corrosion problems due to leaks or electric currents should be anticipated and prevented.
  - » Bridge spans that either eliminate or minimize the disturbance of the watercourse bed and shore are preferable.
  - » Recreation access to the watercourse and approach ramps should be included, as appropriate.
  - » Where significant conflicts are expected, priority should be given to the protection of wildlife habitat and corridors (ecologically sensitive areas) over all other uses.
- Adverse biophysical impacts should be avoided if possible, or minimized if unavoidable.
  - » Vegetation impacts should be minimized by crossing the stream corridor at a right angle and keeping the right-of-way as narrow as possible.

- » Designing for acoustic, visual and safety factors is important.
  - Sound barriers block the view and turn crossings into visual canyons; however, they may be needed to reduce salt spray and/or disruptions to wildlife habitat and corridors.
  - Concrete is very noisy but physical buffers and rubberized surfaces help.
  - Wet surfaces increase traffic noise, especially with low clouds that reflect sound back to the ground.

- Water from bridge and approach runoff needs primary and secondary treatment. Best management practices such as stormwater ponds, storm receptors, and constructed wetlands should be used in the vicinity of the crossing to treat **street** drainage and runoff from bridge decks to meet federal, provincial and municipal requirements as well as the objectives and criteria in water and watershed management plans.
- Shadowing from crossings can alter the seasonal and daily sunlight patterns on water and land and change biological functions, structure and viability. These impacts may be addressed by narrowing the right-of-way, using grated bridge decking where appropriate, or dividing the **roadway** into two with an open segment in between.
- The natural hydraulics of the watercourse must be respected and accommodated.
  - » Bridge crossings should be sized to accommodate the maximum flood flow **as per design guidelines**..
  - » Adequate clearance must be provided between the high-water flood level and the lowest part of the bridge structure, to allow unobstructed passage of debris.
  - » The placement of and hydraulic impacts due to bridge abutments should consider existing impediments and recreation river traffic because of the dangers to boaters during different water levels.
  - » Bridge abutments, piers and footings should be located outside the bank-full channel. An arched construction that spans the channel may be preferable. For bridge elements located in the flood plain, the orientation and surfaces of the structures should be hydraulically smooth and designed in a manner to allow a gradual contraction of flow from the natural channel and flood plain through the crossing, and expansion of the flow downstream of the crossing.
  - » Bridge length should be established to allow proper conveyance of the probable maximum flood flow. The length of the bridge should be increased to eliminate the potential for scour of the abutments and piers, to provide access under the crossing for pedestrian paths, and to preserve wildlife migration corridors and riparian vegetation.
  - » The footprint of crossings and their associated facilities should be minimized to reduce impacts or interruptions to natural groundwater flows within the alluvial aquifer.

Principle 5: Co-operation between multiple jurisdictions based on long term planning and mutual agreement on objectives and uses.

- Integrate proposed watercourse crossings with relevant plans and policies such as local watershed management plans (e.g., Bow River, Elbow River, Nose Creek), the provincial Water for Life Strategy and Land Use Framework, the Calgary Metropolitan Region Board plans, and the City's Wetland Conservation Plan **and Riparian Action Plan**.
- Aim to exceed the current minimum requirements established by regulatory agencies, in anticipation of more stringent regulations as our increasing population puts more pressure on shared resources and natural capital.
- Contact agencies responsible for fisheries, terrestrial species, hydraulics, alluvial aquifers, flood plain management, wetlands etc. to ensure that all requirements and initiatives will be co- ordinated.
- Pre-screening of locations should include long term goals of multiple jurisdictions (municipal, regional, provincial, federal) to optimize each individual crossing and minimize the number of crossings.

Principle 6: Effective policies, regulations, guidelines and enforcement.

Proper planning and design of watercourse crossings must be governed and supported by environmentally responsible legislation. Some relevant examples of local regulations, guidelines, policies etc. are listed below:

- The Department of Fisheries and Oceans Canada (DFO) typically requires a site-specific analysis for major watercourse crossings, which would, at a minimum, include the following details: fish habitat, hydraulics, timing of the project (for spawning and mitigation), construction activities and sequencing.
- The City of Calgary biophysical components include flora, fauna, terrestrial, avian, amphibians, insects and hydrology.
- Alberta's Wetland Policy and Calgary's Wetland Conservation Plan include a 'no net loss' principle, with a prioritized approach: avoid, mitigate, compensate.
- The City of Calgary's Wetland Conservation Plan includes a minimum 3:1 replacement ratio on the basis of affected wildlife habitat and other functionalities.
- **City of Calgary Stormwater Management and Design Manual.**
- **Alberta Water Act Code of Practice.**
- **Alberta Transportation guidelines provide guidance on sizing, hydrotechnical design and fish habitat.**
-

Principle 7: Public consultation.

The City should consult the public, impacted communities and businesses on the planning, design and construction of any new river crossings. The consultation process should address the environmental, social, fiscal, safety and mobility impacts of the proposed crossing.

~~APPENDIX C~~ Part 7

Glossary of Terms

A

accessibility

Ease of access/egress to any location by walking, ~~cycling~~**wheeling**, transit~~,~~ and private vehicles, or for commercial vehicles.

active modes

Non motorized travel, primarily walking~~ and cycling but also includes roller blading~~, **wheeling** and movements with mobility devices.

Activity Centre

All areas defined as Major **Activity Centres**, Community **Activity Centres** or Neighbourhood **Activity Centres** in the MDP, and as shown on the MDP Urban Structure ~~Map~~**Maps**.

asset management program

A process that guides the gaining of assets, along with their use and disposal in order to make the most of the assets and their potential throughout the life of the assets. While doing this, it also manages and maintains any costs and risks associated with the assets.

B

Balanced Growth Boundary

The boundary between Developed and Developing areas of the city in 2006, used to measure the balance of growth being achieved by way of the urban expansion core indicator.

built form

The engineered surroundings that provide the setting for human activity and includes buildings, **streets** and structures (including infrastructure).

bus rapid transit (BRT)

A type of limited stop bus service that relies on technology to speed up the service. It can operate on exclusive transit ways, high-occupancy vehicle lanes and any type of **road** or **street**. A BRT line combines intelligent transportation systems technology, priority for transit, rapid and convenient fare collection and integration with land use policy, in order to upgrade bus system performance substantially.

C

Calgary Metropolitan Region Board

The provincially mandated Growth Board for the Calgary Region, as described in section 1.3.

Calgary Metropolitan Region Board Growth Plan

~~A regional plan~~**Refers** to ~~guide long-term growth and development for members~~**the current approved Growth Plan** of the Calgary ~~Regional Partnership.~~

~~**Calgary Regional Partnership (CRP)**~~

~~An association of municipalities in the Calgary Region – from Crossfield in the north to Nanton in the south, and from Banff in the west, to Wheatland County in the east, with Calgary at its Centre – that are working together to develop an integrated regional land use and transportation plan~~**Metropolitan Region Board**.

canopy cover

The area **within the boundaries of Calgary** covered by tree and forest foliage**.**

capacity

The volume of **people or** vehicles ~~the roadway~~**a transportation facility** was designed to carry in a unit of time, such as an hour. Can also be applied to transit or ~~bicycle/pedestrian~~**walking/wheeling facilities (e.g.** pathways~~.~~**).**

complete community

A community that is fully developed and meets the needs of local residents through an entire lifetime. Complete communities include a full range of housing, commerce, recreational, institutional and public spaces. A complete community provides a physical and social environment where residents and visitors can live, learn, work and play.

Complete Street

~~A street that moves people, by foot, bike, bus and car; provides places where people can live, work, shop and play; supports the natural environment; facilitates movement of trucks and service vehicles, and supports our economy.~~

A street designed and operated to enable safe, attractive and comfortable access and travel for all users, including pedestrians, cyclists and public transit and private vehicle users. A Complete Street incorporates natural infrastructure and optimize public space and aesthetics wherever possible. The degree to which any one street supports different modes of transportation, natural infrastructure or public space varies depending on surrounding context and role of the street.

congestion

A condition lasting 15 minutes or longer where travel demand exceeds the design capacity of a transportation facility.

~~Corridor~~

~~All areas defined as Urban Corridors or Neighbourhood Corridors in the MDP, and as shown on the MDP Urban Structure Map.~~

connectivity

The directness of links and the density of connections in a path or road network. A connected transportation system allows for more direct travel between destinations, offers more route options and makes active transportation more feasible.

Crime Prevention Through Environmental Design (CPTED)

The proper design and effective use of the built environment, which may lead to a reduction in the fear and incidence of crime and an improvement in quality of life.

~~**cycle track**~~

~~Dedicated space for bicycles built into street right-of-way. They are physically separated from both vehicle travel lanes and sidewalks to improve safety and efficiency for all modes of transportation.~~

D

deep utility

Design indicators are criteria for measuring progress towards sustainability, with a focus on the issues relating to the interaction and design of land use and transportation systems (e.g., proximity of population and jobs to convenient transit). Effective design issues should be measured easily and reliably, be simple and easy to understand, and can be used to drive future decision-making processes related to land use and transportation.

design indicators

Stormwater, sanitary and water pipes.

E

ecosystem

~~A dynamic system of plants, animals and other organisms, together with the non-living components of the environment, that functions as an interdependent unit.~~

The interaction between organisms, including humans and their environment. Ecosystem health/integrity refers to the adequate structure and functioning of an ecosystem, as described by scientific information and societal priorities.

G

Greater Downtown

Refers to an area comprised of the Eau Claire, Chinatown, Downtown West, East Village, Downtown Core, and Beltline communities. Greater Downtown is located on the south bank of the Bow River and bounded to the east by the Elbow River, to the south by 17 Avenue S.W. and to the west by 14 Street S.W. The direction within this Plan will also apply to properties west of 14 Street SW and south of 17 Avenue S. This area can also referred to as Centre City.

~~**green infrastructure**~~

~~An interconnected network of natural green and engineered green elements applicable at multiple scales in the land use and mobility framework. Natural green elements include the conservation and integration of traditional green elements such as trees, wetlands, riparian areas and parks. Engineered green elements include systems and technologies designed to mimic ecological functions or to reduce impacts on ecological systems. Examples include green alleys, green buildings and green roadways and bridges.~~

greenhouse gas (GHG) emissions

Gases in the atmosphere that absorb and emit radiation within the thermal infrared range.

H

hydrology

The study of the movement, distribution and quality of water throughout the Earth; hydrology thus addresses both the hydrologic cycle and water resources.

I

impervious surfaces

Mainly artificial structures, such as building roofs, ~~roadway~~**road** pavements, sidewalks and parking lots~~,~~ that cannot be easily penetrated by water, thereby resulting in runoff.

intensification

The development of a property, site or area at a higher density than currently exists. **Intensification** can be achieved through redevelopment, development of vacant/ underutilized lots, the conversion of existing buildings, or through infill development in previously developed areas.

intensity

A measure of the concentration of people and jobs within a given area calculated by ~~totalling~~**totaling** the number of people either living or working in a given area.

intermodal facilities

Places that accommodate connections between transportation modes. Typically refers to break of bulk locations between rail and air and truck.

L

life -cycle cost

The sum of all recurring and one-time (non-recurring) costs over the full life span or a specified period of a good, service, structure or system. It includes purchase price, installation cost, operating costs, maintenance and upgrade costs and remaining (residual or salvage) value at the end of ownership or of its useful life.

light rail transit (LRT)

Electrically-powered rail cars, operating in sets of three to five cars per train~~, operating~~ on protected rights-of-way, adjacent to or in the medians of **roadways** or rail rights-of-way. Generally at grade, with some sections operating in mixed traffic and/or tunnels or on elevated bridge structures.

logistics

The management of the flow of goods, information and other resources, including energy and people, between the point of origin and the point of consumption in order to meet the requirements of consumers.

low impact development (LID)

An approach to land development that uses various land planning and design practices and technologies to simultaneously conserve and protect natural resource systems and reduce infrastructure costs.

M

Main Street

All areas defined as Urban Corridors or Neighbourhood Corridors in the MDP, and as shown on the MDP Urban Structure Map.

mixed use development

The development of land, a building or a structure with two or more different uses, such as residential, office and retail. Mixed-use can occur vertically within a building, or horizontally on a site.

~~**Mobility Assessment Plan (MAP)**~~

~~Framework for assessing the multi-modal transportation impacts of new developments. Replaces Transportation Impact Assessment (TIA).~~

mode split or modal split

The proportion of total person trips using each of the various modes of transportation. The proportion using any one mode is its modal share.

N

native biodiversity

Species of flora and fauna that are indigenous to a specific area.

natural infrastructure

An interconnected network of natural green and engineered green elements applicable at multiple scales in the land use and mobility framework. Natural green elements include the conservation and integration of traditional green elements such as trees, wetlands, riparian areas and parks. Engineered green elements include systems and technologies designed to mimic ecological functions or to reduce impacts on ecological systems.

Examples include green alleys, green buildings and green roadways and bridge.

P

park and ride lots

Parking lots located at LRT stations or bus stops that allow automobile users to park their private vehicles, access and transfer to and from public transportation service in a convenient manner.

parking facilities

Any surface used to provide parking for vehicles, whether inside part of or all of a building, or outside either off-**street** or within the **roadway** right-of-way.

pedestrian-oriented or pedestrian-friendly

An environment designed to make travel on foot **and/or by assisted mobility device safe,** convenient, attractive and ~~comfortable~~**accessible** for ~~various~~**all** ages and abilities. Considerations include directness of the route, interest along the route, safety, ~~amount of~~ **street** activity, separation of pedestrians and traffic, **street** furniture, surface material, sidewalk width, prevailing wind direction, intersection treatment, curb cuts, ramps and landscaping.

primary transit threshold

A minimum intensity of people or jobs per gross developable hectare that is required within walking distance of a transit station or stop to support service levels of the Primary Transit Network.

public realm

The space between and within buildings that are publicly accessible, including **streets**, squares, parks and open spaces. These areas and settings support or facilitate public life and social interaction.

R

redevelopment

The creation of new units, uses or lots on previously developed land in existing communities.

right-of-way (ROW)

Publicly owned land containing **road**s and **streets** and/or utilities.

road

Roadways that are designed to move large volumes of vehicular traffic (private vehicles, commercial vehicles and occasionally transit) at higher speeds over long distances.

roadway

A generic term that encompasses all types of **road**s and **streets**.

S

sense of place

A strong identity and character that is felt by local inhabitants and visitors. Factors that help to create a "strong sense of place" include natural and cultural features, built form and architecture, mobility to and within the place and the people who frequent that place. Areas with a good sense of place often have elements that are appealing to the five senses (sight, smell, touch, taste, sound) and generally encourage people to linger longer and enjoy the atmosphere.

shallow utility

Gas, electrical, telephone and television cable services.

street

Roadways that are designed to accommodate all modes of transportation (to varying degrees depending on the specific type of **street**). They also contribute to sense of place, and typically provide more **street**scape elements than **road**s.

streetcars

Urban rail vehicles operating a low speeds (e.g~~.~~**.,** 10 to 25 ~~km/h~~**kph**) in mixed traffic, with closely spaced stops (e.g., every 200 metres).

streetscape

All the elements that make up the physical environment of a **street** and define its character. This includes paving, trees **and vegetation**, lighting, building type, style setback, pedestrian, cycle and transit amenities, **street** furniture, etc.

sustainability

Meeting the needs of the present without compromising the ability of future generations to meet their own needs. It includes environmental, economic and social sustainability. **Sustainability** is defined by the 11 **Sustainability** Principles for Land Use and Mobility, approved by Calgary City Council on Jan. 8, 2007.

T

Transit-Oriented Development (TOD)

A compact, mixed-use community within walking distance of a transit stop, that mixes residential, retail, office, open space and public uses in a way that makes it convenient to travel on foot or by public transportation instead of by car.

transit-oriented, transit-friendly or transit-supportive

The elements of urban form and design that make transit more accessible and efficient. These range from land use elements, (e.g., locating higher-intensity housing and commercial uses along transit routes) to design (e.g., **street** layout that allows efficient bus routing). It also encompasses pedestrian-friendly features, as most transit riders begin and end their rides as pedestrians.

transit priority measures

Strategies that improve transit operating speeds and transit travel time reliability in mixed traffic, such as traffic signal priority or queue jumps.

typology

Typology defines the key geographic areas within the urban boundary that share common characteristics. Typologies establish the strategic framework within which more detailed land use designations and policies can be established. Integral to each typology and the city as a whole are the "**Road** and **Street** Palette" and transit services which are integrated with the land use pattern or typologies.

U

universal design

Universal design is the design of products**, building features** and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

urban forest

All the trees and associated vegetative understory in the city, including trees and shrubs intentionally planted, naturally occurring or accidentally seeded within the city limits.

W

walkable

See “pedestrian-oriented.”

watercourse

A natural or artificial channel through which water flows.

watershed

Watersheds include groundwater, springs, wetlands, ponds, streams and lakes as well as all land that drains into these linked aquatic systems. **Watershed**s reflect both the natural characteristics of their geography and the impacts of human activities within them.

wayfinding

A term used to describe how people respond to the built environment to orient themselves. Elements that contribute to wayfinding include reference points such as signage, natural areas or parks, landmark buildings, bridges, distinctive lighting, public art, etc.

wetlands

A (Calgary) wetland is a waterbody and its bed and shores, that is naturally occurring or disturbed and is located within the Foothills Fescue and Foothills Parkland Natural Regions within the city of Calgary ~~– see wetland conservation plan~~ (as per the Wetland Conservation Plan).

wheeling

A person travelling by bike, skateboard, in-line skates, kick-scooter, e-scooter, or other similar form of mobility device.

~~APPENDIX D~~ Part 8

Maps

These maps represent a conceptual land use structure and transportation networks for the city as a whole. No representation is made herein that a particular site use or City investment, as represented on these maps, will be made. Site specific assessments, including environmental contamination, as well as the future financial capacities of the City of Calgary must be considered before any