TRANSPORT 2050

Draft Regional Transportation Strategy

October 12, 2021

Message from the Chair of the Mayors' Council and Chair of the TransLink Board of Directors

[To be inserted here in final draft]

Recognition of Indigenous Peoples and Voices

We acknowledge, respect and celebrate the Indigenous Nations on whose treaty and unceded territories we are fortunate to live, work, operate and serve. We recognize that in planning and managing the region's transportation system we have an important role to play in supporting reconciliation with Indigenous peoples.

In Phase 2 of Transport 2050, we invited the Indigenous Nations and Indigenous groups to sit on an Indigenous Advisory Council to help guide development of Transport 2050.

We extend our sincere gratitude to the Indigenous Nations and Indigenous groups that have participated in the Indigenous Advisory Committee and helped shape the strategies and actions that we will implement together, with support from our partners, over the coming years.

This space below is reserved for input and/or revisions from the Indigenous Advisory Committee and will be updated in the final draft of the document.

In Parts E & D, actions that advance reconciliation with Indigenous communities are shown with this icon: X.

For a summary of all Indigenous reconciliation-related actions, see Part J: Topic Indices.

TransLink's commitment to supporting reconciliation with Indigenous communities

As the region's transportation authority, TransLink is committed to supporting reconciliation through the implementation of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the Truth and Reconciliation Commission Calls to Action. It is a commitment to supporting the fundamental paradigm shift required to dismantle the systemic racism, discrimination, and disparity faced by Indigenous peoples in our society today.

TransLink acknowledges that reconciliation means something different to each Indigenous Nation, community and individual. We recognize that our actions, intended to support reconciliation, must be tailored to reflect that Indigenous communities have distinct and unique cultures, histories, languages, rights, and traditions. Like our relationship with Indigenous Nations and peoples, our understanding of the meaning of reconciliation, and its application to our work, will grow and evolve over time.

Through engagement with Indigenous Nations and Indigenous peoples on Transport 2050, TransLink has heard that supporting reconciliation is reliant on telling the truth. TransLink acknowledges that building mutually beneficial relationships and supporting reconciliation with Indigenous Nations and Indigenous peoples is overdue. Looking forward, there is significant work to be done to foster inclusivity and collaboration with Indigenous peoples that supports reconciliation within the region.

We must collectively acknowledge the historical policies and practices that have caused generations of injustices and harm to Indigenous peoples and their communities. The present-day impacts to Indigenous communities and peoples as a result of the pattern of transportation development in the region are complex, multi-generational, and undeniable. The current lack of transportation options to Indigenous communities acts to further entrench the segregation, marginalization, economic disparity, and threats to the health and safety of Indigenous peoples.

Through engagement with Indigenous Nations and Indigenous peoples on Transport 2050, TransLink has heard that demonstrating a commitment to reconciliation requires action. The Strategy sets out specific actions that we commit to working with Indigenous Nations to implement over the next 30 years. A priority will be to work with Indigenous Nations, federal and provincial governments, and transportation partners to explore multi-modal options and to provide improved transportation services to on-reserve communities and to review the effectiveness of service for Tsawwassen First Nation.

TransLink understands that it will take long-term sustained commitment and ongoing actions to gain the trust and confidence of Indigenous communities.

Table of Contents

Executive Summary

The 2050 we want: Access for Everyone

Imagine a future where getting around Metro Vancouver is easy.

Where we all have convenient transportation choices. That are reliable, affordable, safe, and comfortable. Where everyone has access to transportation options that don't contribute to climate change. So that both current and future generations can enjoy a healthy environment.

Imagine a future where we can ensure *Access for Everyone.* Where every person in Metro Vancouver, no matter who they are, where they live, or how they choose to get around, can easily connect to the opportunities they need to thrive.

Because our lives, the future of our region, and its economy, depend on a sustainable, effective, and efficient transportation system that works for everyone.

To realize our vision of *Access for Everyone*, we need to understand that every single person in Metro Vancouver is unique. And that they can face different struggles and barriers that make moving and living in the region more or less challenging.

To create a fairer and more just and inclusive transportation system that truly delivers on the promise of *Access for Everyone*, we need to take steps to support these struggles. So that everyone — regardless of their background, no matter their race, faith, national origin, sexual orientation, gender identity, ability, age, or socioeconomic status — can easily, reliably, affordably, safely, comfortably and cleanly travel around the region.

The transportation future we want is one where no one gets left behind.

Transport 2050: the roadmap to our shared transportation future

Transport 2050 is the new Regional Transportation Strategy (RTS) for Metro Vancouver. Designed to be flexible in an era of rapid change, Transport 2050 is our roadmap for the next 30 years. It identifies projects, services, and policies to make transportation better for everyone.

Through TransLink's largest-ever public engagement, we heard from you — the people who live, work, and play in Metro Vancouver. We learned about your values, concerns, priorities, and ideas, which we've used to inform this strategy.

Transport 2050 was developed in collaboration with residents, municipalities, Metro Vancouver, the Province, and stakeholders, and through engagement with Indigenous Nations and groups. As a shared strategy, it reflects a common vision for the future of transportation in Metro Vancouver. This includes connections beyond the region, which are critical to the social and economic well-being of the province.

> As an integrated, multi-modal transportation authority, TransLink plans Metro Vancouver's transportation system. TransLink also led the development of Transport 2050. Whether you walk, bike, roll, transit, or drive, Transport 2050 will shape how you get around. The strategy also lays out a path for goods movement. So that we can keep building a sustainable economy in a growing region.

Although Transport 2050 is a document prepared by TransLink, the strategy — per our legislated mandate — covers regional transportation at large, and speaks from a broad regional voice. It recognizes that a single entity cannot get us to the transportation future we want, it will require actions from many partners.

Leveraging technology — for the benefit of everyone

Technology can help transform the region for the better. But only if we make it so.

We only need to look to history to know that major unforeseen disruptions, such as in the form of new technologies, can come suddenly, bringing major benefits and consequences. Past transport revolutions — such as the introduction of streetcars or the rise of the automobile — have, within a short span, reshaped how we move and live.

These transport revolutions have made it easier for many people to travel faster and further, but have also brought some negative impacts, making it harder for some people to live in the region. Including by bringing sprawl, pollution, or safety hazards, sharpening inequalities, or by making it more expensive to live here for some.

> **Our transportation vision**
> Everyone can easily connect to the people, places, and opportunities that they need to thrive — because we all have real transportation choices, that we can count on, that we can afford, and that we can safely enjoy. Our transportation system supports an inclusive, future-ready region that advances reconciliation.

We're living in an era of rapid change and disruption and are on the cusp of some dramatic evolutions in technology. Automation could touch every part of transportation, and automated vehicles could be carrying a majority of personal trips within the time horizon of this strategy. Similarly, digital connectivity, electric vehicles, and urban air mobility technologies are either already here or are gaining traction. These technologies all hold out promise to make it easier to connect to opportunity, reduce carbon pollution, or bypass congestion. They are also redefining how goods are moved and delivered.

However, these transport revolutions bring with them risks and unanticipated consequences that need to be managed carefully, so that they work in support of our vision. Reducing social inequity, addressing the climate emergency, and supporting vibrant, compact, and livable people-oriented cities and streets. This means asking how new technologies can support — and not replace — the most sustainable modes of walking, biking, rolling, and transit.

The region has work to do: challenges and opportunities

Like all places, the region faces challenges that affect our quality of life, our economy, and our environment.

Not the least of which includes recovering from COVID-19. The pandemic has touched all of our lives, impacting our physical, mental, and social wellbeing, harming our economy, and accentuating social inequalities. While Transport 2050 is a long-range strategy, the pandemic does inform our present reality and has accelerated some transportation trends we'll need to consider so we can build back better.

Metro Vancouver — with its beautiful natural areas, vibrant communities, and diverse peoples — sits on traditional and unceded Indigenous territory. Throughout our history, colonialism and racism have brought vast harms to Indigenous communities and peoples who have lived here since time immemorial. As the region evolves, we need to address how transportation planning has upheld this system of colonial power so that we can work towards reconciliation.

The gap between the haves — those with options for safe travel, affordable living, discrimination-free mobility, and access to places they need to go — and the have-nots continues to be a problem. If anything, recent events in the COVID-19 global pandemic have shone a light on social inequity. By improving transportation, we can help people thrive, no matter who they are, or what part of the region they call home.

Metro Vancouver is an unaffordable region, with its expensive housing and lower incomes relative to comparable jurisdictions. Good transportation connections often increase housing prices as it makes the location more

desirable. As expensive housing forces families to pursue more affordable homes in poorly connected or outlying parts of the region, they often have fewer transportation options — often requiring them to rely on cars for their daily needs. As we continue to invest in good transportation facilities and connections, communities can see displacement or gentrification, which can hurt the most vulnerable.

Traffic congestion affects nearly everyone in Metro Vancouver, whether they travel by car, bus, bike, or foot. The result is frustration, time lost to traffic, and more air pollution and greenhouse gases. Congestion also leads to extra costs for goods movers, which erode our economic competitiveness, and end up on our grocery bill. To date, no region in the world, including ours, has built its way out of congestion, not even by providing more transit service. Tackling congestion will mean making tough choices.

The global and local challenge of climate change, of which transportation is a prime contributor, calls for us to act urgently, at every level of government. Regional greenhouse gas emissions have basically remained stuck at the same level for a decade. Every year we fail to dramatically reduce them requires that we do even heavier lifting in future years, at higher costs, to reach the region's goal of carbon neutrality by 2050.

We are a region that shapes our own future

By putting our values first, we can shape the future we want. We know this, because we've done it in the past.

At critical times in history, we've come together to change the trajectory of the region's future. Decisions, such as the ones to reject downtown freeways, create the Agricultural Land Reserve, or embrace compact, transit-oriented communities, have made this region what it is today. In more recent history, the decision to create TransLink — as North America's first integrated, multimodal transportation authority — and the adoption of the regional goal of carbon neutrality have and will continue to support the region we want. Now that nearly everything first envisioned in Transport 2021, the region's first long-range transportation strategy from 1993, has been completed, it's time for Transport 2050 to guide us into the future.

This is a crucial moment: the choices we make today will influence how we move and live for decades to come. But we also need to remain nimble, so that we can be resilient to whatever the future might bring. From disruptive new technologies, to pandemics, to extreme natural events, external forces and events have the potential to upend life in the region. Especially in our increasingly globally connected region and economy. It's our responsibility to ensure the future transportation system thrives in a world of shocks and disruptions.

How we'll act: creating the transportation future we want

To help create the future we want, Transport 2050 sets out five goals and headline targets and maps out the key strategies that are needed to get us there.

Transport 2050

	We all have real choices	that we can count on,	that we can afford,	that we can safely enjoy,	now and into the future.
Vision	**Access for Everyone**				
Goals	1 / **Convenient** Choices for Everyone	2 / **Reliable** Choices for Everyone	3 / **Affordable** Choices for Everyone	4 / **Safe & Comfortable** Choices for Everyone	5 / **Carbon-Free** Choices for Everyone
Headline Targets	By 2050, walking, cycling, and transit are competitive choices accounting for at least half of all passenger trips, with taxi, ride-hail and carsharing accounting for most of the remainder.	We are all spending 20% less time stuck in congestion compared to today	None of us need to spend more than 45% of our household income on housing & transport combined	Reduce serious traffic injuries and fatalities by at least 5% annually until we reach zero by or before 2050	By 2030, lower carbon pollution from light-duty vehicles by 65% over 2010 levels; eliminate carbon pollution from transport altogether by 2050
Strategies (key things we'll do to achieve each goal)	1.1 Make **active transportation** the most convenient choice for shorter trips	2.1 Make **transit** more reliable	3.1 Make **living close to frequent transit** more affordable	4.1 Eliminate **traffic fatalities and serious injuries**	5.1 Reduce the **energy requirements** of the transport system
	1.2 Make **transit** the most convenient choice for longer trips	2.2 Make **goods movement** more reliable	3.2 As a priority, invest in the most cost-effective and most **affordable modes**	4.2. Ensure everyone feels **welcome**, **comfortable**, and **physically secure** while getting around	5.2 Transition to **zero emissions vehicles**
	1.3 For those who need to **drive**, help make it convenient and accessible .	2.3 Make **driving and parking** more reliable	3.3 Ensure that **transportation fees and taxes** are affordable for everyone	4.3 Minimize transportation's **adverse impacts** on local communities	5.3 Support ready access to **low carbon fuels** for the transportation system
	1.4 Provide **many different choices** conveniently together in one place	2.4 Maintain transportation infrastructure in a **state of good repair**	3.4 Help people and businesses connect to more **economic opportunities**	4.4 Safely respond to and recover from **disruptions and disasters**	5.4 Account for and reduce **upstream and downstream** emissions in the transportation system
Strategic Lenses (cross-cutting priorities)	Reconciliation				
	Social Equity				
	Resilience				

Transformative actions

The strategies and actions outlined in Transport 2050 will be undertaken in partnership between local governments, TransLink, Metro Vancouver, the provincial and federal governments, Indigenous Nations, and other actors. Most of the over 100 actions proposed in Transport 2050 have the potential to fundamentally change how we live and get around in Metro Vancouver. We think the following 10 actions will be especially transformative:

1. **Supporting walkable, complete, and affordable communities** where it's easy to access most of your daily needs within a kilometre of home and without having to drive.
2. Transforming roads that have been designed primarily for cars into **people-first streets** designed for everyone. Where all road users, including people with disabilities and people using transit, cycling, walking, or rolling, feel safe, comfortable, and connected.
3. Implementing complete networks of **traffic-protected bikeways within every urban centre**, an **850-kilometre network of major bikeways** connecting every urban centre, and abundant bicycle parking everywhere in order to provide active transportation and recreation options that are comfortable for most people to use.
4. Delivering **frequent local transit service** to within a 5-minute walk of nearly all communities within the urban parts of the region.
5. Serving more people in more parts of the region with **fast and reliable transit service** by adding 310 kilometres to our existing 100-kilometre rapid transit network and working with partners to implement new express and interregional connections.
6. **Prioritizing the movement of transit** on roads through more extensive provision of dedicated transit lanes, priority at intersections, and sidewalk extensions at bus stops. This will enable transit users to quickly and reliably get to where they need to go without getting stuck in traffic. It will also allow us to achieve our bold vision for expanding the rapid transit network primarily in dedicated lanes at street level.
7. Expanding **shared mobility** options across the region so that no matter who you are, where you are, or

where you need to go, you'll have access to a shared bike, e-scooter, or car when you want one.

8. Changing our vehicles and how we fuel them: we'll support the move to **zero emission vehicles** with more charging options and make it easier to use electric bikes and other micromobility devices. Managing the safe and equitable introduction of **automated, connected, electrified, and shared vehicles** so that they work in support of our region's goals.

9. Using the power of new **digital tools** to work towards an efficient, reliable and easy-to-use transportation system. Where everything is seamlessly integrated, everyone can easily plan and make trips that involve multiple modes, curb-side spaces are available when you need them, and traffic headaches are a thing of the past.

10. Ensuring that everyone can afford to get around, with a commitment to **universal basic mobility** where fares and fees are based on an individual's ability to pay.

Adopted by the Mayors' Council on Regional Transportation on [insert approval date], Transport 2050 begins with actions starting today. We're excited to start down this path towards our shared transportation future.

Part A: A Shared Strategy for the Region: Transport 2050 Scope and Linkages to Other Plans

Transport 2050 is the Regional Transportation Strategy (RTS) for the Metro Vancouver region. During this time of rapid change, it will help local, regional and Provincial and Federal agencies make sound transportation investment and policy decisions that align with where we collectively want to be heading over the next thirty years.

TransLink led the development of Transport 2050 in collaboration with local, regional, provincial and federal government partners, Indigenous Nations and Indigenous groups, and a wide range of stakeholders and residents across Metro Vancouver. But this strategy isn't for TransLink alone.

Transport 2050 recognizes that no single entity can get us to the transportation future we want. It will require a range of actions from many public and private actors to shape the future of how we move and live. Only through collaboration, coordination and cooperation between all partners can we realize our shared vision.

- **Local governments** in the region are responsible for land use and development and many parts of the transportation system including sidewalks, bikeways, local roads, bus stops, parking, and curb space.
- **Metro Vancouver**, the regional district, collaboratively plans for and delivers regional-scale services including water, sewers, waste, affordable housing and regional parks. It also manages regional growth and air quality in the region — including greenhouse gases (GHGs).
- **Indigenous Nations** who are non-treaty Indigenous Nations are governed by the *Indian Act*. The *Indian Act* governs all aspects of Indigenous lives, and the legislation is widely recognized as racist and paternalistic. Indigenous Nations are working to make their own decisions and to have the ability to govern themselves. "The Tsawwassen First Nation Final agreement (the Treaty) is a tri-partite agreement between Canada, British Columbia, and Tsawwassen First Nation. It is a comprehensive agreement that provides for the transfer of land and self-government jurisdiction to Tsawwassen First Nation (TFN)." [1]

> **TransLink's role**
> As the integrated, multi-modal transportation authority for Metro Vancouver, TransLink is mandated to plan, manage, and provide a regional transportation system that moves people and goods.
>
> The *South Coast British Columbia Transportation Authority Act* requires TransLink to prepare a long-term strategy every five years. The Regional Transportation Strategy must set out the goals, directions, and key initiatives for the entire regional transportation system. It must consider regional land use objectives, provincial transportation and economic objectives, and provincial and regional environmental and emissions reduction objectives.

- The **Government of BC** governs private vehicle operation (including through the *Motor Vehicle Act*) and new, light-duty vehicles that can be sold (through the *Zero-Emission Vehicles Act*), highways, and some major cycling routes and bridges. It also regulates some forms of private transportation, such as taxis and transportation network services (TNSs). The Government of BC is also responsible for enabling TransLink and is an important contributor to regional transportation investments.
- The **Government of Canada** oversees ports, intercity rail, and airports and regulates freight and passenger airlines. It also sets automobile standards, such as for safety and fuel efficiency, and is an important contributor to regional transportation investments.

> **A region, together: Climate 2050, Metro 2050, and Transport 2050**
> In parallel with the development of Transport 2050, Metro Vancouver has developed Metro 2050, the updated Regional Growth Strategy, and Climate 2050, which informs regional actions toward carbon neutrality. Together,

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[1] http://tsawwassenfirstnation.com/governance-overview/treaty-and-constitution

these three strategies will shape the future of how we move and live. They will help coordinate regional action on transportation, land use, and climate.

Our region is increasingly economically and socially integrated with the entire South Coast area. Engagement and coordination with the Government of BC, Squamish Lillooet Regional District, Fraser Valley Regional District, and neighbouring municipalities will be essential towards achieving our shared objectives.

Figure 1 — Relationship between Transport 2050 and other plans and strategies

How Will Transport 2050 Make a Difference?

As the regional transportation roadmap for the next 30 years, Transport 2050 identifies transportation projects, services, and policies to help us reach our regional goals.

Ultimately to reach the region's transportation goals, all partners and stakeholders will need to do their part. Especially since some actions fall outside of the transportation sector, such as in shaping land use, supporting vibrant local businesses, and providing the digital infrastructure and digital access needed to realize so many of the actions described in this document.

It's often said that the best transportation plan is a good land use plan: land use influences travel behaviour in many ways, especially by determining how far we need to travel to different destinations which impacts the modes we're likely to use and the total kilometres we're likely to travel in a year. That's why it's so important for the region to coordinate land use and transportation planning.

To that end, Transport 2050 will help coordinate land use policies (outlined through Metro 2050 and municipal official community plans) and transportation decisions, especially with respect to the location of future major transit investments.

Working together, we will continue to improve the region's transportation system so that it works better for everyone.

Towards the Future We Want

We believe that the values we heard and have reflected in Transport 2050 will endure over time — even as the region and technologies evolve.

Reflecting the values of the region – how what we heard through engagement shaped Transport 2050

We asked you to help shape Transport 2050, and you responded. Through TransLink's largest-ever public engagement process, Transport 2050 represents the voice of the people who live, work, and play here.

Through three phases of engagement, TransLink engaged thousands of people throughout our region and neighbouring regions including Indigenous Nations and Indigenous peoples, community organizations, businesses, workers, students and more.

By involving people in the development of Transport 2050, we learned what was most important to residents and how transportation could be improved. We are grateful to everyone who contributed their values, vision, and ideas for the future of transportation. To read more about the engagement process, see Appendix Z.

By the numbers: 315 events | 31.6k surveys completed | 158k conversations | 4k ideas submitted | 143 days of engagement

To reach our shared transportation future, we need to imagine a region that looks different from what we know from today. In some cases, we will leverage technologies, new business models, and innovations that have yet to be imagined, in the spirit of advancing Access for Everyone.

We also need to ensure that the region's transportation system is resilient, so that we can adapt to the uncertainties of an ever-changing future.

Transport 2050: a long-term view with immediate action

While the year 2050 feels a long way off – Transport 2050 is not an abstract exercise. Rather, this document is intended to bring a long-term view to the pressing policy and investment decisions of today.

The strategies and actions in Transport 2050 have different timescales, partly depending on the pace of technological change, but also on funding availability and political will. In simple terms, there are:
- Things we need to start implementing now; and
- Things that we need to start preparing for now with strategic planning, policy, and regulation.

Throughout Transport 2050 are words such as "prioritize" and "urgently" to highlight where actions are especially pressing. These are meant to draw attention to the strategies and actions that require immediate implementation.

Moving forward, TransLink will use Transport 2050 as a foundation for the development of its medium-term plans – the next Mayors' Vision and the next 10-Year Investment Plans. Investment Plans are updated at least every three years.

Every partner and every organization with a role to play in transportation in this region is invited to view this Strategy as a consistent regional foundation upon which to build their own more detailed implementation plans.

Together, we can help make our common vision of "Access for Everyone" a reality.

Part B: Regional Context, Challenges & Opportunities

Looking Back: The Major Forces and Pivotal Decisions That Shaped Our Region

The history of this region begins with the Indigenous peoples who, since time immemorial, have inhabited and cared for this land near the mouth of the Sto:lo River (Fraser River) and along the edge of the Salish Sea. With its confluence of waterways and abundant resources, this region has always been a place for meeting, food sustenance and trade.

Over this region's long history, external forces, events, and technological developments have shaped and altered its trajectory. They've introduced rapid changes in the economy, society, and environment. Reshaping land use, how our communities look, people's behaviour and preferences, and how we move and live.

Examples of some of these external forces that have played a major role in shaping the region that we are today include:

> *It's up to us to leverage external forces to propel the kind of change that we collectively want to see – in order to create a transportation system that is effective, equitable, and future-ready.*

- **Shifting trade patterns** that have shaped where communities and transportation infrastructure is located and how power and wealth are distributed;
- **Colonial assimilation laws and practices** were imposed by the Canadian government to control all aspects of the lives of Indigenous peoples and criminalize traditional practices, languages, cultural and gatherings. Canada created reserve lands to isolate Indigenous peoples and seize lands and resources for the use and benefit of others. Residential schools were operated by the Christian denomination churches and the Canadian government allowing Indigenous children to be abused, neglected, isolated from their family and in many cases, causing their death. The *Indian Act* enforced in 1876 is still in existence today.
- **Natural events such as earthquakes and the flooding** of the Fraser Valley in 1948, resulting in the region laying the groundwork for integrated regional planning to help coordinate urban growth and to avoid development didn't in flood plains;
- **Oil crisis of the 1970s**, resulting in oil supply shortages a four-fold increase in gasoline prices. This dramatically impacted the cost of living for many people and prompted the development of fuel economy standards for vehicles;
- **Economic recessions** in 1981–82, 1990–92, 2008–09, and 2020 resulting in job losses in many BC sectors and a growing wealth gap;
- **Global climate emergency**, resulting in strong climate commitments in B.C., dating back to 2007;
- **Truth and Reconciliation Commission (TRC)** released a report in 2015 with 94 'Calls to Action'. TRC called for the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) be utilized as the framework for reconciliation across all sectors of society resulting in the current understanding that reconciliation is everyone's responsibility.
- **Global COVID-19 pandemic**, resulting in major shifts in transportation patterns and dramatic uptake of remote work, e-learning and home deliveries. For trips that still needed to be made, many people chose private vehicles or active transportation to avoid crowds of people. Transit ridership fell by around half. Essential workers, many of whom work in lower-wage jobs, continued to travel the most and have borne the brunt of the health risks.

Moving into the future, we will strive for more inclusive engagement and decision-making to better understand, represent and serve the variety of people who live in the Metro Vancouver region.

Transportation technology revolutions

Humans have always been on the move. Over millennia, humans around the world have developed new technologies that have increased our travel speeds and the distances we can travel. Below is a snapshot of some of the past key technological changes that have influenced how we move and live here in the Metro Vancouver region:

Human power

People relied on human and animal powered transportation for most of history. This limited the distance people typically commuted to about 2-3 kilometers, and similarly limited the size of most cities.

Rise of the Car

The automobile revolution enabled travel up to ten times faster than walking for those who could afford a car. Rather than reducing the amount of time spent travelling, people travelled longer distances. Many regions responded by building new highways, bridges, and lower-density automobile-oriented suburbs far from jobs.

Pre-1800's — Late 19th century — Mid 20th century →

Streetcars

The streetcar era was launched around the end of the nineteenth century and allowed humans to travel up to three times faster than walking. This extended commuting distances and led to the rise of streetcar suburbs on the periphery of many major urban centres.

What's Next?

Further electrification and automation of vehicles will reduce the financial cost and time burden of commuting and may encourage people to travel even farther. Proactive management can help shape how these new technologies are implemented and adopted.

Looking Ahead: Opportunities & Challenges

This is a crucial moment in time. With generation-defining challenges, with unprecedented opportunities, and with the next major transport revolution likely just around the corner, the choices we make today and over the next decade will shape how we live and move for generations.

As we look forward, a frank understanding of where Metro Vancouver is now will set the stage for the decisions we need to make over the next few years to set us in the right direction for the long-term. Over the next few pages, we summarize key opportunities and challenges that we have considered in developing Transport 2050, and will continue to track as we move to implementation.

Right up front, we must acknowledge that we don't know for certain what the future will look like. But based on the lessons of the past, we know that external forces — from major events to disruptive new technologies — can arrive quickly, with major high impacts. The COVID-19 pandemic has illustrated how quickly such things can affect our lives and the systems that we all rely on. We need to prepare the transportation system for future uncertainties like this, especially since all-too-often it's been that society's most vulnerable have borne a disproportionate share of the costs.

By "future-proofing" the transportation system we can contribute to a more resilient region, helping us weather whatever tomorrow's shocks and disruptions may be.

Creating a resilient transportation system and region

Resilience is the capacity of individuals, communities, organizations and natural systems to **prepare, avoid, absorb, recover, and adapt to shocks and stresses** through the preservation, restoration, and adaptation of essential functions. Resilience also involves learning from shocks and stresses to build back better.

Transport 2050 aims to enhance the resilience and ability of our residents, transportation system, and region to continue to operate, recover, and maintain their core purposes in the face of change and disruption. Resilience in Transport 2050 includes:

1. **Robust** approaches that improve the quality of an asset, program or operation so it can better withstand shocks and stresses;
2. **Redundancy** in critical systems that provide alternatives if one part of a system fails;
3. **Resourceful** approaches that can mobilize diverse resources and partnerships across sectors; and
4. **Rapid** approaches that can quickly deploy the tools and processes needed to address shocks and stresses.

Actions that advance a more resilient transportation system in our region are shown with this icon: X. For a summary of all resilience-related actions, see Part J: Topic Indices.

TransLink and Metro Vancouver partnered to think about how the region could be impacted by various shocks, stresses, forces and trends in the coming decades. To learn more, see the *Long-Range Growth and Transportation Scenarios* report at transport2050.ca.

Key Regional Challenges and Opportunities

Recognizing the Rights of Indigenous Peoples	
Challenges	*Opportunities*
Nearly all of present-day British Columbia sits on lands over which different Indigenous Nations enjoy inherent rights and title, as set out in the Constitution and confirmed by the Supreme Court of Canada. **One Indigenous Nation in the South Coast region of British Columbia — sc̓əwaθən məsteyəxʷ (Tsawwassen First Nation) — has negotiated a modern treaty and formalized role in decision-making processes through the Mayor's Council on Regional Transportation and the Metro Vancouver Board as per the SCBCTA Act.** **We find ourselves planning, operating and building on the unceded territory of the q̓íc̓əy (Katzie First Nation), q'ʷa:n̓ƛ'ən̓ (Kwantlen), kʷikʷəƛ̓əm (Kwikwetlem), qiqéyt (Matsqui), xʷməθkʷəy̓əm (Musqueam), Qayqayt, Semiahmoo, Skwxwú7mesh (Squamish), and səlililw̓ətaʔɬ (Tsleil-Waututh) Nations.**	By listening, understanding, and recognizing historic and current injustices, by supporting implementation of the *Declaration on the Rights of Indigenous Peoples Act*, and by establishing more collaborative relationships between Indigenous Nations, TransLink and transportation authorities can begin to take more concrete steps towards supporting reconciliation.
Advancing social equity	
Challenges	*Opportunities*
Many groups face barriers travelling around the region, whether caused by age, ability, race, faith, national origin, socioeconomic status, sexual orientation, or gender identity. **Whether that's due to limited travel options, physical safety or barriers, or harassment and discrimination, moving around the region is more challenging for some people than others.**	By understanding how different groups face different barriers, we can take steps to remove those barriers making it easier for everyone to access the opportunities they need to thrive.
Improving affordability	
Challenges	*Opportunities*
Region-wide, nearly one-third of households spend more than 70% per cent of their before-tax income on the two major and inter-related costs of housing and transportation. **These residents are particularly struggling under the weight of an unaffordable housing and transportation costs, leaving them with difficult choices about what to spend or forego on food, clothing, childcare, and other critical expenses.**	Working together — the Government of Canada, Government of BC, Metro Vancouver, and the region's municipalities — can help increase the supply of affordable housing next to frequent transit, increase the supply of the most affordable modes, and help ensure that any transport fares or fees or linked to ability to pay.

Supporting economic prosperity	
Challenges	*Opportunities*
A lack of available industrial land and our worsening congestion is making our region a less and less attractive place to do business. **The global pandemic's impact on our national, provincial, and regional economy is putting additional pressure on our region's financial capacity to deliver needed regional transportation investments.**	Protecting and optimizing industrial land and applying meaningful congestion reduction solutions can support productivity growth and business competitiveness. Focusing on the most cost-effective transportation solutions to deliver more transportation value to the public for less money can keep taxes and fees lower. Providing reliable transportation connections for people and goods can help foster job growth and economic development across more of the region and beyond — connecting workers with access to more jobs and connecting businesses with access to a broader labour force and more markets.

Reducing greenhouse gas emissions and preparing for climate change	
Challenges	*Opportunities*
With transport being the largest single source of carbon pollution in the region, we need to act urgently with bold moves if we are to meet our climate action targets and avoid the worst impacts of a destabilized climate. Even if we are successful in reaching our emissions-reduction targets in this region, global GHG emissions to date will still lead to future climate impacts. We must prepare for a future of more weather-related extreme events and climate disruptions.	With a shared agenda for low-carbon mobility, local, regional, provincial, and federal governments have committed to aggressive GHG reduction targets. And Metro Vancouver's near-100 per cent renewable energy grid will be an asset in reducing our reliance on imported fossil fuels. Preparing for the intensifying impacts of climate change will contribute to a more resilient transportation system.

Key Regional Transportation Challenges and Opportunities

Accommodating growth to advance livability and sustainability	
Challenges	*Opportunities*
The region is set to welcome about a million new residents by 2050, and this growth will add pressure to a transportation system that's already strained.	Building on a long-held regional vision for compact communities and transit-oriented development, we have an opportunity to leverage this growth to support sustainable transportation outcomes, by co-locating people, places, and opportunity. More people and more jobs, in the right locations, will generate the ridership demand needed to support a thriving regional transit system with fast, frequent and reliable service to more parts of the region.
Providing people with access to a diverse selection of transportation options	
Challenges	*Opportunities*
One of the main reasons that people choose to own a personal car is they don't have good walking, biking, rolling, transit, or shared vehicle options close to where they are — or where they need to be. Or, for many people, these choices may be available but they don't meet their accessibility needs.	We can build on unprecedented levels of senior government funding for transit infrastructure and a pandemic-related resurgence in public interest and support for walking, biking, or rolling.
Reducing road congestion and improving travel time reliability	
Challenges	*Opportunities*
Traffic volumes strain road capacity in many parts of the region. This leads to unreliable travel times for people and goods, with some areas experiencing congestion all day long.	By leveraging demand management tools and new technologies, and by prioritizing more road space for transit, we can deliver a regional transportation system that makes moving across the region more efficient and reliable, for every mode on the road.
Improving traffic safety	
Challenges	*Opportunities*
For the past five years, an average of 100 people have died in traffic crashes on our region's roads every year — 40 of whom per year were walking or biking when they were killed.	By separating different road users according to speed, by reducing overall traffic speeds, and by leveraging the potential of automated vehicles — we can make our streets safer for everyone.

Technological Challenges and Opportunities

Transport revolutions throughout history have quickly and dramatically changed how we move — and promise to continue to do so into the future. [2] Looking back, the arrival of the streetcar in the late 1800s and the automobile in the early 1900s each had transformative impacts. Within a span of two decades, they each in turn re-shaped our cities, the nature of housing and commerce, and how most people and goods moved around.

Looking ahead, the convergence of four trends promise to fundamentally reshape transportation once again. They are: Automation, Connectivity, Electrification, and Sharing (or "ACES"). On their own, these trends are already transforming vehicles, business models, and habits. But together, the ACES could enable the next transport revolution, the automated vehicle revolution — with the potential to transform the region for the better if it is managed well.

Throughout history, the costs and benefits of transport revolutions have not been evenly distributed. With the specific groups being left out or bearing a disproportionate share of the burdens.

In future revolutions, we need to make sure that costs and benefits are fairly distributed and that no one gets left behind. History has also shown that choices around how we respond to transport revolutions can come with unintended consequences that are only evident years later.

For example, the automobile is a remarkable invention that has made it easy to travel farther, faster. It has also opened access to opportunity (such as employment, social, and recreational opportunities) — for those who can afford a car. But following the widespread adoption of the car, most urban regions also saw a rapid rise in traffic congestion, air pollution, and traffic fatalities as governments at all levels prioritized automobiles through investments and urban design.

At the same time, for the most exposed road users, such as people on foot or bicycle, the automobile revolution has brought harms. These groups are more likely to be impacted by traffic collisions or by tailpipe emissions. And for those without a car and living outside of

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What are Automated Vehicles (AVs)?

Advances in computing and sensors are putting robots in the driver's seat. Automated Vehicles (AVs) put safety-critical controls, such as steering, throttling, or braking, outside direct driver control.

Six levels of vehicle automation describe how much responsibility a computer takes on – versus a human driver. AVs are already here – Level 2 and 3 vehicles that include advanced driver assistance systems are now common-place in new vehicles. It's only a matter of time until more vehicles with higher levels of automation enter the market. Fully automated driving occurs where a steering wheel and driver are no longer required in well-mapped and defined cities and regions (level 4) or in any condition (level 5).

For the purposes of this Strategy, the automated vehicle "transport revolution" begins with the arrival of Level 4 automation. While Level 5 automation may still be many years away, experts believe that Level 4 automation is likely to be commercially available within the decade and widespread by 2050. We only need to look to history to learn that transport revolutions can be sudden, rapid and disruptive. For example, just two decades after the arrival of the Ford Model-T, 60% of U.S. households owned a car, up from a baseline of nearly zero

Automation has applications for all transportation, from personal vehicles, to ride-hailing, to transit, to freight. These technologies will need to be closely monitored to ensure that potential negative impacts – such as increased congestion, worsening inequality, and potential job losses – are addressed fairly and proactively.

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[2] In their book, "Transport Revolutions: Moving People and Freight Without Oil," Anthony Perl and Richard Gilbert define a transport revolution as "a substantial change in a society's transport activity that occurs in less than 25 years." And they define "substantial change" as a shift in which "something that was happening before increases or decreases dramatically, say by 50 percent; or a new means of transport becomes prevalent to the extent that it becomes a part of the lives of ten percent or more of the society's population."

urban areas, the relative gaps in access to employment, health care, recreation and inclusion in society have widened.

One of the key tasks of Transport 2050 is to anticipate the challenges and opportunities that are likely to arise from coming transport revolutions. In this way, we can act to leverage the benefits while reducing the risks.

It's up to us to ensure that coming transport revolutions are managed carefully so that we can realize the vision of Access for Everyone.

"The future is already here — it's just not evenly distributed." — William Gibson (1992)

Unlike earlier in this section, the opportunities are indicated first and the challenges second. This reflects the fact that these technologies are new or rapidly evolving and are being rolled out on the basis of their promise.

Shared mobility	
Opportunities	*Challenges*
Advances in technology are enabling more convenient vehicle sharing. From scooters to bikes to cars, more people are moving from owning their own vehicle to paying to use one for a few minutes or hours at a time. **In just five years, the number of carsharing vehicles in the region has grown from 1,000 to over 2,500. Displacing as many as 30,000 privately-owned cars, shared mobility platforms offer an opportunity to make it more attractive to move and live in this region without needing to own a car.** **This will be critical to reducing congestion, improving safety, and achieving our climate action objectives.**	App-based ride-hailing, if not managed well, can lead to significant increases in driving and traffic, especially in the most congested parts of the region. Shared micromobility systems (such as bikes and scooters) can lead to clusters of scooters and bikes blocking sidewalks and entrances at key destinations, causing particular challenges for people with disabilities.
Digital and connected mobility	
Opportunities	*Challenges*
Digital access is reshaping how we connect to opportunity — from work, to medicine, to learning, to shopping. By 2025, it is expected that all new road vehicles will be capable of communicating with the internet, with each other, and with street infrastructure. **This connectivity will enable more accurate and personalized up-to-the minute customer information and more seamless connections between modes and services. It will also enable improved traffic safety and reliability, and more effective asset maintenance.**	As more devices, vehicles, and transportation assets rely on digital connectivity to function, the entire transportation system becomes more vulnerable to cyber-attacks or other disruptions, such as power outages.

Electric vehicles	
Opportunities	*Challenges*
Driven by government policy and advances in batteries and hydrogen fuel cells, electric vehicles (EVs) and zero emission vehicles (ZEVs) are becoming more popular. Already, nearly one-in-ten new vehicles sold today are electric. **The Government of Canada now requires that all new light-duty vehicles sold in 2035 and thereafter produce zero emissions at the tailpipe.** **These vehicles are becoming more affordable and, within the decade, a market for used EVs will become more robust — making them even more affordable.** **The electric vehicle revolution will be critical to achieving our regional and Provincial climate action and air quality targets, given that light-duty vehicles are currently the single largest source of GHG emissions in our region.**	Currently, EV battery manufacturing generates significant GHGs. Until the entire supply chain is decarbonized, we cannot rely on the transition to EVs alone in the fight against climate change. The substantial increase in demand for electricity to power an all-electric vehicle fleet will demand new electricity generating capacity across the Province which will require both creative solutions and substantial new investment. Assuming that electricity remains as abundant and affordable as today, electric vehicles will continue to have operating costs of roughly one-third that of comparable gas or diesel vehicles. Making it cheaper and more attractive to drive more frequently — which could lead to more traffic and congestion. All personal vehicles — whether powered by electricity or fossil fuels — occupy scarce urban space and are the main culprits behind nearly all traffic fatalities and injuries. Especially to vulnerable road users. The personal benefits of EVs also accrue to who can afford them — further exacerbating inequalities. Meanwhile, the regional fuel sales tax that has historically funded about a third of regional transportation needs will decline and ultimately disappear. A new transportation-based revenue tool will be needed to replace it.
Urban air mobility	
Opportunities	*Challenges*
As advances in electric propulsion, miniaturization, and automation drive the commercialization of electric Vertical Take-Off and Landing vehicles (eVTOLs), we anticipate private sector interest in offering new air transit services targeting shorter to medium length trips. These vehicles could provide very fast connections between destinations within the South Coast Region and with neighbouring regions.	Expensive and exclusive air transportation services could accelerate inequalities and would likely increase transportation energy consumption. There is a greater risk of serious injury or fatality in the event of malfunctions or operator errors. And for those on the ground, there could be noise, stress, discomfort, and privacy concerns associated with being under a flight path.
Automated vehicles	
Opportunities	*Challenges*
With most traffic crashes today occurring due to human error — automation promises to enhance safety and reduce collisions. It can also provide better	With reduced time and financial costs of travel, private AVs could lead to a large increase in driving.

mobility for people who don't or can't drive, such as people with disabilities, seniors, or those without driving licenses. **Shared AV fleets could accommodate all urban trips with a small fraction of today's vehicle fleet. And because there could be fewer cars on the road, cities could repurpose road and parking space for other uses.**	This reduced cost of travel would also lead to increased congestion, energy use, urban sprawl, and physical inactivity.

In this era of rapid change, we collectively need to manage these challenges and channel these unprecedented opportunities in order to advance our shared goals and help build a region that delivers access to opportunity for everyone.

By putting our values first, we can shape the future we want. Being clear about those values and aspirations is the topic we now turn to in Part C below.

Part C: The Future We Want — Access for Everyone

No matter who you are, where you live, or how you choose to get around, Transport 2050 is about making sure that we all have access to real choices that we can count on, that we can afford, and that we can safely enjoy, now and into the future.

Transport 2050 sets out five **goals**, each with an associated **headline target** intended to describe the scale and pace of our ambition and to set the benchmark for the kinds of actions that are needed. Additional key performance indicators beyond these headline targets are included in Part H.

Each of these five goals begins with the phrase "We all have." This phrase points to a vision for the future where everyone in the region can connect to the opportunities they need to thrive. This is the vision of *Access for Everyone*. After all, the purpose of transportation is to connect us to the people, places, and opportunities that matter most. Whether that's jobs, essential services, education, and other social, cultural, and recreational opportunities.

Goals	Headline Targets
1. We all have **abundant universally accessible choices** allowing us to **conveniently** connect to opportunities without needing to rely on a car.	*By 2050 active transportation and transit are competitive choices accounting for at least half of all passenger trips, with taxi, ride-hail, and car-share accounting for most of the remaining passenger trips.*
2. We all have **reliable** choices that get us where we need to go on time.	*By 2050 people and goods are spending 20% less time stuck in congestion compared to today.*
3. We all have **affordable** choices allowing us to easily live and move in this region.	*By 2050 none of us — especially those of us with less ability to pay — need to spend more than 45% of our household incomes on transport and housing combined.*
4. We all have **safe and comfortable** choices that make us all healthier and happier.	*We steadily reduce serious traffic injuries and fatalities by at least 5% annually until we reach zero before 2050.*
5. We all have transportation choices that are **carbon-free**, supporting global efforts to respond to the climate emergency.	*By 2030 we have lowered greenhouse gas emissions from light-duty vehicles by 65% over 2010 levels; and have eliminated transportation greenhouse gas emissions altogether by 2050.*

The Path to Achieving *Access for Everyone*

To achieve *Access for Everyone*, we need to realize that every single person in Metro Vancouver has unique needs, preferences and aspirations. And also that some people face particular struggles and barriers that can make living and moving around in our region more challenging.

To create a fairer and more just and inclusive transportation system that truly delivers on this promise of *Access for Everyone*, we need to take steps to support these struggles and to understand and address systemic barriers in the transportation system that may cause or worsen disparities experienced by different groups of people. Especially marginalized individuals and groups who have been denied equitable processes or outcomes.

- It means supporting reconciliation by working with **Indigenous Nations** and urban Indigenous peoples to ensure access to safe, affordable, and reliable transportation options including in on-reserve

communities.
- It means actively taking steps to make people of **all races, faiths, and national origins** feel welcome, safe, represented, and included as full and equal members of society.
- It means making sure that people of **all sexual orientations** and **gender identities** feel welcome, safe, and included: women and gender diverse or queer people are more frequently subjected to violence, threat of violence, or discrimination. Meaning they may feel less safe to travel alone, at certain times, or in certain locations.
- It means finding ways to support people of **all abilities**: able-bodied, neurotypical people for whom most of our transportation system has historically been designed — but especially people with diverse cognitive, intellectual, psychiatric, sensory, and physical abilities and functioning who often struggle to get around in a world that wasn't designed to meet their needs.
- It means supporting the needs of people of **all ages**: children, youth, and older adults often have fewer transportation options compared to middle-aged adults. They also can suffer other barriers, including visual, hearing, or other physical impairments that make it uncomfortable, difficult, or dangerous to travel.
- It means ensuring that people of **all socioeconomic groups** can afford to easily and safely get around: the cost of transportation can make it prohibitively expensive for people living in poverty to get around and attend to their daily needs, forcing them to drive poorly maintained vehicles, sometimes evade transit fares, walk long distances, or forego often important trips altogether.

Many members of our community who face these and other barriers to their mobility also don't often see themselves well-represented in transportation decision-making. This "invisibility" means that their needs are often overlooked or poorly understood by decision-makers. This can lead to harmful and discriminatory policies which then further widen disparities.

Expanding social equity means developing a region where people aren't discriminated against or excluded from society because of any of these characteristics, identities, or abilities. But instead, are welcomed, celebrated, supported and treated with dignity and respect.

Previous regional transportation strategies have not paid enough attention to issues of social equity and inclusion as they relate to getting around in our region. As governments and public sector agencies involved with transportation in Metro Vancouver, we have a lot to learn, a lot of data gaps to fill, and a lot of relationships to build.

The strategies and actions contained in Transport 2050 take some preliminary but substantive steps towards realizing a more just, equitable, and inclusive transportation system. *Access for Everyone* is about supporting equitable outcomes for all individuals, asking not only whether a program or policy is working – but for whom it works.

Throughout this document, wherever you see the term "everyone" — it is referring to the *everyone* described above including Indigenous and non-Indigenous people; people of all races, faiths, national origins and languages; people of all sexual orientations and gender identities; and people of all ages, abilities, and socioeconomic groups.

In Part E, actions that advance a more just, equitable and inclusive transportation system in our region are shown with this icon: X

For a summary of all equity-related actions, see Part J: Topic Indices

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Part D: The Tools in Our Toolkit

There are three key policy tools available to help steer the transportation system towards the future we want. Where we can realize our goals, and build a more just, equitable, and inclusive transportation system that is resilient and future-ready.

Each of the following three policy tools drive the strategies and actions described in Part E:

1. Managing Land Use

As noted earlier, the best transportation plan is a good land use plan: land use influences travel behaviour in many ways, including by determining trip destinations, trip routing, trip length, and mode choice. Land use planning decisions can bring people, goods, and destinations closer together resulting in shorter trips or it can spread them further apart resulting in longer trips with more driving and more traffic. That's why it's so important to coordinate transportation and land use planning — starting with tight alignment between Transport 2050, the region's transportation strategy, and Metro 2050, the region's growth strategy.

Local government land use planning and zoning regulations have great power to create more compact urban forms, complete communities, and more active transportation and transit-friendly streets. This includes the quantity and quality of intersections, street design, and grid patterns. In this way, land use can reduce sprawl, promote more sustainable modes of transportation, and reduce levels of vehicle ownership and use. Residents of walkable, complete communities oriented around frequent transit typically own 10-30% fewer vehicles, drive 20-40% fewer kilometres, and use walking, cycling and transit 2-10 times more than residents in automobile-dependent locations. [3]

2. Managing Travel Demand (Information, Regulation, Design, Pricing)

This tool focuses on making better use of the existing transportation system, for example by encouraging off-peak travel and discouraging single-occupant vehicle trips. The three main types of demand management tools include: regulation and design (e.g., pedestrian-only zones), pricing (e.g., peak period parking charges), and information (e.g., personal travel planning, marketing).

Of all three categories, the demand management tools described above demonstrate the greatest potential to reduce traffic and congestion, between 20-30% and to increase the use of walking, cycling, and transit by 10-30% [4].

3. Managing Service Levels and Infrastructure

Service level means the quality of the service experienced by the traveler or, in the context of goods movement, by the person or business shipping freight. Aspects of service level include speed, convenience, frequency of service, comfort, and other qualities. Service level is a key factor for determining how competitive different modes of travel are. In many cases, people will change their choice of travel mode because of service levels. For instance, many travelers will not use transit, despite the affordability of the fare, because it is not quick and convenient enough compared with vehicles. However, a proportion of vehicle drivers will change to transit when they observe fast-moving buses passing them in dedicated transit lanes. Selectively improving the relative service levels of the different modes or in different places can shift travel patterns. Hence, how we use our scarce road space, and how priority is allocated between active transportation, transit, cars and trucks, and other vehicles, has a major impact on service level.

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[3] Bento, et al.2003; Ewing and Cervero 2002; Khattak and Rodriguez 2005;Kuzmyak and Pratt 2003; Stead and Marshall 2001; Lawrence Frank and Company, Bradley and Lawton Associates (2005); Ewing, et al. 2007; TRB 2009
[4] TransLink 2017 Trip Diary

Reimagining our streets in order to increase the quality and supply of walking, cycling and transit service and infrastructure is an essential prerequisite to increasing the share of trips by active and shared modes. It also helps to reduce traffic congestion and emissions (although not nearly as much as the land use and demand management tools described above) and helps to make significant improvements to affordability, health, safety, and community well-being.
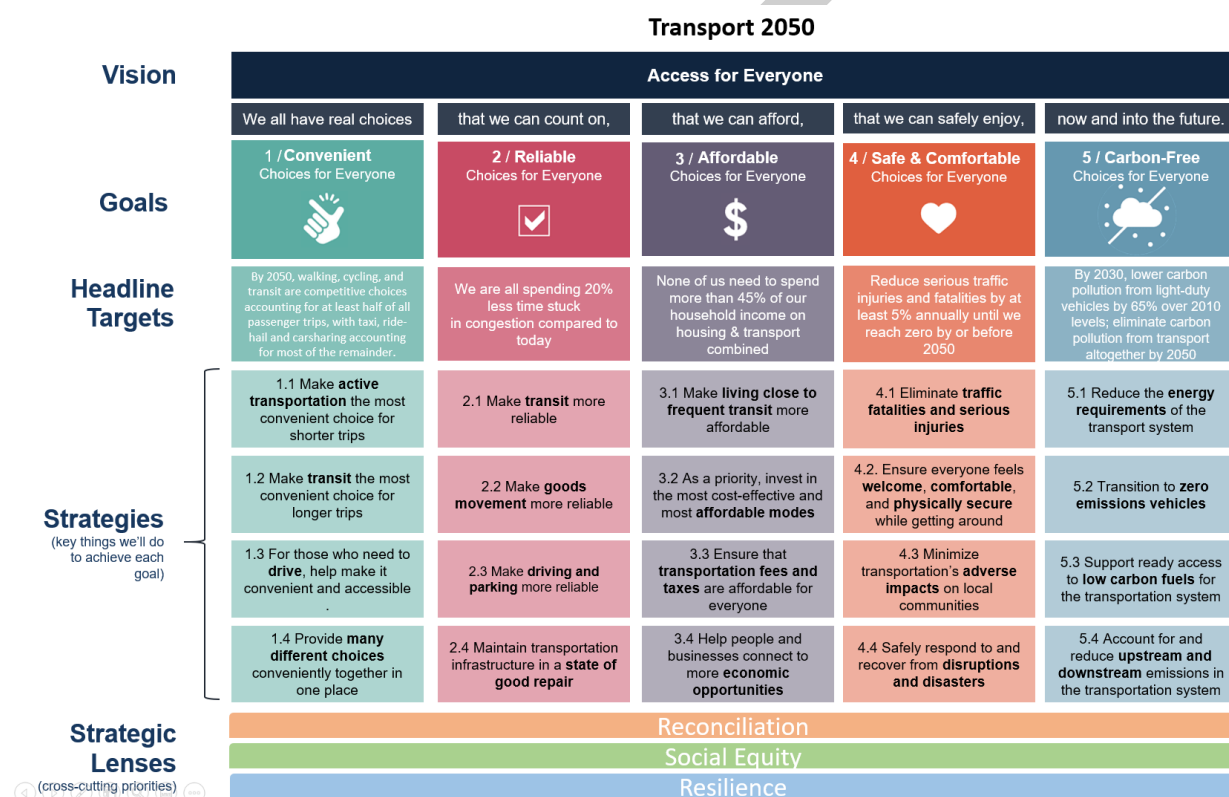
Balancing the Three Tools

The task of every long-range transportation plan is to find the optimal balance between the different policy tools on the table. By managing land use, travel demand, and service levels and infrastructure, the region can work towards achieving its goals and targets.

PART E: Strategies & Actions

Part E outlines everything the region will do to achieve its transportation vision and goals by identifying strategies and actions. These strategies and actions are organized by the goal that they most support, acknowledging that most support the achievement of multiple goals.

Delivering on the region's vision for 2050 — and on our goals and targets — won't be easy. It will take ambitious strategies and actions delivered by TransLink, Indigenous Nations, governments, and Indigenous and public and private organizations that make and deliver transportation investments, policies, and services in the region. This includes land use and economic development, which influence transportation.

Transport 2050

	Access for Everyone				
Vision	We all have real choices	that we can count on,	that we can afford,	that we can safely enjoy,	now and into the future.
Goals	1 /**Convenient** Choices for Everyone	**2 / Reliable** Choices for Everyone	**3 / Affordable** Choices for Everyone	**4 / Safe & Comfortable** Choices for Everyone	**5 / Carbon-Free** Choices for Everyone
Headline Targets	By 2050, walking, cycling, and transit are competitive choices accounting for at least half of all passenger trips, with taxi, ride-hail and carsharing accounting for most of the remainder.	We are all spending 20% less time stuck in congestion compared to today	None of us need to spend more than 45% of our household income on housing & transport combined	Reduce serious traffic injuries and fatalities by at least 5% annually until we reach zero by or before 2050	By 2030, lower carbon pollution from light-duty vehicles by 65% over 2010 levels; eliminate carbon pollution from transport altogether by 2050
Strategies (key things we'll do to achieve each goal)	1.1 Make **active transportation** the most convenient choice for shorter trips	2.1 Make **transit** more reliable	3.1 Make **living close to frequent transit** more affordable	4.1 Eliminate **traffic fatalities and serious injuries**	5.1 Reduce the **energy requirements** of the transport system
	1.2 Make **transit** the most convenient choice for longer trips	2.2 Make **goods movement** more reliable	3.2 As a priority, invest in the most cost-effective and most **affordable modes**	4.2. Ensure everyone feels **welcome**, **comfortable**, and **physically secure** while getting around	5.2 Transition to **zero emissions vehicles**
	1.3 For those who need to **drive**, help make it convenient and accessible .	2.3 Make **driving and parking** more reliable	3.3 Ensure that **transportation fees and taxes** are affordable for everyone	4.3 Minimize transportation's **adverse impacts** on local communities	5.3 Support ready access to **low carbon fuels** for the transportation system
	1.4 Provide **many different choices** conveniently together in one place	2.4 Maintain transportation infrastructure in a **state of good repair**	3.4 Help people and businesses connect to more **economic opportunities**	4.4 Safely respond to and recover from **disruptions and disasters**	5.4 Account for and reduce **upstream and downstream** emissions in the transportation system
Strategic Lenses (cross-cutting priorities)	Reconciliation				
	Social Equity				
	Resilience				

Key:

- [RECONCILIATION ICON] – Strategy or action that supports our approach to reconciliation
- [EQUITY ICON] – Strategy or action that supports social equity
- [RESILIENCY ICON] – Strategy or action that supports resilience

1. GOAL ONE | Convenient Choices for Everyone

The problem today	Where we want to be	
"Walking, rolling, cycling, transit and shared cars aren't convenient or available choices where I live and for the trips I need to make, so I need to rely on a car."	We all have **universally accessible choices** allowing us to **conveniently** connect to opportunities without needing to rely on a car…	… such that, by 2050, active transportation and transit are competitive choices accounting for at least half of all passenger trips, with taxi, ride-hail, and car-share accounting for most of the remaining passenger trips

We envision a future where everyone can easily choose the mode of transportation that works best for the unique needs of each of their trip. The person who cycles to visit a friend on Saturday can easily take a shared vehicle to the mountains on Sunday and commute to work via transit on Monday. Meanwhile, their partner uses the family car to help a friend move, hops on a shared bike to visit the dentist, and joins work remotely from the comfort of their home.

For many people, short trips can often be most quickly and conveniently served by walking, biking, or rolling. For longer trips along busy corridors, transit is often the most convenient and economical choice. For longer, more indirect trips, especially to less dense parts of the region — or when carrying heavy cargo — cars are often the most convenient choice. Each of these options has a time and place.

To ensure that everyone can make the most convenient choice for each trip, we need to make sure that people have access to a variety of different options. These options need to be both physically *accessible* and comfortable for everyone and physically *available* throughout Metro Vancouver, including on-reserve communities.

The first two strategies in this section describe what it will take to increase the convenience of active modes and transit for everyone such that they **account for at least half of all trips by 2050**.

> **Definitions**
>
> "**Rolling**" includes a range of self-propelled or low-speed electric personal transportation, such as wheelchairs or scooters, which together with walking and cycling are forms of **active transportation**.
>
> **Micromobility** includes both human-powered mobility devices (bikes, kick scooters, etc.) and electric assisted mobility devices, such as electric bikes and scooters, which can be personally owned or used in shared fleets.

This section also describes how, when car travel is the best choice, to make sure these trips are convenient and accessible to everyone. And when not making a trip at all is the best choice, to make sure that this option is also convenient and accessible to everyone.

As outlined in "Our commitment to supporting reconciliation with Indigenous communities' section at the beginning of this document and in the draft DRIPA Action Plan, we will work with Indigenous Nations to identify and implement multi-modal transportation solutions to support convenient, safe, accessible, and reliable transportation services for communities.

The following pages describe what it will take to create a future where **we all have universally accessible choices allowing us to conveniently connect to opportunities without needing to rely on a car.**

- For **walking, cycling, and rolling** to be the convenient choice for shorter trips, key destinations need to be physically close with compact, **complete communities** connected by **fine-grained networks** of high-quality

walkways, bikeways, and low-speed streets. These conditions allow active transport trips to be shorter and more direct than the comparable motor vehicle route and also feel welcoming, safe and attractive.

- For **transit** to be the convenient choice for longer trips, most homes, jobs, and major destinations will need to be located along or quickly connected to major transit corridors featuring fast, frequent, reliable and high-capacity service that is universally accessible and barrier-free. This requires tight coordination between land use and transportation planning — directing nearly all future growth to Urban Centres and major transit corridors — and removing barriers to ensure transit is accessible and inclusive for everyone.

- A well-connected regional **road network** is important to support efficient goods movement and because a car will continue to be the most convenient choice for some trips. To ensure that everyone has access to the convenience of the occasional trip by car without needing to own one, we'll need to incentivize carpooling; substantially expand universally accessible fleets of carsharing, ride-hailing, and taxis; and leverage automated vehicle technology.

- Integrating all of these choices **together in the same location** makes them even more convenient. Mobility hubs that feature active transportation infrastructure and shared-mobility options at transit stops and stations along with mobility-as-a-service apps that allow multi-modal trip planning, booking and payment can make it easier to connect between modes. Sometimes the most convenient choice is to avoid making a trip altogether and get what we need by going online where the internet can enable access to work, school, health services and shopping — all from a single screen on our phone or computer.

On Resilience & Convenient Choices

With more transportation choices available, we'll all have more alternatives in the event that our first choice of transportation faces disruption. For example, great bikeways and abundant availability of shared electric bikes (e-bikes) will mean more people have an option in the event of a car or bus breakdown. If you were hoping to use a shared vehicle to visit a friend but find that one isn't available, hopping on the bus is always an option.

If we design our communities to support more and better active and shared transportation options, we'll all have greater choice and individual resilience. Expanding the transit network so there are multiple routes to get to many destinations increases network resilience in the event of delays in one part of the system.

The strategies to achieve convenient choices in this section could also introduce new vulnerabilities that we'll need to actively manage. For example:
- If the costs of housing continue to rise, people may re-locate to areas with lower cost housing that are more car-dependent, leading to increased traffic for everyone.
- A greater reliance on digital access may increase the gap between those who have digital access and those who do not.
- A greater reliance on digital access also increases our vulnerability to cyber-attacks with real-life impacts to the transport system.

1.1.   Make active transportation the most convenient choice for shorter trips.

Active transportation includes all human-powered forms of travel. Walking and cycling are the most common, but using a wheelchair or other mobility aid, running, scootering, skateboarding, or inline skating, are all forms of active transportation. Electric bicycles, electric kick scooters and other similar forms of personal "micromobility" devices that can travel up to 32 km/hr are also considered alongside these purely human-powered forms of travel since they often operate in the same space, such as off-street pathways and bikeways. These electric micromobility options may allow more people to travel greater distances and "flatten" steep roadways that might otherwise be too challenging. Motorized two-wheelers that can exceed 32 km/hr are not considered alongside active transportation since vehicles travelling that fast are meant to be operating on roadways alongside cars and trucks.

Active transportation is low-cost, zero or low-carbon, healthy, and efficient. A substantial and rapid expansion of the region's active transportation networks (paths, walkways, bikeways) is one of the most cost-effective ways to reach all five Transport 2050 goals.

While many of us report wanting to walk, bike, or roll more frequently, it is not a convenient option for many trips where distances are too great, where there is a lack of safe infrastructure, and where there is nowhere to store equipment at our final destination. The actions below aim to address each of these deficiencies.

The other major barrier to more walking, cycling, and rolling is the very real safety risk — and the associated fear and anxiety — of being next to high-speed motor vehicle traffic. Actions to address these safety and comfort concerns are outlined in Goal 4.

Actions:

1.1.1.   Support the development of **complete communities** as outlined in Metro 2050, so that nearly everyone in the urban parts of the region [5] can find every service or good they are likely to need more than once a week within a convenient 1-kilometre walk, bike, or roll.

    a.   Encourage local land use planning authorities to concentrate street-oriented shops and community amenities at the heart of each neighbourhood, including schools and childcare; healthcare and pharmacies; groceries; parks; and a selection of restaurants and shops.

    b.   Support local shops and services on commercial high-streets, who are facing increasing online competition and rising rents, by ensuring that people can conveniently walk to them.

    c.   Encourage local economic development initiatives to enhance the attractiveness and competitiveness of commercial high-streets at the heart of each neighbourhood with programmatic funding for making them more attractive and welcoming for everyone.

Figure 2 — Regional map showing existing 1-km neighbourhoods — places that are within a 1-km walk of a retail cluster of at least 25 shops.

1.1.2.   Design **walkable neighbourhood street networks** that are discontinuous for cut-through motor-vehicle traffic but that are seamlessly and well-connected with a dense network of pathways, walkways, bikeways and green spaces per Figure 3, to make walking, cycling, or rolling the most convenient choice for most short trips.

Figure 3 — Approach to street network design that encourages walking and cycling by reducing distances, while discouraging driving for short trips.

1.1.3.   Rapidly complete a **network of walkways** so that walking can be the most direct, and most convenient travel option for most short trips (e.g. less than one kilometre distance).

    a.   Ensure that safe and comfortable walkways are provided throughout all Urban Centres and Frequent Transit Development Areas, as well as connecting people to stations and stops served by frequent transit service, and that ultimately every public-facing business and community facility in the region is connected by the region's walkway network and can be reached as directly as possible by walking or rolling.

    b.   Ensure that every street within the Urban Containment Boundary (with the exception of limited-access highways) has sidewalks on both sides, accessible to people using a wheelchair or pushing a stroller; or has been otherwise designed for traffic to travel at walking speeds.

Figure 4 — Map of Sidewalk coverage today compared to 2050 Concept (where all streets have good walking conditions)

1.1.4.   Rapidly complete a **network of bikeways, bike parking, and e-charging stations** that make bicycles, scooters, and other electrified or micromobility devices the most direct, and most convenient travel option for most trips between 1–5 kilometres, as well as longer trips throughout the region.

    a.   Develop the bikeway network per the Regional Cycling Strategy, with a focus on making safe and comfortable bikeways widely available in all Urban Centres and areas of high cycling potential across the region.

    b.   Advance implementation of a Regional Cycling Network consistent with Figure 6, comprised of a Major Bikeway Network that connects Urban Centres across the region and a Regional Greenways Network that connects to parks, open spaces, natural areas, and scenic pathways.

    c.   Provide a sufficient level of secure parking (including racks, lockers, and parkades) and charging stations for bicycles and electrified micromobility devices across the bikeway

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[5] Urban parts of the region defined as those lands within the Urban Containment Boundary shown in Map X of Metro 2050.

network, especially in Urban Centres and Frequent Transit Development Areas, at transit stations and exchanges, and at civic locations such as schools, libraries, parks, and greenways.

d. Require provision of appropriate end-of-trip facilities, such as showers, lockers, and basic bike maintenance tools at workplaces and other major non-residential trip-generating uses.

e. Program traffic signals on major bikeways and bicycle-priority streets to facilitate "green waves", allowing people traveling at average bicycle speeds to travel continuously without being stopped by a red light.

Figure 5 — Illustration of cycling network development.
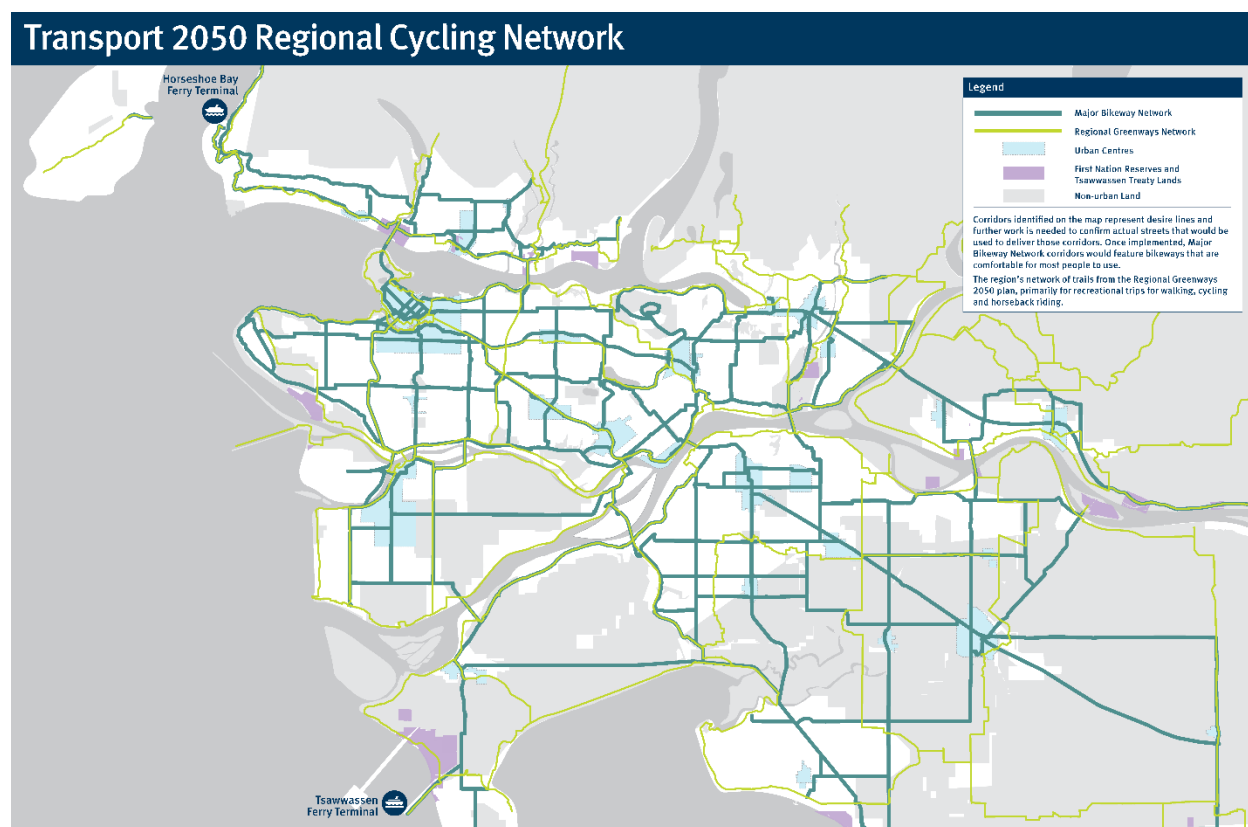
Figure 6 — Map of Regional Cycling Network (2050 Concept, including Major Bikeway Network & Regional Greenway Network)

1.1.5. Improve access to **shared micromobility** by enabling convenient, safe, accessible, and interoperable services that are well-distributed throughout the urban parts of the region such that they can support short local trips within Urban Centres as well as longer trips between Urban Centres.

a. Develop region-wide shared micromobility standards for safety, data collection and management, space and curbside allocation, fleet and operational requirements, and supporting infrastructure that makes it easy to support and scale these services and ensure they are interoperable.

b. **[RECONCILIATION ICON]** Support access to shared micromobility services for Indigenous peoples living on reserve and treaty lands, where desired by the community.

c. **[EQUITY ICON]** Ensure shared micromobility devices are accessible equitably across the region including to communities with high proportions of disadvantaged residents.

    d.   **[EQUITY ICON]** Regulate end-of-trip procedures to ensure that devices are not blocking sidewalks, entrances, or rights-of-way so that pedestrians (and especially people with disabilities) are unobstructed.

Figure 7 — Typology of micromobility devices

1.2.   Make transit the most convenient choice for longer trips.

For trips not suited for walking, rolling or cycling, transit should be a convenient option — especially when it is tightly integrated with the regional growth management goals and strategies of Metro 2050 such that most homes, jobs, and major destinations are near frequent stops and stations.

In addition to focusing growth near major transit stops and stations, expanding the reach, speed, and frequency of the transit system is a key to providing convenient travel alternatives to driving.

The transit network is comprised of several different service *layers*, each with their own set of service characteristics (span of service, frequency, route design) and unique role. These different layers work together to provide transit to most residents of the region and serve a wide range of different customer markets, origins, and destinations. As service expansion continues, it will be a priority to equitably reflect the unique needs of geographic and demographic communities in the region; for example, this might include special services in areas with a high seniors population, or different schedules that target communities where many residents are shift workers.

The multiple layers of our transit network

- **Local transit** provides extensive coverage and ensures that all development in the urban part of the region is within walking distance of transit. With short walks to stops, local transit is used for trips within each community or to connect to higher order transit services. Many local transit routes are already high-frequency.
- **Frequent transit** supports spontaneous trips, without needing to refer to a schedule. Currently, we consider 15-minute or better frequencies to provide a high degree of convenience for customers. Over the next three decades, we envision that nearly all local transit routes within the urban area will eventually operate at very high frequencies, and that we will work to improve on this minimum expectation for frequency to make transit even more attractive. In the future, transit vehicles along frequent transit routes could be expected every 12, 10 or even 5 minutes as a minimum. This would be implemented as land use and demand grows, with the potential that deployment of automated transit vehicles can support this high level of frequency.
- **Express transit** provides fast and reliable service over longer distances both within and across regional boundaries. Travel times that are as fast or faster than driving are achieved by routing that is direct and largely separated from traffic.
- The **Major Transit Network (MTN)** is the highest order of transit — with services that are high-capacity, high-frequency, fast, and reliable, travelling in dedicated rights-of-way all day, every day in both directions. The MTN is expected to be delivered primarily through bus-based services, but will include a range of technologies, each with different capacities and infrastructure needs. Reallocating road space will be the most cost-effective way of expanding the MTN, however there will be situations where widening of roads or construction of grade-separated rapid transit facilities are required. These situations may arise from changes in adjacent urban form, a lack of available road space, or through transit demand along a corridor exceeding the capacity of conventional service. Together, the Express and MTN layers create a grid network of fast and reliable transit services, providing convenient connections and improving access to high-quality transit throughout the region (see Figure 12: Map of Fast & Reliable Transit Network (Today and 2050 Concept).

> - **Demand-responsive transit** plays a supporting role to meet the needs of those people who can't safely navigate the conventional transit system without assistance. Or — in some limited cases — to provide service in times and places with insufficient demand to warrant fixed-route service. However, significant and ongoing investment in fixed-route bus service — the workhorse of the transit system today and well into the future — will be key to making transit the most convenient choice for most longer trips.
>
> *Figure 8 — The transit network is made up of multiple layers*

Actions:

1.2.1.　　Support the **transit-oriented regional growth** framework outlined in Metro 2050, in order to make transit more convenient for more people and for more trips.

　　　a.　　Continue to plan for a compact urban form within the Urban Containment Boundary when developing and implementing transportation plans, strategies, and investments. (M2050 1.1)

　　　b.　　Discourage the provision of infrastructure that would facilitate the dispersal of housing and employment growth outside the Urban Containment Boundary when preparing and implementing transportation plans, strategies, and investments. (M2050 1.1)

　　　c.　　Locate all major developments according to the following location-efficiency framework, consistent with the goals and strategies of Metro 2050.

Location Type	Development Type
Locations with **excellent transit** and poor car/truck accessibility	Suitable for uses with a large number and high density of employees and many visitors, such as offices and community, cultural, educational, and health institutions.
Locations with **good** transit and **good** car/truck accessibility	Suitable for uses with a large number of employees or visitors but at moderate densities and/or who depend partly on car journeys for professional reasons.
Locations with poor transit and **excellent car/truck** accessibility	Suitable for uses with the lowest densities of employees or visitors but that generate significant numbers of truck trips like logistics, warehousing, and other industry.

Table 1 — Location-efficiency framework for siting major trip generating developments

Figure 9 — Areas with frequent local transit in 2050.

　　　d.　　Secure commitments from all local, regional, Provincial, and Federal public sector agencies to lead by example by locating their offices and other significant trip generating activities in locations with excellent transit accessibility – in Urban Centres, Frequent Transit Development Areas, or near stops and stations on the Major Transit Network.

　　　e.　　Implement recommendations made in TransLink's Transit-Oriented Communities Design Guidelines to ensure that transit investments support the development of highly walkable, climate-resilient and inclusive Transit-Oriented Communities.

　　　f.　　Ensure supportive land use and community design for major transit investments through binding agreements early on in project development that build on existing Supportive Policy Agreements framework. Agreements can provide confidence to municipalities to implement supportive land use ahead of transit investments, and certainty that major investments will be supported by transit-oriented land use planning, design, and demand management policies at the corridor, neighbourhood and site scales.

g. **[RECONCILIATION ICON]** Work with Indigenous communities to develop context sensitive land use plans that helps support transit service provision in their communities.

From Metro 2050 (see: [Draft Metro 2050](#)**)**

Urban Containment Boundary
The Urban Containment Boundary is a stable, long-term, regionally defined area for urban development that protects Agricultural, Conservation and Recreation, and Rural lands from developments requiring utility infrastructure and from auto-oriented, dispersed development patterns. Locating housing, regional transportation, and other infrastructure investments within the Urban Containment Boundary supports land development patterns that can protect food producing land, reduce energy demand and greenhouse gas emissions from commuter traffic, and secures land that stores carbon and helps communities adapt to climate change. Residential and employment infill development is encouraged within the Urban Containment Boundary.

Urban Centres
Urban Centres are intended to be the region's primary focal points for concentrated growth and transit service. They are intended as priority locations for employment and services, higher density forms, mixed residential tenures, affordable housing options, commercial, cultural, entertainment, institutional, and mixed uses. Urban Centres are intended to emphasize place-making, an enriched public realm, and promote transit-oriented communities, where transit, cycling, and walking are the preferred modes of transportation. Urban Centres are priority locations for services and amenities that support a growing population.

Major Transit Growth Corridors
Major Transit Growth Corridors are areas along TransLink's Major Transit Network where member jurisdictions, in consultation with Metro Vancouver and TransLink, may identify new Frequent Transit Development Areas (FTDAs). These corridors are intended to extend approximately 1 kilometre from the roadway centerline in both directions. The intent of these corridors is to provide an overall structure for the region in an effort to support the regional planning principle of directing portions of growth towards Urban Centres and areas around transit. Further local planning will be needed along these corridors to ensure that human settlement patterns support complete communities in an appropriate local context. The Major Transit Growth Corridors have been identified as good potential locations for regionally significant levels of transit-oriented growth based on a consideration of the following principles:

- anchored by Urban Centres or FTDAs,
- connected by the Major Transit Network,
- generally resilient to natural hazards,
- accessible to jobs and services, and
- walkable.

Major Transit Growth Corridors are not an overlay, rather they are an organizing principle to support the identification of FTDAs. The Major Transit Growth Corridors are also a growth monitoring tool to assess performance on transit-oriented development objectives.

Frequent Transit Development Areas
Frequent Transit Development Areas (FTDAs) are intended to be additional priority locations to accommodate concentrated growth in higher density forms of development. They are identified by Metro Vancouver member jurisdictions and located at appropriate locations within the Major Transit Growth Corridors. FTDAs complement the network of Urban Centres, and are characterized by higher density forms of residential, commercial, and mixed uses, and may contain community, cultural and institutional uses. Urban design for these areas promotes transit-oriented communities where transit, cycling, and walking are the preferred modes of transportation. Identifying FTDAs within the Major Transit Growth Corridors 1) provides greater certainty and integration between local, regional, and transit plans, and 2) supports transit-oriented development planning across jurisdictional boundaries.

1.2.2. **[EQUITY ICON]** Build an **accessible, equitable, and inclusive transit system** that is barrier-free and accommodates all riders.

    a. **[EQUITY ICON]** Ensure that all transit vehicles and passenger facilities are universally accessible and barrier-free.

    b. **[RECONCILIATION ICON]** Continue engaging with Indigenous Nations and urban Indigenous peoples to understand and address barriers to accessibility, equity and inclusion. Continue engaging with people and organizations that represent people with lived experience of discrimination and marginalization to understand and address barriers to accessibility, equity and inclusion — such as inclusive planning processes and improved social equity competency for staff and decision makers as described in action 4.2.4.

    c. **[EQUITY ICON]** Make the built environment surrounding rapid transit stations, exchanges, bus stops, wayfinding and other connection points universally accessible, welcoming and supportive of a range of unique customer needs.

    d. **[EQUITY ICON]** Broaden existing planning processes, network design objectives, performance measures, and guidelines for transit service and infrastructure — such as the Transit Service Guidelines and Transit Passenger Facility Design Guidelines — to better incorporate additional social equity considerations and better serve disadvantaged groups.

    e. **[RECONCILIATION ICON]** Work with Indigenous Nations to determine community-specific transit service priorities.

1.2.3. Expand **frequent local fixed-route bus service** so that nearly all residents within the urban area are within a five-minute walk of frequent, all-day, every-day service.

    a. Provide frequent local transit across ridership and coverage services to (1) strengthen the grid network to improve network connectivity and provide customers with a greater range of trip planning options (2) improve access to less urban areas of the region, including parks and natural areas, and (3) serve a broad range of customer markets and trip purposes, including late night bus service to better serve people travelling later in the evening.

    b. Explore opportunities to provide new or augmented transit service through third-party transit service partnerships. This may come in the form of increased service levels on existing transit service, accelerating planned service improvements identified in investment plans, or providing new transit access to areas or markets not currently well-served.

    c. Take advantage of the arrival of Level 4 vehicle automation [6] to operate smaller transit vehicles (right-sized to demand) and accelerate the provision of significantly increased frequency levels.

    d. Consider additional passenger ferry services to connect locations where water-based transit offers greater accessibility, convenience, travel times, and reliability compared to land-based transit alternatives.

Frequent Transit Network

Today, local government staff and some members of the general public are aware that TransLink and Metro Vancouver have used the concept of a Frequent Transit Network (FTN) to help make transit a highly convenient option for people to choose for their daily travel. Along the FTN, transit vehicles (buses or trains) arrive at stops and stations every 15-minutes or better, throughout the day from the morning to the evening, every day of the week. This gives customers the convenience of being able to step out of their door and walk up to a transit stop without needing to consult a schedule because

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[6] Find description of Society of Automotive Engineers Levels of Vehicle Automation in the Technological Challenges and Opportunities section.

they know they will never have long to wait. This also provides a high-quality transit service which land governments and developers can plan around to help shape communities.

Between today and 2050, it is anticipated that service of FTN quality will expand to most urban areas of the region [see Action 1.2.3] to be within walking distance of nearly all residents of Metro Vancouver. While this is great news for the travelling public, as this occurs it means the value of the FTN as an organizing framework for shaping land use becomes somewhat less significant. Therefore, within Transport 2050, greater emphasis is being placed on the newly introduced Major Transit Network (MTN) as the key organizing framework for regional coordination of transportation and land use. Likewise, Metro 2050 has introduced the concept of Major Transit Growth Corridors to help direct that portion of future growth and development occurring outside of Urban Centres [see Action 1.2.4].

Figure 10 — Graphic: Why a grid network of frequent fixed-route transit is the best way forward, even in an automated future.

1.2.4.   Expand fast, frequent, reliable, and high-capacity transit along the **Major Transit Network**, to support regional connectivity and regionally-significant urban growth, including by investing in:

   a.   Existing rapid transit lines and facilities, monitoring demand to determine when capacity relief measures may be required — in particular, study of the Expo and Canada Lines.

   b.   Limited stop services on corridors where regular local routes are experiencing high ridership volumes, in support of building ridership for potential future rapid transit.

   c.   At-grade rapid transit, running in separated rights-of-way, to provide fast, reliable, and high-capacity service when conventional transit is unable to meet demand and when supported by local land use patterns.

   d.   Grade-separated rapid transit when forecasted demand indicates that at-grade technology will not provide sufficient capacity to meet demand.

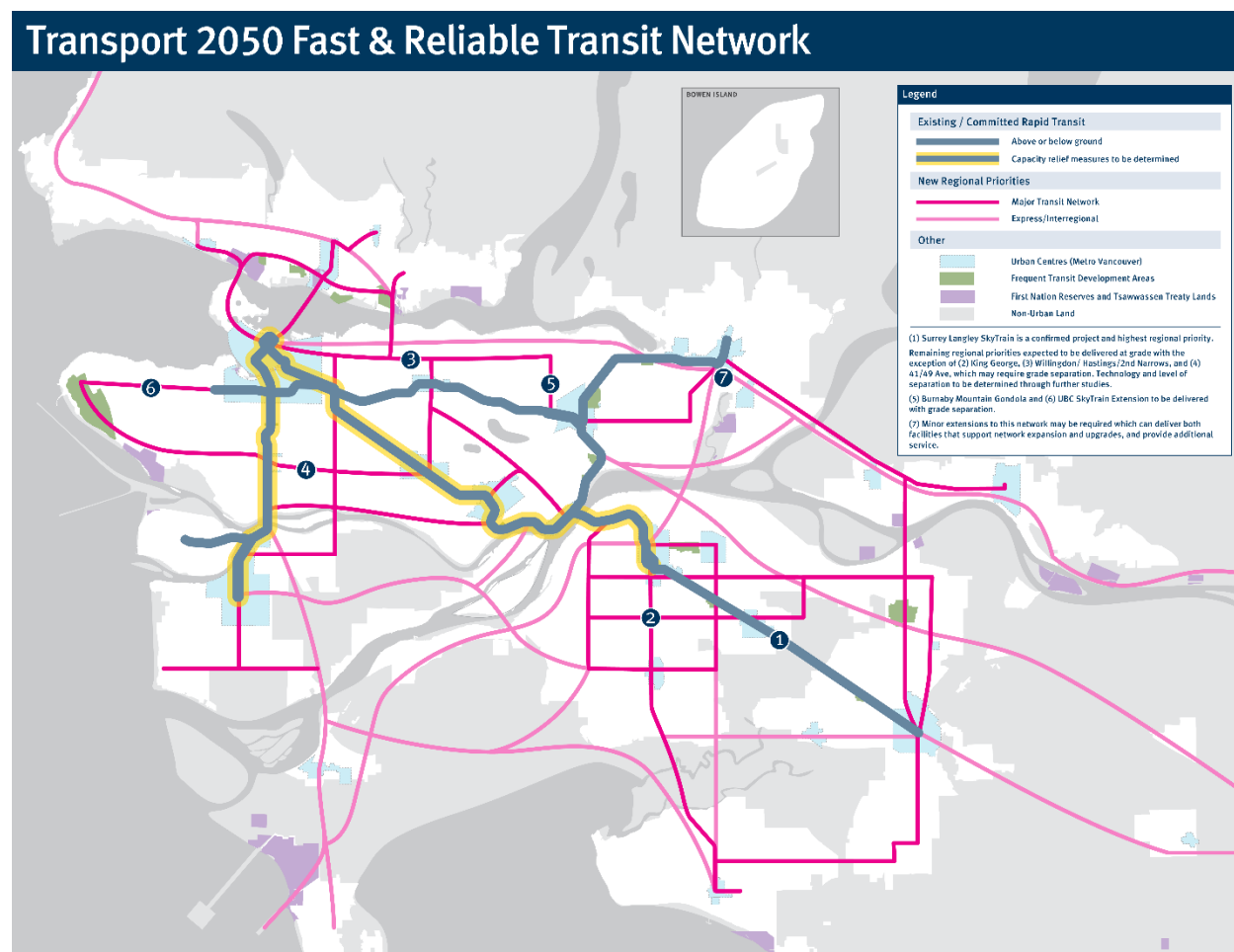*Figure 11 — Map of Frequent Transit Network Today*

Transport 2050 Fast & Reliable Transit Network

Figure 12 — Map of Fast & Reliable Transit Network (Today and 2050 Concept)

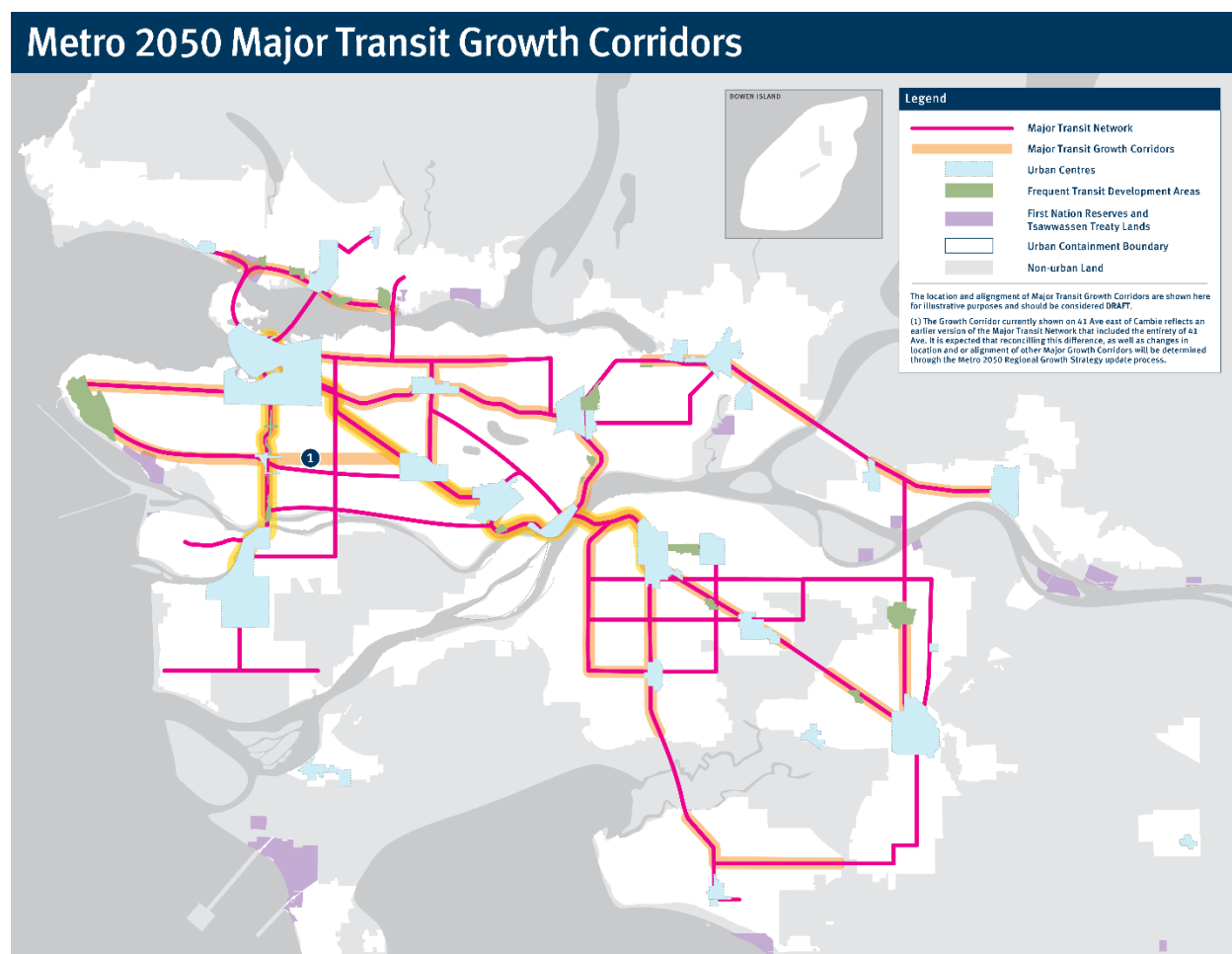## Metro 2050 Major Transit Growth Corridors

Figure 13 — Map of Major Transit Growth Corridors from Metro 2050 (draft for reference, to be updated through Metro 2050 Regional Growth Strategy update process)

1.2.5. Expand the network of **express transit** connections that are direct, make limited stops, and are fast, in order to provide convenient and competitive travel times compared to driving over longer distances.

   a. Develop a network of dedicated Express routes throughout Metro Vancouver — including on regional or Provincial highways. Express and Interregional services (delivered primarily by buses, including eventually automated buses) travelling in dedicated lanes — and supported by other transit priority measures — will be faster and more competitive with private vehicles.

   b. Provide transit connections between Metro Vancouver and the Fraser Valley, Sea to Sky corridor, Sunshine Coast, Vancouver Island, and Washington State that are seamlessly integrated, accessible, and convenient.

   c. Maintain and enhance existing heavy passenger rail service by supporting investments that could increase freight and passenger rail reliability, including additional capacity and span of service along existing and potential future passenger rail corridors.

   d. Protect future opportunities to expand interregional heavy passenger rail service by protecting or securing access rights to existing and future rail corridors, while protecting capacity for existing and future freight rail service needs.

e.   Support planning for a potential high-speed passenger rail service between British Columbia, Washington, and Oregon; ensuring that stations are located in Urban Centres and fully integrated with the region's Major Transit Network — and that any investments in rights-of-way and infrastructure help also to advance regional rapid transit and passenger rail objectives.

f.   Encourage and enable passenger-only ferry services that provide more direct access and connectivity between Urban Centres within the region and destinations beyond Metro Vancouver.

g.   Work with the emerging urban air transit sector to ensure the operation of any urban air transit services within Metro Vancouver are contingent on the industry demonstrating acceptable solutions to this region's key concerns relating to equitable and affordable access, noise, emissions, energy consumption, safety, and livability.
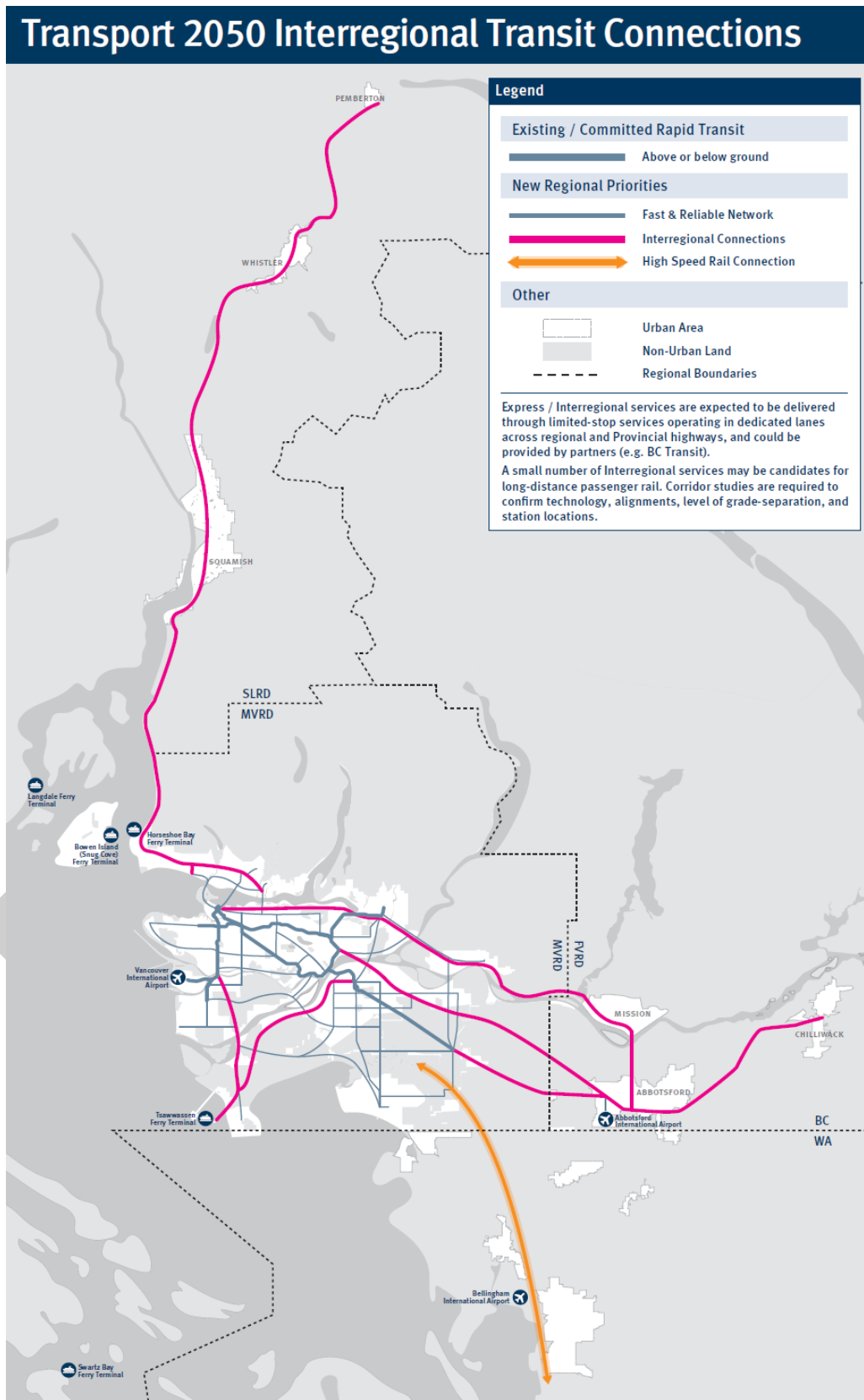
Figure 14 — Map of Interregional Transit Connections (2050 Concept)

1.2.6.   Expand **demand-responsive** transit service in targeted applications.

    a.   **[EQUITY ICON]** Meet the needs of customers with disabilities by providing customized service when they are unable to take the conventional system independently. The customer experience should be high-quality: easy to book and use and suited to a wide range of unique customer needs. This may require an accessible vehicle, a specially trained attendant, door-to-door service, or person-to-person transfer.

    b.   Continue to maximize the combination of accessible conventional services, custom transit services, and travel training support to provide a seamless experience using a Family of Services approach.

    c.   Fill gaps in the fixed-route transit network by providing on-demand microtransit service in locations and times of day when on-demand microtransit can provide better service than fixed-route transit for the same cost or less.

1.3.   For those who need to drive, help make it convenient and accessible

The ambitious land use planning and transportation actions set out in Metro 2050 and Transport 2050 will enable significant strides in making transit the preferred choice for most longer trips and walking, rolling and cycling the preferred choice for most shorter trips. However, there will always be trips that walking, biking, rolling, or transit cannot accommodate in a convenient way.

A significant segment of the population relies on cars and trucks to conduct everyday business — the landscaper carrying tools, the realtor bringing clients to showings, the logistics companies delivering new appliances, and the hospital worker whose shift ends at 3 a.m. Additionally, for people who live in lower density, less walkable neighbourhoods, who have larger families, who are caregivers, or who have mobility challenges, cars and trucks play an essential role in managing busy lives or simply getting around safely and conveniently.

To enable these trips to be made conveniently and to support the safe and efficient movement of people, goods and service vehicles we need a **network of local streets** with vehicle access within a reasonable walk of all properties, and a well-connected **network of regional roads** to carry higher volumes of people and goods, travelling longer distances, consistent with land use framework set out in the goals and strategies of Metro 2050.

Figure 15 — Map of Regional Road Network.

Given the limited space we have available on our streets, if we make driving so convenient that everyone chose to drive their car for all of their trips — we could expect traffic gridlock, especially in the higher density Urban Centres and Frequent Transit Development Areas. Specific measures to reduce this potential traffic congestion and improve the reliability of driving and parking are described in Strategy 2.3. But an essential part of avoiding this gridlocked future is to make active and shared modes as convenient as possible, as described here under Goal 1, so that it is easy and attractive to live without owning a car, or with owning fewer cars per household.

For some people, automobiles play an occasional rather than daily role — carrying groceries, the airport trip with lots of luggage, or the trip to buy new furniture or to visit a trail. Faced with the occasional need for an automobile, nearly 25% of households in Metro Vancouver in this situation still choose to own a car [7]. For this, they need to incur the hassle and expense of car depreciation, parking, maintenance, and insurance, simply for occasional use. Supporting the expansion of shared-use autos (carsharing, taxis, ride-hailing, rental agencies) helps provide more ways for people to **conveniently make the occasional car trip without needing to own a car**.

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[7] TransLink 2017 Trip Diary

Actions:

1.3.1.   Plan for sufficient **parking, pick-up and drop-off, and loading and unloading spaces** on dynamically managed curbsides and through off-street lots (as described further in Strategy 2.3) so that people can conveniently begin and end their driving trip, the over-supply of parking can be avoided, and valuable street space can be used more efficiently.

1.3.2.   Provide a **network of local streets** that enable motor vehicle access to within a reasonable walk of all properties in the region, consistent with the street network concept described in Strategy 1.1.2.

1.3.3.   Design a well-connected **network of regional roads** to carry higher volumes of people and goods travelling longer distances between communities. Before contemplating any road capacity expansion, all efforts should first be made to address any reliability or safety issues through access management and demand management measures. While the approach for regional roads is primarily to optimize the existing network, additional road links or capacity may be provided in some parts of the region to improve connectivity for both people and goods in a way that does not increase general purpose traffic. These include:

   a.   East-west connections on the North Shore;

   b.   East-west connections in North Surrey;

   c.   A long-term solution to connect Highway 1 and Highway 91A north of the Fraser River: filling this critical gap in the regional goods movement network in a way that also reduces the negative impacts of high commuter and truck traffic on the livability of the New Westminster Regional City Centre.

1.3.4.   **[EQUITY ICON]** Increase the consistency of **truck route designation** across the region through collaboratively developed design guidance for the Regional Truck Route Network, including a clear hierarchy of routes that will support goods movement. This process should consider equity to ensure negative impacts from these routes are not disproportionately experienced by disadvantaged groups.

1.3.5.   Maintain the existing network of **separated highways** — intended primarily to serve a Provincial and National role — and discourage shorter intra-regional trips so that the long-distance movement of people and goods between regions is prioritized on these roadways. Some targeted investments, including a new George Massey tunnel, are needed to address critical traffic and seismic safety issues and capacity pinch-points at key bottlenecks. Any such highway investments that may result in increased capacity should include measures to discourage induced traffic demand.

1.3.6.   Provide convenient access for **occasional car trips**, without needing to own one.

   a.   Take an integrated and consistent approach to managing taxis and ride-hailing services within the South Coast Region, ensuring a sufficient supply of passenger-directed vehicles to accommodate growing demand.

   b.   Use regulations, incentives, and direct public sector investment to support the rapid scaling and growth of one-way and two-way carsharing services in all parts of the urban area within Metro Vancouver.

   c.   Provide a sufficient supply of dedicated parking and charging infrastructure for shared vehicles at dynamically managed curbsides in Urban Centres and Frequent Transit Development Areas, at transit stops and stations, in new and existing civic and community facilities, multi-family residential buildings, commercial buildings, and at key destinations for accessing nature.

    d.   Use regulations and public investment to prioritize a rapid and near-term transition to zero-emission carshare vehicles, taxis, and ride-hail vehicles all of which are driven more kilometres per year than the average personally-owned vehicle.

    e.   Use pricing, regulations, and public investment to:

- **[EQUITY ICON]** Encourage the roll-out of automated vehicles in this region primarily as shared or publicly-accessible vehicles, rather than primarily as personally-owned vehicles, in order to increase access to this technology for people of all incomes.

- Decrease the incidences of deadheading (empty vehicles travelling to pick up next fares).

- Increase efficient pooled rides (carpooling) in shared modes.

- **[EQUITY ICON]** Support a rapid transition to universally accessible carshare vehicles, taxis, ride-hail vehicles, and eventually robo-taxis (or automated vehicle taxis) — so that they are widely available for people with specific disabilities who require them.

CALLOUT BOX: Highway capacity to 2050

Beyond the projects currently underway for the George Massey Tunnel and Highway 1 widening through the eastern parts of the region connecting into Abbottsford, future targeted projects to alleviate key chokepoints should be sufficient to meet demand on the separated highway network over the planning horizon of Transport 2050. This assessment is based on:

- Additional regional road network connectivity, per Action 1.3.3, which will remove shorter local trips from the separated highway network and free up additional capacity;

- The substantial investments in rapid transit and express transit services across the South Coast Region outlined in Strategy 1.2 that will each provide the equivalent of multiple lanes of highway capacity without adding vehicles to the road;

- The advent of automated vehicles within the horizon of this strategy can increase travel speeds on existing highways and reduce the buffer space needed between each vehicle to maintain safe stopping distances, while reducing traffic collisions, thereby enabling substantially higher traffic volumes to flow within existing highway road space;

- Any major expansion in highway capacity inducing a significant growth in new traffic and congestion would be counter to the goals of Transport 2050, as well as the land-use objectives and the transit-oriented focus of Metro 2050, which Transport 2050 is required to support; and

- Additional major highway expansion would also be counter to Provincial and regional climate action targets as described in Goal 5, which Transport 2050 is also required to support.

1.4.   Provide many different choices conveniently together in one place.

Physically locating different transportation choices right next to each other makes all of them more convenient. For example, having a taxi, car-share or bike-share waiting for you right where you step off the bus, takes some of the stress and friction out of making connections between modes and lets us take advantage of the best that each mode has to offer.

While digital connectivity is no substitute for actual human contact when it comes to our closest relationships, this trend towards replacing some of the most inconvenient in-person travel with online access, already well underway before the pandemic, will certainly be a key feature shaping the future of transportation demand.

During the COVID-19 pandemic, just more than half of workers in the Metro Vancouver region were able to transition to remote working. From schools to healthcare to professional services, nearly all workers who were not

engaged in front-line work requiring their physical presence at a jobsite, shifted online. E-commerce grew 110.8% nationwide compared to the previous year [8]. All of which contributed to substantially lower passenger travel demand — albeit significantly higher parcel delivery demand. This growth in e-commerce will also increase demand for scarce industrial space, reliable truck movement, and delivery facilities which is addressed within this strategy and under Goal 2: Reliable Choices.

In addition to reducing the need for unnecessary travel, digital tools can enable more seamless travel across modes and services and reduce "pain-points" in the transportation experience for both people and businesses—– especially for trips involving different modes and accessing shared vehicles. This strategy envisions a future where trip planning, booking, and payment for any transport mode or service is seamless — from a single app or phone call. This open, inter-operable ecosystem of mobility on-demand services is referred to as "Mobility-As-A-Service" (MaaS).

Finally, as we become more dependent on digital services for our daily needs, including for transportation, we need to consider that not everyone has access to this technology — we'll need to pay careful attention to policies that promote digital access, so that they don't create unforeseen or negative consequences for disadvantaged groups, especially lower-income households.

> **Access to Digital Tools**
> Ensuring equitable access for everyone in an era of increasingly digital and online services means ensuring that everyone has access to a universal basic level of internet connectivity. Encouraging the expansion of free public wi-fi is an important step to this end, as is encouraging programs that provide low-cost access to internet and smart phone service for people with less ability to pay. From a transportation perspective, all services that are provided digitally must also include easily accessible analog alternatives so that people without credit cards, bank accounts or smart phones can continue to enjoy full and equal access to all mobility services. This requirement is especially relevant for actions related to Mobility-as-a-Service (Action 1.4.3) and real-time mobility management systems (Action 2.3).

Actions:

1.4.1.   Provide mobility hubs at high usage transit stops and all transit stations to enable **seamless transfers between different transportation options**. Based on the surrounding environment and transportation demand, updated design guidance for these "**mobility hubs**" should specify the appropriate mix, scale and spatial priority for each transportation option including:

    a.   Walkway connections and public realm amenities, in recognition that good transit access requires a high-quality, supportive pedestrian environment and public realm.

    b.   Bikeway connections.

    c.   Bicycle parking.

    d.   Docking stations, hubs and charging for shared micromobility services.

    e.   Priority parking and charging for car-share vehicles.

    f.   Pick-up and drop-off spots for taxis, ride-hailing, and "kiss and ride".

1.4.2.   Support **convenient pick up** for deliveries through:

    a.   Expanding the use of **parcel lockers at transit stop and stations** to allow convenient access to urban freight deliveries by active or transit modes.

    b.   Supporting industry and municipalities in the development of **neighbourhood logistics hubs**, where appropriate, to better enable the consolidation of parcels in central locations for pick up by customers or use of smaller, lighter, emissions-free freight vehicles for final mile deliveries in low-speed and pedestrianized zones, per Action 4.3.4.a.

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[8] Statistics Canada, 2020, https://www150.statcan.gc.ca/n1/pub/45-28-0001/2020001/article/00064-eng.htm

1.4.3.   Collaborate on the development of a **single application** for trip planning, booking, payment, and customer rewards for transit and other mobility services.

   a.   Advance development of an **urban data trust**, with stakeholders from public and private sector, to own and operate a data exchange platform, receiving trip-planning related data from transport service providers and making it available to app-providers (see 2.3.1).

   b.   Support an open, inter-operable and competitive **Mobility-As-A-Service ecosystem** that gives customers the best range of choices and services. Require all transport service providers, including app-based transportation platform providers, to make their essential real-time trip-planning, payment, and booking functions available to the urban data trust.

   c.   Provide appropriate user training and ensure that low-tech trip planning options available, to ensure equitable and resilient access.

1.4.4.   Work with digital communication service providers and authorities regulating communications service providers to:

   a.   Enable **Wi-Fi and cellular connectivity** throughout the service area for ubiquitous internet access and communication services.

   b.   Ensure **oversight of digital assets** in the region, including establishing cost sharing agreements, ownership, and maintenance contracts to ensure long term viability.

1.4.5.   Work with major employers to update their policies and practices to support **telecommuting** and more **flexible work hours**, in order to reduce overall demand and especially peak-period demand on the transportation system.

CALLOUT BOX: **Access to Nature**

What we heard: through Transport 2050 engagement we heard that residents of Metro Vancouver highly value this region's natural areas like parks and forests.

Access today: currently, just 11 of 22 of Metro Vancouver's Regional Parks are accessible by transit, making them largely out out-of-reach for most people without a personal vehicle. We also know that parking at some key parks is challenging due to high demand. Ultimately, this is an equity issue, as not being able to access a car shouldn't be a barrier to taking advantage of the spectacular parks and natural areas that are a key attraction of living in Metro Vancouver.

What we are planning: Transport 2050 includes actions that make it easier for everyone to get to our beautiful parks and forests, including the following:

- **Cycling & Micromobility**: coordinate the implementation of a Regional Cycling Network to provide safe and convenient cycling connections that link up Urban Centres with regional parks and natural areas [Action 1.1.4.b], as well as the provision of secure bike parking and electric charging stations for bicycles and micromobility devices for when people reach their destination [Action 1.1.4.c].

- **Transit**: make investments and network decisions to support more convenient travel by specifically including parks and natural areas [Action 1.2.3.a]. Recognizing that there are attractive natural areas outside Metro Vancouver, we will work with partners to expand the network of seamless and convenient interregional transit connections to destinations outside our region [Action 1.2.5].

- **Driving**: ensure everyone has convenient access to the occasional car trip without needing to own one, including by providing dedicated parking and electric charging for shared vehicles at key destinations to support accessing nature [Action 1.3.6.c].

Where we are planning for: Figure 16 below highlights these key "access to nature" destinations within the region, from the spectacular North Shore mountains to the beautiful beaches overlooking the Salish Sea.

Figure 16 — Map of key "Access to Nature" destinations

2. GOAL TWO | Reliable Choices for Everyone

The problem today	Where we want to be	
"Getting where I need to go takes too much time, is too far from my home, and is often unreliable—— taking much longer than I had planned."	We all have **reliable** choices that get us where we need to go on time...	...such that, by 2050, we are all spending 20% less time stuck in congestion compared to today. [9]

One of the most frustrating experiences of travel in the region is unreliable transportation. Whether by bus or by car, getting stuck in traffic costs people time — and hurts the Metro Vancouver economy.

Improving travel time reliability over the next thirty years will be an enormous challenge requiring us to think creatively. Especially as we expect to welcome around one million more people to the region by 2050. We also expect that the addition of more electric vehicles, and later automated vehicles, will increase traffic, given the lower operating costs. If we don't take bold action to make more efficient use of our existing road infrastructure, congestion could get up to three times worse than today. In a growing region, we'll need to accommodate all these extra trips using the same road space as today.

The following pages describe what it will take to create a future where **people and goods spend 20% less time stuck in congestion than today:**

- Extensive **transit priority measures** to ensure that **transit** is reliable and doesn't get stuck in traffic congestion.

- A suite of measures to increase the reliability of goods movement **including shortening freight trips** through more coordinated industrial land use planning, **consolidating freight loads**, **shifting freight modes** off of roads wherever viable, **shifting freight times** to less busy periods wherever possible, and introducing physical or regulatory **freight priority measures** where still needed.

- Application of **demand management tools and digital technology** including introduction of an advanced mobility operating system capable of coordinating all streets, signals, lanes, and trip options to make driving and parking more reliable. This is especially important as we prepare for the arrival of automated vehicles.

- Maintaining the transportation assets and infrastructure we rely on every day in a **state of good repair** is essential to reducing disruptions and delays, making travel more reliable.

While the strategies described in this section will be a good start, ultimately, they may not be enough to reduce congestion compared to today's levels, especially as the region grows and as electrification and automation lower driving costs and encourage even more car travel.

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[9] "Today" refers to congestion levels pre-COVID, in 2019, which will be the baseline for comparison going forward. This level of congestion reflects Phase 1 engagement results indicating congestion is a priority issue and that 2019 levels were unacceptable for most people.

A region-wide approach to **road usage charging**, as proposed by the Mobility Pricing Independent Commission in their 2018 report, remains one of the most promising tools to reduce traffic congestion and improve travel time reliability for people and goods travelling in and through our region. Road usage charging can help manage available transportation capacity by encouraging users making discretionary trips or who have flexibility to change how, where, and when they travel, to travel during less busy times or on less busy routes, making space for users making non-discretionary trips with less flexibility (e.g. time-sensitive deliveries). A well-designed system would have the additional benefit of reducing inequities in how transportation is priced today. It could also reduce GHG emissions and air pollution, and provide a long-term, sustainable source of revenue for transportation investments.

A transformative policy of this magnitude does not come without its challenges. While there are real concerns about growing congestion in the region there are also real concerns about the impacts that a road usage charge might have on households and businesses, especially movers of goods and other businesses that rely on large amounts of road travel. Ultimately, further dialogue and greater levels of public and political support are needed before a region-wide approach to road usage charging could be more seriously contemplated for the Metro Vancouver region.

Over the longer term, the region will need to keep some form of road usage charging available in its policy toolkit in order to manage the significant traffic increases and congestion challenges associated with the widespread adoption of first electric vehicles and then automated vehicles — anticipated within the time horizon of Transport 2050. As such, regional policymakers will carefully monitor the arrival and scaling of these technologies as well as traffic congestion and its impact to people and goods in order to determine if, when, and how to introduce a region-wide approach to road usage charging.

These conditions are not expected to materialize within the next 5–10 years. But in order to be prepared, more detailed planning and policy discussions with Indigenous Nations, local governments, and the Provincial Government should occur during this period in order to establish a clear regulatory framework in British Columbia and Metro Vancouver — in particular well in advance of the arrival of level 4 automated vehicles.

In the meantime, the strategies and actions described in this section can be more immediately deployed to ensure that people and goods continue to move as reliably as possible.

On Resiliency & Reliable Choices

Future shocks and stresses could be disruptive and potentially hinder the reliability of the transportation system. For example, power disruptions could impact traffic signaling and real-time travel information communications. Flooding could inhibit road travel. Key strategies in this section that aim to improve reliability may also mitigate against future shocks.

2.1. Make transit more reliable.

One of the biggest barriers to more people using transit is they feel it can be unreliable. To make transit an attractive choice for most trips over a few kilometres — it needs to be reliable and time-competitive with driving. However, traffic congestion, which is a top concern among residents, is the primary factor in slowing transit and making travel times unpredictable.

In 2020, 80% of bus routes were slower than they were in 2015 due to traffic congestion and lack of transit priority in critical areas. As a result, each year, the region spends more and more money trying to maintain the current frequency of our buses — now spending more than 1 out of every 10 transit service dollars to respond to delays resulting from congestion. With congestion increasing, we'll need to prioritize transit movement over general purpose traffic on the region's roads so it can bypass congestion, and remain as a reliable transportation choice for everyone.

Actions:

2.1.1.   Provide **widespread priority for transit** on frequent bus corridors to ensure that people on buses are not stuck in traffic and can travel quickly and reliably at all times of day.

   a.   Advance the most effective and appropriate bus priority measures for each context, with priority to frequent bus corridors serving areas of highest need with the biggest delay hot spots affecting the most people.

   b.   Provide dedicated bus lanes in corridors with the highest frequency of service and greatest passenger delay, and deploy other complementary priority measures such as queue jumpers and bus bulbs to reduce delay at intersections and bus stops along frequent bus corridors.

   c.   Expand hours of operation of bus priority lanes to ensure all bus customers experience reliable journeys.

   d.   Where space is a constraint on the most critical bus corridors, expand transit priority by considering if general purpose traffic can be accommodated on parallel corridors or if parking and loading can be accommodated on perpendicular or parallel roadways or off-street facilities.

   e.   Minimize overall person delay by considering where higher levels of delay for general traffic can be accepted, to allow for reallocation of road space from cars toward transit priority.

2.1.2.   In advance of **rapid transit investment**, and as part of the prioritization of rapid transit corridors, ensure that the appropriate road authorities have committed to provide the **dedicated transit lanes** that higher-order transit service requires in order to be fast and reliable.

   a.   Deploy lower-cost interim bus priority measures on future rapid transit corridors to dedicate space and to build ridership in support of future higher-order transit investments.

   b.   Depending on the corridor and the proposed level of investment, existing general-purpose traffic lanes or parking space can be dedicated to transit-only lanes.

2.1.3.   Coordinate the development of **transit priority** measures with consideration to other street uses (based on the street space allocation guidance in Strategy 6.8) in recognition that transit corridors are often also important streets for other modes. The region's streets may carry significant volumes of regional auto traffic, carry important regional freight, have sections of vibrant local businesses with significant local access, loading and unloading needs, or be a critical link in the Major Bikeway Network.

2.1.4.   Explore the potential of different **management and enforcement tools** so that transit vehicles are not delayed due to general purpose traffic, such as ensuring road changes don't adversely impact transit vehicles and traffic doesn't obstruct transit priority lanes. If required, implement changes to the Motor Vehicle Act and the South Coast BC Transportation Authority Act.

2.1.5.   **[EQUITY ICON]** When planning and designing transit priority, carefully consider how marginalized and disadvantaged populations may be positively or negatively impacted, and work towards achieving an **optimal balance between accessibility, convenient access, and fast and reliable service**.

Figure 17 — Summary analysis showing priority areas from bus speed & reliability report

2.2.   Make goods movement more reliable.

Congestion is a top concern for the people and businesses involved in moving goods and services around and through our region. The actions under Goal 1 that help increase the use of transit, walking, biking, and rolling can increase reliability for these commercial drivers by reducing congestion on the road. Pursuing opportunities to

move more Gateway freight by rail and water wherever viable is also essential to help reduce Gateway truck traffic on the region's roads and maintain the region's role as a reliable and competitive multi-modal trade gateway between Canada and Asia-Pacific.

Additionally, compounding congestion problems for commercial vehicles is the fact that delivery schedules are driven largely by customer and business requirements, with an increasing emphasis on just-in-time delivery supply chains and express shipping. There are also municipal regulations that restrict the times of day when deliveries can be made — often directing them to the most congested times of day when people are travelling to and from work and going about their personal business. Shifting times for goods movement and deliveries to less busy periods, while also introducing physical or regulatory priority measures for freight movement, where needed, can help make trips more reliable.

The region is also facing a critical shortage of industrial land. Managing the growing demand and limited supply of industrial lands will require balancing different industrial and commercial needs (e.g. warehousing, distribution, transportation access) and coordinating efforts to protect and intensify existing industrial lands at a regional level per the industrial land policies in Metro 2050. Not only is this shortage limiting opportunities for business growth and expansion that is critical for local economic development but it is pushing many businesses and their suppliers farther away from each other into less ideal locations in the Metro Vancouver region or, in many cases, outside of the region or province altogether. These longer distances result in more freight travel, more traffic, more emissions, more expensive supply chains, more expensive consumer goods, and a less competitive business environment.

To enhance freight reliability, efficiency and competitiveness — the actions in this Strategy support five key moves to: shorten freight trips, consolidate freight loads, shift freight modes, shift freight times, and introduce freight priority measures where appropriate.

Actions:

2.2.1. Coordinate the transportation and **land use needs of goods movement, industrial and agricultural land users** in order to reduce the distance of freight journeys:

    a. Protect the existing supply of accessible industrial land and especially of trade-oriented lands through land use planning, investment, consultation with First Nations, and other policy measures as specified in Metro 2050 and the Regional Industrial Lands Strategy.

    b. Protect urban industrial land near final destinations that could help facilitate consolidation and transition to last mile delivery vehicles, where appropriate.

Figure 18 — Map of Industrial Lands from Metro 2050 and truck routes, including Long Combination Vehicle network

    c. Protect and enhance rail rights-of-way and access points to navigable waterways in order to preserve their potential for goods movement and industrial uses, as specified in Metro 2050.

    d. Explore opportunities to co-locate import and export facilities in order to reduce the need to store empty containers and transport them around the region.

    e. Protect access for agricultural users on key corridors in order to facilitate equipment movement, safe and efficient operations with good animal welfare, or to deliver produce to markets.

From **Metro 2050 (see:** Draft Metro 2050**)**

Trade-Oriented Lands Overlay
The Trade-Oriented Lands Overlay is intended for Industrial lands that are required to support goods movement in, out and through the Metro Vancouver region, and that keep British Columbia and Canada connected to the

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global supply chain. These important areas are occupied by such uses as: terminal facilities, distribution centres, warehouses, container storage, and freight forwarding activities that serve a national trade function and contribute to the provincial and regional economies. These operations generally require large sites and are located near major transportation infrastructure corridors and terminals. Industrial lands with a Trade-Oriented Lands Overlay are not intended for stratification tenure or small lot subdivision.

2.2.2.   Encourage **consolidation of goods and deliveries** to make most efficient use of available capacity

   a.   Work with partners to expand and enhance Long Combination Vehicles (LCVs) operations in Metro Vancouver in a manner that protects public safety and our infrastructure and to the greatest extent possible, in close alignment with Provincial policies and guidelines for LCVs.

   b.   Explore opportunities to facilitate the use of Long Combination Vehicles (LCVs), including to identify safe and accessible locations for coupling and decoupling LCVs, and future-proofing infrastructure for LCVs to accommodate automation and other emerging technologies.

   c.   Explore a range of tools including education, incentives, and per-delivery charges for consumers to encourage them to make combined delivery orders, thereby reducing inefficiencies.

   d.   Engage with developers and building managers to coordinate delivery infrastructure (such as parcel lockers) and service plans (the goods movement equivalent of TravelSmart employee travel plans) that consider consolidation and collaborative delivery arrangements to reduce the number of trips required.

   e.   Support operators of commercial freight vehicles to supply real-time data via API to the urban data trust (including vehicle location, available capacity, and the price for customers to book that capacity) in order to enable Mobility-as-a-Service for freight per Action 2.3.4d.

Figure 19 — Map of Gateway — trade facilities and corridors

2.2.3.   **Optimize road capacity**, while supporting freight by rail, sea, and air, to reduce the time goods movement vehicles spend stuck in traffic.

   a.   Explore opportunities to implement freight priority measures, both physical and demand-management based, on key corridors and at key bottlenecks on the Regional Truck Route Network in ways that do not increase general purpose traffic or impact the reliability of active transportation or transit.

   b.   Make better use of road capacity during off-peak hours by creating a regulatory environment that encourages businesses to opt for more off-peak pick-up and delivery in ways that don't negatively impact community livability.

   c.   Support priority infrastructure investments necessary to accommodate long-term growth in Gateway trade while minimizing any negative impacts to local communities and the environment in support of regional objectives.

   d.   Explore moving more containers by rail directly from marine container terminals to inland transload facilities to reduce drayage space and transportation requirements within the South Coast Region.

   e.   Evaluate and assess viability of expanded short-sea shipping to reduce port-related container drayage traffic on the region's roads.

   f.   Monitor developments in automated ground and aerial deliveries to plan for their integration into the goods movement system. Adapt existing highway and roadway infrastructure to match capabilities of automated vehicle technology to maximize throughput on separated roadways and maximize safety on non-separated roadways. Ensure that potential deployment

addresses concerns relating to emissions, noise, safety, obstruction of sidewalks, visual nuisance and comfort, and impacts to workers in the freight and logistics sector.

2.3.   Make driving and parking more reliable.

To make decisions about their trip, people need information about their different travel choices. The more accurate, relevant, and timely the information, the better the transportation outcome for both the individual and the system. This includes different incentives and disincentives to help manage travel demand.

Cities often struggle to provide real-time data and effectively manage transportation demand (especially for non-recurrent congestion, such as caused by crashes or adverse weather) because of the myriad of transportation agencies or companies involved. Municipal transportation departments oversee the streets and traffic signals; TransLink runs the transit system; and private or non-profit organizations operate goods movement, vehicle sharing, and taxi or ride-hailing fleets and services.

These independent systems are fragmented, have their own data, priorities, and regulatory regimes, and little capacity to communicate and coordinate and respond quickly to emerging issues in real-time.

This strategy envisions a real-time mobility management system that provides a platform for coordination and communication between these entities. For example, this system could ask a responsive traffic signal to hold a crossing signal for someone moving slowly across an isolated intersection. Through dynamic parking management, it could ensure that a curb-side drop-off or parking spot is always available and reservable — potentially with vehicle charging options. If a street is clogged, it can direct vehicles to an emptier parallel street, resulting in less congestion for everyone. These improvements could multiply with the arrival of connected and/or automated vehicles, which can receive information directly from the mobility management system and respond immediately.

The essential functions of such a system would include:

*   **Real-time analysis and optimization**, evaluating how the transportation system is functioning and optimizing for efficiency and other regional goals (2.3.1)
*   **Informing** trip choices by providing real-time information to travelers, mobility services, and commercial goods movers on things like scheduling, pricing, and route availability (2.3.4)
*   **Dynamically managing** the use of road space, including curbs. (2.3.2. and 2.3.3.)

Actions:

2.3.1.   Establish a comprehensive and secure database of urban mobility data (an **urban data trust**) through:

   a.   Ensuring a regionally consistent approach to the deployment, operation and maintenance of real-time sensors across the transportation network, including establishing data standards and communications protocols for inter-operability.

   b.   Collecting urban mobility data with real time sensors and GPS devices, and house that data in an urban data trust.

   c.   Creating a digital twin of the transportation system — a virtual model that pulls real-time monitoring data.

   d.   Monitoring asset condition and performance, road space use including traffic volume, vehicle speeds and occupancy, transit delays, emergency dispatches, and weather patterns across the region's roads to better understand congestion levels at key choke points at various times and locations.

   e.   Optimize system performance using artificial intelligence.

f.   Engaging with stakeholders from the public and private sector to understand legal, social, and business requirements and impacts across sectors of an urban data trust.

2.3.2.   Manage high demand curbside space for **parking and loading with dynamic real time information systems**, including apps, to ensure availability, reduce excessive occupation of high demand curb space and unnecessary driving and circulation.

a.   Make curb zones — except those required for transit stops or lanes — more flexible and more adaptable by using digital street and curb regulations to dynamically adjust permitted uses (such as micromobility parking, taxi pick-up and drop-off, freight loading and unloading, and public realm activities) based on actual real-time demand for those uses combined with regional and locally-specific policy priorities.

b.   Allocate sufficient space to short-term, reservable access zones along the curbside for loading/unloading people and goods to ensure parking availability, especially in Urban Centres, Frequent Transit Development Areas (FTDAs) and other commercial areas.

c.   Designate commercial loading and unloading times that minimize congestion and conflict with other street users, considering off-peak hours wherever possible.

d.   Increase enforcement and fines for illegal parking.

e.   Design streets, curbs and loading areas to accommodate emerging freight technology including compact human-powered and automated freight vehicles most appropriate for Urban Centres, Frequent Transit Development Areas (FTDAs) and longer-combination automated trucks and truck platoons most appropriate at the interface between urban areas and the highway system.

Figure 20 — Illustration of dynamic, reservable curb space concept.

2.3.3.   Use intelligent transportation systems (ITS) to **dynamically manage the flow and movement of automated vehicles and other road users** on the roads for efficient movement and safety.

a.   Dynamically assign lanes, uses, and directional flow based on real-time information. With fully automated vehicles (Level 4 and 5), dynamic management could make significantly more efficient use of road space.

b.   On a regional scale, but especially on urban freight routes from Gateway trade areas, adjust signal timing and traffic speeds to maximize safety on non-separated roadways and maximize throughput on separated highways.

c.   Coordinate rapid incident response following a collision or other disruption to maximize health and safety outcomes and minimize negative impacts to overall transportation system reliability.

d.   Coordinate roadwork permitting and scheduling to minimize negative impacts to overall transportation system reliability.

2.3.4.   **Use real-time data** managed in the urban data trust to enable the creation of applications which allow both shippers and the travelling public to optimize their trip decisions based on:

a.   Parking and loading zone status and price — allowing reservations and raising and lowering prices to ensure that spaces are used most efficiently.

b.   Traffic congestion, street closures, lane reallocations, and price — allowing drivers and mobility services to avoid congested spots and route around any problem areas.

c.   Public transit trip arrival time, space available on each vehicle, and price — allowing users to optimize trips and seamlessly connect across multiple modes.

d.   Commercial vehicle locations, available capacity, routing, and price — supplied in a consistent open data format by commercial passenger and freight mobility service providers—– to enable third-party digital brokering of passenger trips as well as immediate processing and cargo tracking for freight deliveries (a component of Mobility-as-a-Service).

2.3.5.   Support **integrated fares pricing and loyalty programs** between different mobility provides to allow users to combine trips of different modes and to incentivize off-peak travel.

2.3.6.   Introduce **commute trip reduction programs** which support or require employers to establish and meet mode shift and emissions reduction targets through travel demand management (TDM) measures.

2.3.7.   [**EQUITY ICON**] Broaden the reach of **transportation demand management** (TDM) programming and resource capacity in the region, such as through cost share initiatives, TravelSmart, and local Transport Management Associations (TMAs). Program areas should provide tailored support services, resources, and behaviour change incentives focusing on:

a.   Major employers, new developments, schools or post-secondary institutions, and seniors' institutions.

b.   Timing through life phases and changes where people are more open to establishing new habits due to the "fresh start effect", such as when children enter or change schools or afterschool regimes, moving homes or jobs, seniors cease driving, newcomers to British Columbia, or when a new transportation service or infrastructure improvement has been made.

2.3.8.   Support transportation choice for residents of multi-family buildings or occupants of commercial buildings through:

a.   Engaging with developers on transportation demand management (TDM) measures that are most applicable under the various development and local contexts.

b.   Engaging with managers of existing commercial and residential buildings on TDM measures such as parking strategies, bike facilities, carsharing infrastructure and vehicles.

c.   Integrating requirements for TDM into the development process using municipal bylaws.

d.   Monitoring the progress and impact of these TDM measures post-occupancy.

2.4.   Maintain transportation infrastructure in a state of good repair.

While maintaining existing transportation assets in a state of good repair is a sound management practice, this has not typically been the case in North America where governments have often prioritized transport system expansion while underfunding maintenance. As a result, the maintenance and repair backlog across the continent is substantial and growing, and many older cities are now seeing critical transportation infrastructure — including roads, transit, and the technology and systems to keep them functioning reliably — fall into poor condition. When roads are pot-holed, when station elevators and escalators aren't working, or when transit vehicles break down — people's journeys are often disrupted, and they are less likely to get where they are going on time.

To avoid the downward spiral of deferred maintenance which can often result in delays and less reliable travel, and to reap the benefits of greater travel time reliability — not to mention greater cost savings, public safety, and noise reduction — we must be clear about which assets and infrastructure are needed into the future and maintain those in a state of good repair.

2.4.1.   Deploy routine **surveys and technologies** such as real-time sensors and software as they become available, to monitor conditions to inform predictive maintenance priorities. This includes monitoring the condition of pavement and structures on the region's walkways, bikeways, streets and roads and

the condition of transit vehicles, guideways, facilities, and stops and stations — with special attention to vertical circulation, such as stairs, escalators, and elevators.

2.4.2.   Provide the timely, adequate, and ongoing **availability of funds** to operate, maintain, and rehabilitate the region's walkways, bikeways (including the Major Bikeway Network), streets and roads (including the Major Road Network), and transit fleet and infrastructure to keep them in a state of good repair and operating reliably.

3. GOAL THREE | Affordable Choices for Everyone

Where we are today	Where we want to be	
"In this expensive region, I'm forced to spend more than I can afford on housing and transportation. In areas with more affordable transportation choices, housing is too expensive. In places further from urban centers where housing is a bit more affordable, I need to rely on my car, taxis or rideshare services for most of my trips, which is more expensive."	We all have **affordable choices** allowing us to easily live and move in this region.	…such that, by 2050, none of us — especially those of us with less wealth and lower incomes — need to spend more than **45% of our household incomes** on housing and transport combined.

Metro Vancouver is an unaffordable region to live in by Canadian and North American standards, particularly for people of lower income. According to Metro Vancouver's 2015 Housing and Transportation Cost Burden Study, nearly half of renter households in Metro Vancouver make $50,000 or less per year; making up 31% of all households. In this expensive region, this group ends up spending nearly 70% of their household income on paying the rent and on getting around. These households are particularly struggling under the weight of a heavy housing and transportation cost burden, leaving them with difficult choices about what to spend on food, clothing, childcare, and other expenses.

Keeping the two major interrelated household costs of shelter and transportation to the more manageable level of below 45% [10] of household incomes is critical to ensuring that we can all afford to live in this region, that we can connect to the opportunities we need to thrive, participate fully in our communities, be productive contributors to the region's economy, and live rewarding, dignified, and independent lives.

Goods movement also plays a key role in supporting affordability as costs of transporting goods impacts the cost of consumer goods. Actions that impact the cost, efficiency, and reliability of moving goods will require analysis and monitoring to understand the impacts to affordability for households and businesses.

The following pages describe what it will take to create a future where **none of us — especially those of us with less wealth and lower incomes — needs to spend more than 45% of our household incomes on housing and transport combined**:

- Increasing the supply of new — and protecting existing — **transit-oriented affordable housing** and community-serving retail so that people can live nearby and make use of the most affordable transportation options.

- Investing in the most cost-effective modes. In particular, **walking, rolling, cycling, and transit** in areas with higher proportions of lower-income households to help make these, the **most affordable modes,** especially convenient for people with the most to gain from them.

- Guaranteeing everyone a **universal basic level of mobility** with any fares, fees and tolls on any urban transportation service (including transit, shared mobility, parking and driving) to be set at a price that

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[10] Numerous agencies, including the U.S. Department of Transportation and U.S. Department of Housing and Urban Development, are replacing the conventional housing affordability threshold (30% of household incomes spent on housing) with a new combined affordability threshold of 45% of household incomes spent on the inter-related costs of housing and transport.

each household can afford and linked to each household's ability to pay. Regional transportation taxes——most of which today are weakly connected to household wealth and income — will also be adjusted to be **more progressive —** linking them as closely as possible to **one's ability to pay**.

- Supporting **regional prosperity** and **quality economic growth** that is equitable, with benefits shared broadly by everyone.

On Resilience & Affordable Choices

Increasing affordability supports resiliency by allowing households enough resources to buffer against shocks and stressors. Households who are dealing with poverty, or are financially strained, are less resilient. This same principle applies to the transportation system as a whole – focusing on lower cost transportation options that involve less capital-intensive infrastructure requires fewer resources to rebuild or repair in the event or a shock of stressor. For these reasons, transportation affordability supports regional resiliency at both the household and system-wide levels.

3.1.   Make living close to frequent transit more affordable.

Living next to fast, frequent, and reliable transit and community-serving retail allows many households to live comfortably without needing to own a car — and so saving upwards of $10,000 in expenses per year for each foregone automobile. However, housing next to frequent transit is typically also in high-demand and so is the least affordable.

To address this challenge, bold and deliberate measures to increase housing affordability near transit are necessary to realize more equitable, mixed-income transit-oriented communities. The status quo alternative, which has played out in Metro Vancouver over the last 30 years, is that announcements of major transit investments have spurred land speculation which has driven up real estate prices which in turn has harmed affordability and accelerated gentrification and displacement.

That major transit investments, so important in helping us reach most of our other goals, have contributed to worsening housing affordability in this region is one of this region's significant policy failures. This requires bold new approaches by land use, development, and taxation authorities.

To make up for this past failure, the Province, region, and local governments need to step up our collective efforts to build transit-oriented affordable housing, including affordable rental housing, at a much more ambitious pace and scale. Currently, municipalities have been leading this effort, but there is a need for Provincial and Federal support to achieve a more ambitious expansion and retention of affordable housing near transit. We also need to actively cool speculation around existing and proposed transit investments in order to ensure that existing residents aren't displaced to more auto-oriented areas where housing costs might be lower but where higher transport costs often negate these savings.

Parking is a major cost associated with development, so taking a regionally coordinated, affordability-focused approach to parking management and requirements in zoning by-laws can help bring down housing costs by avoiding an oversupply of parking and by not forcing potential residents to purchase parking along with their units if they don't require it.

Even if housing and transport are made more affordable, living can't be truly affordable if all of the amenities and local retail in your neighbourhood are oriented to a wealthy clientele, focusing on luxury goods. Faced with rapidly rising rents and stiff competition from international e-commerce giants, local retailers are in jeopardy, particularly

small, family businesses many of whom are best positioned to effectively serve disadvantaged individuals and communities. We need to encourage policies that actively support these local businesses that form the foundation of commercial high-streets at the heart of equitable, affordable, walkable and complete communities.

CALLOUT BOX: Transit-Oriented Affordable Housing

Metro Vancouver's Transit Oriented Affordable Housing [link] study proposes a suite of strategies to ensure that transit investments benefit all residents, irrespective of wealth or income. Read more about the study findings here.

Actions:

3.1.1.   [**EQUITY ICON**] Encourage land use planning authorities and affordable housing organizations to **expand, retain, and renew rental housing supply** adjacent to frequent transit stops and stations, especially within Urban Centres and Frequent Transit Development Areas, at a much more ambitious pace and scale than today, through measures including:

   a.   [**EQUITY ICON**] Coordinate across municipalities and with Indigenous Nations to align the land use planning, policy, and investment measures needed to achieve agreed-upon affordable housing targets along the length of major transit growth corridors. Document these commitments as part of Partnership Agreements to be approved by the Mayors' Council on Regional Transportation concurrently with regional approval of major transit investments.

   b.   [**RECONCILIATION ICON**] Engaging Indigenous Nations on new transit-oriented affordable housing targets concurrent with approval of major transit investments.

   c.   [**EQUITY ICON**] Coordinating across public agencies to secure land for non-market housing and supportive services along with decisions on major transit investments, ensuring that land purchased for transportation facilities is also assembled in ways that optimize development potential for regional objectives.

   d.   [**EQUITY ICON**] Encouraging public agencies with land holdings in the vicinity of frequent transit to partner with non-profit housing developers to deliver affordable housing.

   e.   [**EQUITY ICON**] Encouraging public agencies to develop procurement, disposition, and development plans and actions for land holdings that support the goals of the Regional Growth Strategy and include the provision of affordable rental housing. (M2050 1.2)

3.1.2.   [**EQUITY ICON**] Support Provincial, First Nation, and municipal efforts to protect and expand the existing supply of transit-oriented affordable housing through measures to **cool land speculation** along major transit corridors.

   a.   [**EQUITY ICON**] At the earliest stages of planning for a major transit project, implement policies aimed at preventing residential and small business displacement, to slow the pace of speculation and increase opportunities for affordable housing and services, including expansion of affordable and non-market rental housing, as noted in 3.1.1.

   b.   Adopt Development Contribution Expectation policies for each corridor identified in the Major Transit Network to ensure that owners, realtors, and developers are made aware of the significant expectations to preserve and grow affordable and rental housing along these corridors, even in advance of further community planning processes.

    c.   [**EQUITY ICON**] Where possible, preserve, protect, and reinvest in existing older, more affordable market and non-market rental housing around transit, in order to minimize displacement of existing residents.

3.1.3.   **Advance parking management solutions** to increase housing affordability and reduce demand for driving:

    a.   Encourage developers to unbundle parking costs from housing costs so that individual vehicle parking spots can be purchased separately by residents as needed.

    b.   Eliminate parking minimums in new developments so that developers are not forced to add to the cost of housing units by oversupplying parking, most of which today remains underutilized across Metro Vancouver. This action should be delivered in concert with 2.3.8. to avoid increased pressure on street parking.

    c.   In new developments adjacent to frequent transit stops and stations, explore concepts such as car-free developments, mandated parking for shared mobility (e.g., carsharing), investment in shared mobility infrastructure or services, parking maximums, and shared district parking.

    d.   Develop area-wide parking management plans, including on-street parking meters and permits and shared off-street lots, to effectively manage any spillover impacts from reduced on-site parking.

    e.   To avoid turning underutilized parking into expensive stranded assets, ensure that new structured and underground parking is built in ways that allow the space to be easily repurposed should demand continue to decline, especially considering the coming introduction of more shared and potentially automated vehicles.

3.1.4.   Increase **community-serving retail and other local amenities in frequent transit development areas** so that residents living around frequent transit can easily walk to a wide selection of affordable goods and services.

3.2.   As a priority, invest in the most cost-effective and most affordable modes

Cost effective modes of transportation are those which are lowest cost / most affordable to residents to use to move around the region. Investing in cost effective and affordable modes will have significant benefits for people with low-incomes and for Indigenous communities, which are some of the most underserved by transportation options in the region.

Actions:

3.2.1.   Prioritize investment in transit service improvements and active transportation across the region, but especially to neighbourhoods with high populations of households with low-income. These investments should be accompanied by measures to **prevent community displacement** (see Strategy 3.1 on affordable housing).

3.2.2.   [EQUITY ICON] Make bicycles and micromobility devices more widely available to more people at low cost through:

    a.   Public ownership of micromobility as a utility and extension of the public transportation system.

    b.   Rebates for bicycles, bicycle repairs, or accessories for low-income individuals.

    c.   Refurbishment and redistribution programs.

3.2.3.   Implement minimum requirements for secure, safe, and convenient bicycle parking in all new developments and encourage / incentivize retrofit of existing multi-family and rental buildings to accommodate more secure bicycle and micromobility parking and charging infrastructure.

3.2.4.   [EQUITY ICON] Prioritize **subsidies and rebates** for electric vehicles, electric bicycles, and bicycles to those residents with the least ability to pay and particularly to those who require that transportation mode in order to conduct their jobs (e.g., gig couriers, mobile care aids).

3.3.   Ensure that transportation fees and taxes are affordable for everyone.

Urban mobility is of benefit both to the individual, who enjoys being able to move around and connect to opportunities, to property owners whose land values go up with increased access, and to businesses and the broader society, who share in the benefits of increased economic activity that comes with good urban mobility. Given the value enjoyed by each of these groups, the approach our region has long taken to funding regional transportation is to share the cost-burden between user pay (e.g. transit fares, fuel tax) and indirect beneficiary pay (e.g. property tax).

Usage charges are important to help avoid the inefficiency and high cost involved with free public goods, however, high usage charges create a heavy cost burden especially for lower income residents. Making usage charges more progressive by linking them to a household's wealth and income ability to pay — will ensure a basic level of mobility is affordable to all and will be necessary to achieve the region's social equity goals.

Actions:

3.3.1.   Fund the regional transportation system through a diverse and resilient mix of taxes and fees that reflect both the value enjoyed by different beneficiaries and their ability to pay.

   a.   [**EQUITY ICON ICON**] Establish electronic mobility accounts from which users can pay for all transportation modes and services within the region — with the fares and fees charged for any given user linked directly to their ability to pay. Users with the lowest incomes and wealth should pay a very low discounted fare or fee and users with higher incomes and wealth should pay the full undiscounted fare or fee.

   b.   Make adjustments to each of the region's transportation taxes to make them more progressive, ensuring they are closely linked to ability pay.

   c.   Develop mechanisms which ensure that owners of all motor vehicles, regardless of fuel source, pay a fair share towards funding the regional transportation system.

   d.   Include a clear analysis of costs and benefits for any fees that impact passenger and commercial vehicles, including costs and benefits for businesses, consumers, and carriers as appropriate.

   e.   Coordinate with private-sector goods movement stakeholders to ensure pricing schemes meet their mobility needs and enhance the region's economic competitiveness.

3.4.   Help people and businesses connect to more economic opportunities

The first three strategies in this section focus on improving affordability by reducing expenses. This fourth strategy focuses on improving affordability by growing household incomes through equitable economic growth. In addition to the transportation and logistics sector itself providing many good, household-supporting jobs in our region — a well-managed transportation system is an essential ingredient for any region's economic development and overall prosperity. Good transportation and supportive land use increases access to employment and educational opportunities for people and increases access to employees, markets, suppliers, and end-customers for businesses. Providing convenient, reliable, affordable, safe and carbon-free mobility choices (per the strategies set out in Goals 1, 2, 3, 4, and 5) is a major contributor to high quality of life and valuable for talent attraction and retention in a competitive global environment.

Actions:

3.4.1. Provide consumers with better access to more local shopping opportunities by enhancing access to businesses by active transportation, transit, and other shared mobility options — especially to local street commerce and main street shops (as described in 1.1, 1.2, 1.3, and 3.1).

3.4.2. Provide workers with better access to more local jobs by:

   a. Enhancing access to employment opportunities by active transportation, transit, and other shared mobility options (as described in 1.1, 1.2, and 1.3).

   b. Providing flexible services like vanpools that improve access to jobs in lower-density business and industrial parks that are otherwise challenging to serve with fixed route transit.

3.4.3. Ensure businesses have better access to more markets, suppliers, customers and workers by:

   a. Helping them set up in the right location, per the location-efficiency framework described in 1.2.1, to minimize distances that customers, workers, goods and services will need to travel.

   b. Enhancing access to businesses by active transportation, transit, and other shared mobility options (as described in 1.1, 1.2, and 1.3).

   c. Improving travel-time reliability for commercial vehicles and services that rely on the road network in order to help businesses consistently and predictably bring their products to market (as described in 2.2 and 2.3).

   d. Including, in any evaluation of transport interventions, a robust assessment of impacts to the region's trade and economic competitiveness and impacts to cost for goods movers, businesses, and households.

3.4.4. Support safe and efficient operations for the region's agricultural sector by:

   a. Discouraging non-agricultural trips on local roads within the Agricultural Land Reserve.

   b. Taking the unique transportation needs of this industry into consideration in road infrastructure design and network planning.

   c. Ensuring adequate education and enforcement of safe speeds and vehicle operation around farm vehicles (see 4.1.8.).

3.4.5. Provide good jobs in a thriving transportation sector by developing proactive strategies to **attract, train, and retain a skilled and qualified transportation workforce** that:

   a. [**EQUITY ICON**] is representative of Metro Vancouver's diverse population;

   b. [**RECONCILIATION ICON**] includes strong representation from local Indigenous peoples;

   c. is ready and able to monitor, model, analyze, plan, build, operate, and maintain the highly automated, connected, electric and shared transportation system of tomorrow.

3.4.6. [**EQUITY ICON**] Collaborate across the transportation sector, with industry and labour partners, to proactively navigate an orderly, planned, and gradual transition for transportation workers whose jobs will be affected by automation and other technological changes.

3.4.7. Support a thriving **ecosystem of businesses** in Metro Vancouver and British Columbia oriented around transport automation, digitization, electrification and shared mobility by:

   a. Fostering active partnerships between entrepreneurs, industry, and academics to collaborate, prototype, pilot, demonstrate, and evaluate new mobility technologies, product concepts and innovations that promise to advance Transport 2050 goals.

b.   Establishing transportation innovation zones to facilitate trials by industry and academic partners in real-world environments within Metro Vancouver in order to better understand emerging transportation technologies and approaches and how they might advance or hinder progress towards Transport 2050 goals.

4. GOAL FOUR | Safe & Comfortable Choices for Everyone

Where we are today	Where we want to be	
"I often don't feel safe or comfortable getting around, because of high-speed traffic, because of other people who might do me harm, and because of a lack of amenities that meet my needs."	We all have **safe and comfortable** choices that make us all healthier and happier…	…and where we reduce serious traffic injuries and fatalities by at least 5% annually until we reach zero before 2050.

A feeling of being unsafe, uncomfortable, or unwelcome is a key barrier that limits freedom of movement and ability to access the opportunities people need to thrive.

For people walking, biking, or rolling — including pushing a stroller or being in a wheelchair — that means feeling anxious and unsafe being next to larger, faster-moving vehicles. For people with a disability, including those why rely on mobility aids, it could mean being uncomfortable on streets with no or limited sidewalks or curb cuts. As our population ages, seniors transitioning away from driving — and encountering new accessibility challenges — will require more safe and comfortable choices, particularly as more people age "in-place."

Many people, especially individuals with lower incomes who are more likely to live adjacent to major roads, live with constant and unsafe levels of transportation noise, vibrations, and air pollution leading to mental and physical health problems. And many people in Metro Vancouver experience discrimination, harassment, and outright hate while trying to get around the region — especially women, and people who present as Indigenous, Asian, Black or non-white.

Through Transport 2050, the Metro Vancouver region is embracing the core belief that everyone has the right to live and move safely and comfortably in their communities, free from harm, and committing transportation system designers and policy makers to share the responsibility to help make this aspiration a reality.

The following pages describe what it will take to make sure that our transportation system contributes in positive ways to our health, happiness and well-being, helping everyone feel welcome, comfortable and safe while getting around, including to reduce **traffic fatalities and serious injuries by at least 5% annually until we reach zero before 2050:**

- A transition from roads designed for cars towards people-first streets designed for everyone, featuring **reduced motor vehicle speeds** and **greater separation of different modes and speeds**. In the long run, **automation** can also play a major role in improving traffic safety and freeing up space to support more people-oriented streets.

- Making **everyone feel welcome,** included, and comfortable while getting around the region will require a multi-faceted and society-wide effort to **eliminate harassment, hate,** and **systemic discrimination.** It will also require creating welcoming public spaces for everyone including investment in programs and **amenities to support inclusion**.

- Making the transportation system **cleaner and quieter** to improve health and well-being for adjacent communities and ecosystems.

- Being prepared to **respond to and recover from disruptions and disasters** through robust safety and resiliency planning.

On Resiliency and Safe & Comfortable Choices

Various shocks – be they environmental, such as flooding or earthquakes, or technological, such as power outages or cyberattacks – can bring unanticipated safety risks. Key resilience approaches to mitigate these impacts to safety include:

- Maintaining state of good repair of infrastructure, robust asset management and operational practices to enable infrastructure to better withstand climate or extreme weather impacts.
- Establishing standards for infrastructure development that prepare new projects for climate impacts such as excessive heat, floods, and temperature fluctuations.
- Prioritizing bus-based investments over fixed rail infrastructure in areas of high risk to flooding, seismic activity, or earthquakes. Buses can be more easily re-deployed if local conditions change.
- Supporting a robust transition to autonomous vehicles that emphasizes safety not only for drivers and car passengers but also vulnerable road users.
- Planning streets to mitigate potential conflicts between modes of transportation – conflicts that could increase when systems are under stress.

4.1.   Eliminate traffic fatalities and serious injuries.

Streets are the lifeblood of our communities. Streets use about a third of the land area in urban Metro Vancouver and make up 80 percent of all public space. They have the potential to foster business activity, serve as a front yard for residents, and provide a safe place for people to get around on foot, bicycle, car, or transit. However, most streets in our region were designed to prioritize high-speed car movement at the expense of other uses and users.

Each year, more than 100 people are needlessly killed on Metro Vancouver streets — typically 40 of whom were walking, biking, or rolling while they were struck and killed. Tens of thousands more people are seriously injured every year. The key factor in these fatalities is speed. Based on the human body's ability to withstand impact, as shown in Figure 20, the National Association of City Transportation Officials (NACTO) recommends the top design speed for urban streets should be no higher than 40km/h.

Figure 21 — Risk of pedestrian death as a function of vehicle impact speed. At collision speeds above 35 km/h, the probability that a pedestrian will be fatally injured rises rapidly, with death almost certain at impact speeds of 55 km/h or higher.

For too long, we've considered these persistent high levels of traffic deaths and severe injuries to be inevitable side effects of modern life. While often referred to as accidents, the reality is that we can prevent these tragedies by taking a proactive, preventative, and systems approach that prioritizes traffic safety as a key public health issue.

The Vision Zero approach is a significant departure from status quo transportation system management in two major ways:
- Vision Zero recognizes that people will make mistakes, so the road system and related policies should be designed to ensure those inevitable mistakes do not result in severe injuries or fatalities.
- Vision Zero is a multidisciplinary approach, bringing together local traffic planners and engineers, policymakers, public health professionals, and the public to collaborate on problem-solving.

The arrival of advanced connected and automated vehicle technology could also provide substantial opportunities to move goods and people more safely throughout the region with fewer casualty collisions — 90% of which in 2016 were attributed to human error [11]. However, given the challenges that automated vehicles will likely always

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[11] Autonomous Vehicles and The Future of Work in Canada (ictc-ctic.ca)

have in urban environments when interacting with people on foot — unpredictable as we humans are — cities seeking to bring automated vehicles to scale are likely to find two feasible design options:

1. Significantly reduce traffic speeds on urban streets so that automated vehicles can safely and efficiently interact with people on foot; or
2. Significantly restrict and channelize the movements of people on foot through barrier fences alongside sidewalks and down the middle of streets together with pedestrian tunnels and overpasses that minimizes interaction between automated vehicles and people on foot.

While there will be a few limited locations within our region where the second design option may be necessary to contemplate, our region strongly prefers the first option — to design streets for slower traffic speeds. This option is significantly more favourable to advancing the five goals set out in Transport 2050.

Given the vastness of our region's street network and the length of time it will take to transform them — we need to take steps now to begin redesigning our streets for slower speeds and with more dedicated space for active transportation and transit. In this way we will be more prepared to welcome connected and automated vehicles, whenever they are permitted on B.C. roads, in ways that advance our region's goals rather than work at cross-purposes to them. In the meantime, even in advance of the arrival of automated vehicles, such street transformations will make important progress towards eliminating traffic fatalities and serious injuries, and improving travel reliability, livability, street life, and street commerce.

Actions:

4.1.1.   **Reduce the default speed limits** and design speeds for urban streets to 40km/h or slower, depending on context, with speeds of 60km/h and above reserved for controlled-access highway environments characterized by complete separation from other modes and potentially much faster travel speeds ultimately dictated by the safe upper operating range of automated vehicles.

4.1.2.   Transform our roads into **people-first streets** that are safe for everyone, with different streets prioritized for different uses and speeds, employing physical design and technology to achieve those speeds, including:

   a.   Walking and rolling priority streets, pathways, and car-free zones where motor vehicle traffic travels at walking speeds so that people feel safe and comfortable to choose these active modes.

   b.   Neighbourhood streets where motor vehicle traffic travels at cycling speeds, allowing for play and social activity in the street.

   c.   Neighbourhood main streets where it is still comfortable for cycles to ride in mixed traffic and that could include priority lanes allowing transit to safely travel at somewhat higher speeds.

   d.   Major roads and boulevards that accommodate longer-distance vehicle trips and could permit speeds of up to 50km/h in some cases as long as they feature frequent signalized crossings, wider sidewalks, traffic-protected cycle tracks, and transit priority lanes.

Figure 22 — Examples of street transformations that prioritize different modes and speeds

Figure 23 — Opportunity assessment: street widths and functions in Metro Vancouver today

4.1.3.   **Reduce the frequency and severity of collisions** involving automobiles and vulnerable road users by working towards realizing a people-first street network typology as described in Action 1.1.1 and 1.1.2.

   a.   Welcome local motor vehicle traffic on low-speed local streets but prevent high-speed cut-through traffic on local streets.

b.   Make the resulting neighbourhood open space to serve as a passage and crossover point for walkways and bikeways as well as recreation and play areas and focal points for community activities.

c.   Prepare Freight-Supportive Community Design Guidelines (as a reference for municipalities), that include guidance on particularly challenging issues, including complete street designs that provide safe and efficient networks for all users.

Figure 24 — Comparison of Collisions by Street Network Type ([Dr. Gordon Lovegrove & James Sun](#))

4.1.4.   [**EQUITY ICON**] **Prioritize protection** for those road users with the least physical protection and who are most easily injured and killed in car-dominated environments (i.e., people walking, biking, and rolling, on motorized two-wheelers or horse-back; children, seniors and people with disabilities; road-work crews).

a.   Update legislation and bylaws to strengthen legal protections for these street users.

b.   Strengthen enforcement practices to prioritize protection for these street users, including the use of automated traffic enforcement.

c.   Study the potential of allowing low-speed lane filtering for motorcycles and mopeds — where a motorcycle rider is permitted to move alongside vehicles that have either stopped or are moving very slowly — to confirm if this measure improves the safety of motorcyclists (e.g. improving visibility, reducing the likelihood that they are rear-ended) and if these safety improvements outweigh any potential added risks to motorcyclists or other road users.

4.1.5.   [**EQUITY ICON**] Make active transportation facilities **comfortable and enjoyable** for people of all ages, abilities, and backgrounds, consistent with the B.C. Active Transportation Design Guide. In particular:

a.   [**EQUITY ICON**] Provide low-speed pathways and street crossings for walking and rolling that are comfortable for people of all ages, abilities, and backgrounds, including spaces for rest, placemaking, and social connection.

b.   [**EQUITY ICON**] Make it safer and easier for people who roll (including wheelchairs or strollers) to safely get around by installing curb cuts, removing obstructions, and repairing sidewalks.

c.   [**EQUITY ICON**] Provide low- and medium-speed bikeways that are comfortable and accessible for people of all ages, abilities, and backgrounds.

d.   [**EQUITY ICON**] Ensure the needs of people with disabilities and others experiencing barriers to accessing opportunities are always considered in the design and execution of active transportation facilities. In locations where various modal priorities intersect (i.e., adjacency of protected bikeways, transit stops, and accessible crossings with curb letdowns), prioritize the needs of people with disabilities and traditionally marginalized people in the design.

e.   Address existing gaps in the pedestrian infrastructure network (i.e., missing/narrow sidewalks and crosswalks) and overall built environment (i.e., land use and building form) that make it difficult to access fixed-route transit service.

4.1.6.   Plan to accommodate the needs of the wide variety of micromobility devices with active transportation **networks that support three different speed ranges**: walking speed, slow bicycle speed, and fast bicycle speed.

a.   Future-proof facility designs to transition from bikeways to active travel pathways that include adequate space to accommodate more and potentially different users, including sometimes faster and larger electric bikes, scooters and trikes for freight and deliveries. This will allow adequate buffer space and separation between low-speed and medium-speed users.

    b.   Conduct pilot projects and research to develop suitable people-first street and network designs to accommodate the wide and evolving variety of micromobility devices.

4.1.7.   [**EQUITY ICON**] Make streets **vibrant, comfortable, inviting, and inclusive** public spaces for everyone, especially in Urban Centres and Frequent Transit Development Areas through actions that:

    a.   Design to maximize accessibility and inclusion for people of all ages, abilities, incomes, housing status and backgrounds.

    b.   Provide inclusive spaces for social interactions and gatherings, including publicly-accessible and inclusive parklets, plazas, and patios.

    c.   Plan for the use of streets for public spaces within the context of the transportation network.

    d.   Increase the use of "dark-sky friendly" street lighting to minimize light pollution to adjacent properties but to evenly illuminate the public realm — particularly in darker and less used areas where personal safety may be a concern.

    e.   Support access to a network of safe, non-gendered, and well-maintained publicly accessible washrooms, both in public venues as well as private establishments, that are freely available to people.

    f.   Incorporate awnings and canopies into building facades to add shelter from the elements wherever possible.

    g.   Plan street furniture design and locations to meet the required street activity and needs.

    h.   Protect and enhance trees, plantings, and green infrastructure as an important part of making the pedestrian experience more comfortable, including by providing shelter and contributing to a softer street environment that better supports mental health and well-being.

    i.   Ensure the placement of street furniture maintains clear paths for people walking, biking, and rolling to provide unobstructed and accessible movement.

    j.   Protect and support existing local small businesses, especially those that serve disadvantaged or marginalized communities.

4.1.8.   Increase **awareness and understanding** of how to operate vehicles safely around people walking and cycling, transit vehicles, heavy commercial vehicles and agricultural equipment, by:

    a.   Working with partners to implement road safety public education campaigns.

    b.   Including this as a key element of substantially more rigorous **driver's license requirements** for all vehicle license classes in British Columbia.

4.1.9.   Focus **traffic enforcement** resources on targeting dangerous motor vehicle drivers, including through automated speed and traffic enforcement at high-collision intersections around the region.

Figure 25 — High collision locations on roads in Metro Vancouver

4.1.10.   Advance a more unified regional program of **commercial vehicle safety inspections** on the region's roads coordinated with the Provincial Commercial Vehicle Safety Enforcement (CVSE) branch.

4.1.11.   Work with industry and regulators to encourage uptake of **Advanced Driver Assistance Systems** (ADAS) that include pedestrian and cyclist collision avoidance systems for heavy commercial vehicles, including buses, to help minimize collisions with vulnerable road users.

4.1.12.   Ensure that safety and protection of vulnerable road users is prioritized in the algorithms of any **automated and connected vehicles** permitted to operate on our region's roads.

4.2.   Ensure everyone feels welcome, comfortable, and physically secure while getting around.

If people enjoy their transportation experience, they're more likely to travel. Walking, biking, rolling and using transit should be inviting and enjoyable experiences.

A key part of this is feeling comfortable, safe, and secure when travelling. Although actions around safety and security often involve enforcement, it is important to recognize enforcement does not provide a feeling of safety for everyone. At the same time, passengers may fear verbal, physical, and sexual harassment from others while travelling on public transit. To meet diverse individual and community needs for feeling safe on transit, the approach below focuses on a community-based approach by training and educating frontline staff on unconscious bias and cultural awareness, providing appropriate support with health teams and community organizations, and having community safety officers to build trust and relationships with local communities.

While there are important actions, we can take to support these ends, subtle and often inexpensive improvements can go a long way to creating a positive user experience. For example, planting trees along a walkway can mean the difference between a pleasant stroll or a sweltering walk in the mid-summer heat. Installing art in public spaces can spark joy, surprise and delight in what otherwise might have been a routing journey.

Actions:

4.2.1.   **Improve wayfinding** to make it easier, less stressful, and more intuitive to move around the region through:

    a.   Replacing the patchwork of inconsistent signage across the region with a consistent and coherent system of physical wayfinding and regulatory signage for walking, cycling, transit, shared mobility.

    b.   Work with providers of digital trip-planning applications to ensure that digital iconography and mapping conventions are consistent with the physical wayfinding system.

4.2.2.   Ensure transit passengers have **room to move** around and **room to sit** if they require it through actions such as:

    a.   Increasing transit service frequencies on crowded routes.

    b.   Providing improved real-time information about vehicle and station capacities to help users adjust their travel times and routes.

4.2.3.   Provide a **comfortable transit** experience by:

    a.   **[RESILIENCY ICON]** Providing appropriate heating, ventilation, and air conditioning aboard all transit vehicles and passenger facilities to minimize user exposure from the elements and airborne contaminants.

    b.   Ensuring ample room for comfortable vertical and horizontal circulation within transit stations and exchanges, including well-functioning and reliable escalators and elevators.

    c.   Implementing the actions from TransLink's Customer Experience Action Plan including a new Waterfront Customer Service Centre, escalator, and elevator upgrades, and an app which informs customers of bus crowding levels.

4.2.4.   [**EQUITY ICON**] Ensure disadvantaged individuals and groups, feel **welcome and secure** when getting around on shared transportation services, including transit, through measures such as:

    a.   **[EQUITY ICON]** Improving safety aboard the public transit system by maintaining a zero-tolerance policy for harassment from other passengers or staff. This is supported by training, education, and consequences in order to make the system welcoming to all transit users, especially disadvantaged individuals and groups.

    b.   Technology, including emergency call buttons and security cameras in vehicles, at mobility hubs, and available via smartphone apps.

    c.   Adequate lighting at mobility hubs, including transit stations and stops.

    d.   [**RECONCILIATION ICON**] [**EQUITY ICON**] Training for all staff and decision-makers of mobility service providers, especially frontline and security staff, on: Indigenous cultural awareness to improve cultural competency, anti-harassment, unconscious bias, equity, diversity and inclusion, and understanding and mitigation of systemic racism.

    e.   [**EQUITY ICON**] Implementation by each mobility service provider, including transit, of a strategy to recruit and retain employees who represent disadvantaged individuals and groups into both front-line positions and senior management positions so that all people see themselves well reflected in the transportation work force they rely on.

    f.   Ongoing dialogue with community members to ensure the specific safety and security needs of all people are considered in the planning and operation of the transit system, including disadvantaged individuals and groups.

4.2.5.   Support an integrated non-punitive **community-based approach** to **community safety** in the Metro Vancouver region with social workers, mental health workers, first responders, community ambassadors, and non-armed Community Safety Officers working alongside police officers from local forces and the Metro Vancouver Transit Police in order to:

    a.   Reduce sexual offences that occur to people while they are trying to get around.

    b.   Reduce racist harassment and hate-motivated crimes that occur to people while they are trying to get around.

    c.   Reduce assaults on front line transportation workers while they are trying to do their jobs.

    d.   Help vulnerable people in crisis with the most appropriate personnel and the most appropriate techniques to ensure those individuals feel culturally and psychologically safe, are treated with respect and dignity, and can minimize the risk of harm to themselves or others.

4.2.6.   Provide walking, cycling, and transit **skills training, resources and support programs** that improve safety and confidence.

    a.   [**EQUITY ICON**] Incorporate cycling skills and traffic safety training into the elementary school curriculum so that all children can walk and bike in a safe and confident manner before reaching high school.

    b.   [**EQUITY ICON**] Deliver regular cycling skills training courses for adults at multiple skill levels and in multiple languages, including courses for Indigenous peoples (where desired), women and courses for newcomers to Canada.

    c.   [**RECONCILIATION ICON**] Where desired by the Indigenous Nation, deliver transit system orientations for youth and elders from Indigenous communities to support utilization of an increasingly technology-driven transportation system.

    d.   [**EQUITY ICON**] Support transit system orientations and skills training in multiple languages for people with disabilities, neuro-atypical people, seniors, and newcomers to Canada.

    e.   [**EQUITY ICON**] Through the Regional Youth Travel Strategy, support child and youth-focused walking & cycling programs to encourage safe, independent travel skills with coordination and delivery multi-level stakeholders and government.

4.2.7.   Foster a transportation system that connects people to their communities through **art, design, landscape, and cultural recognition**.

    a.   Support programs that deliver public art, including as part of transportation investments.

b. Incorporate beauty and design excellence as an objective when designing transportation facilities, in order to make public realm and design investments that surprise and delight and are well integrated into the local urban context.

c. **[RESILIENCY ICON]** Increase greenery and native landscapes along and around transportation corridors and facilities.

d. [**RECONCILIATION ICON**] Leverage the transit system as a platform for Indigenous cultural recognition, language revitalization and education — promoting and celebrating the rich cultural heritage of Indigenous communities from this region through design, Indigenous art, landscaping, and naming of networks, stations and places.

4.3. **Minimize transportation's adverse impacts on local communities**

Transportation service and infrastructure, while providing critical access to opportunities, can also have a variety of adverse impacts on local communities and natural systems. Environmental impacts include air pollutants, noise and vibrations, loss of tree canopy and greenspaces (and thus, loss of biodiversity and ecosystem robustness), as well as water pollution and soil contamination. Major transportation developments may impact Indigenous cultural heritage sites and traditional Indigenous cultural practices therefore, TransLink engages communities, as appropriate to identify and mitigate potential impacts and follows provincial laws and guidelines as required.

These impacts are typically not equally distributed. Residents most burdened by environmental impacts are those living closest to the sources; oftentimes residents with lower incomes who live in more affordable homes on major arterial roads, truck routes, or next to major rail corridors. For residents living along such major transportation corridors, air and noise pollution is a key concern. They can disrupt sleep and daily activities, increase stress, and adversely impact health and overall quality of life.

Community health and vitality also suffer when neighbourhoods are divided by wide roads, rail corridors, and high traffic volumes and speeds. For instance, residents are less likely to know each other, visit neighbours or spend time on the street in such high traffic, high-noise environments.

By taking an integrated and community-based approach to mitigating transport's adverse impacts, we can contribute to better physical, mental, community, and ecosystem health outcomes for everyone.

Actions:

4.3.1. **[RESILIENCY ICON]** Conduct **health and environmental impact assessments** for major transportation projects, which consider air quality, climate change, noise, vibrations, urban heat, tree canopy, greenspaces and natural systems, water and sewage and soil contamination impacts, as well as physical activity, traffic safety, and social impacts — with specific attention to any disproportionate and/or cumulative impacts on disadvantaged individuals and groups.

4.3.2. Reduce **air emissions** from transportation through:

a. Implementing greenhouse gas reduction measures described in 2.2.3.f, 5.2, and 5.3. Greenhouse gas reduction measures which transition away from internal combustion also eliminate tailpipe emissions which contribute to improved air quality.

b. Develop regulatory requirements for existing medium and heavy-duty vehicles, initially targeting emissions of health-harming air contaminants. Consistent with RGMS 2.7.2, this could include an inspection and maintenance program that requires repairs on high emitting trucks, registration requirements targeting older trucks, a regional smoking vehicle hotline, and low- or zero-emission zones.

4.3.3. Reduce **water pollution** impacts from rainwater washing pollutants off road surfaces and into waterways through working with local road authorities to develop standards for stormwater

management which includes interventions such as rain gardens and bioswales to collect and treat stormwater at the street level.

4.3.4.   **[RESILIENCE]** Establish tree canopy standards and greenery targets for all streets and major transportation infrastructure and facility projects to reduce **urban heat island** and **biodiversity-loss** impacts of transportation.

    a.   Especially for key walking, cycling and rolling corridors for the comfort of street users during increasingly hot summers.

    b.   [**EQUITY ICON**] Especially with priority to neighbourhoods with higher proportions of lower-income residents and members of other disadvantaged groups.

4.3.5.   Reduce **noise and vibrations** associated with **road-based** transportation, through actions such as:

    a.   Providing routine pavement maintenance of regional roads and truck routes to minimize uneven surfaces and potholes. These create a bumpy and uncomfortable experience for road users of all type, with the loudest and most jarring noises from heavy commercial vehicles.

    b.   Increasing enforcement of posted speed limits.

    c.   Accelerating the use of pavement types and treatments on regional roads that have been shown to reduce tire and pavement noise and that have the same safety, durability, and cost characteristics as more conventional pavement materials.

    d.   Where new medium or higher density development is approved along the Major Transit Network or a regional road, including any truck route, requiring the developer to incorporate noise and vibration mitigation measures including: floorplans that minimize noise intrusion, especially to bedrooms; noise and vibration absorption through building and landscape design; and sound baffles or screens to cover building openings.

    e.   Encouraging increased use of smaller scale vehicles (handcarts, e-trikes and bikes, vans and automated cargo pods of various sizes and configurations) for e-commerce deliveries in Urban Centres and denser urban neighborhoods where appropriate, including through supporting industry and municipalities in the development of neighbourhood logistics hubs to better enable consolidation of parcels in central locations for pick up by customers or use of smaller, lighter, emissions-free freight vehicles for final mile deliveries in low-speed and pedestrianized zones.

4.3.6.   Reduce **noise and vibrations** associated with **rail-based** transportation, through actions such as:

    a.   Regularly performing track maintenance for heavy rail and rail-based transit to reduce track noise.

    b.   Grade-separating roads and heavy rail lines within the urban area, and undertaking other measures to mitigate the use of train whistles or horns in populated areas.

    c.   Incorporating measures to minimize the shunting of rail cars and assembly of trains in heavily populated areas.

    d.   Installing additional rail sidings to help reduce the amount of shunting and associated noise and safety upgrades to enable whistle cessation.

4.3.7.   Reduce neighbourhood partition and social isolation impacts associated with wide roads and rail corridors with high speeds and volumes through actions such as:

    a.   Reduce the design speed for all roads currently 50 km/hr or over within the Urban Containment boundary (consistent with the framework set out in Strategy 4.1.1.) and especially along the Major Transit Growth Corridors (MTGC).

    b.   Minimizing urban development around high-speed corridors.

c.   Providing more frequent at-grade crossings of roads through urban areas, especially in Urban Centres and Frequent Transit Development Areas.

d.   Providing more frequent grade-separated crossings for people to make walking, cycling or rolling connections across freeways and rail corridors passing through urban areas, and especially in Urban Centres and Frequent Transit Development Areas.

4.4.   Safely respond to and recover from disruptions and disasters

To ensure the safety and security of the public, as well as regional prosperity, recovery, and resilience, the transportation system must be available to support communities before, during, and after emergencies and disasters. The ability to respond when time is of the essence and when lives and property are at stake requires that we urgently work together.

Actions:

4.4.1.   [**RESILIENCY ICON**] Create, maintain and audit **emergency and business continuity plans** and programs based on regional assessment of existing and changing hazards, risks, and vulnerabilities.

4.4.2.   [**RESILIENCY ICON**] Conduct periodic public facing emergency-response **training** and exercises with the public, stakeholders, the media, and all levels of government.

4.4.3.   [**RESILIENCY ICON**] Maintain an **emergency operations framework** that enables intergovernmental partners to effectively respond and recover from emergencies and disasters and aligns with provincial and municipal response structures.

4.4.4.   [**RESILIENCY ICON**] Support an integrated **community-based approach** to **community safety** as noted in action 4.2.5 to build system resiliency to help:

a.   Manage major events with large crowds.

b.   Respond and help manage in the immediate aftermath of disruptions and disasters.

4.4.5.   [**RESILIENCY ICON**] Engage partners and stakeholders to identify **critical infrastructure interdependencies**, align response and recovery strategies, training and exercise plans, and strengthen relationships.

4.4.6.   [**RESILIENCY ICON**] Develop and implement a regional transportation **resiliency strategy and action plan** that will:

a.   Develop policies and share information and data related to hazards, risks, and vulnerabilities.

b.   Develop a regional multi-hazard map and indicators to assess existing and changing hazards, risks, and vulnerabilities.

c.   **[EQUITY ICON]** Explicitly consider social equity in assessing risks and vulnerabilities and in developing actions and response strategies.

d.   Identify and consider critical regional infrastructure and system interdependencies.

e.   Coordinate interagency priority actions to address transportation vulnerabilities identified, including implementation and funding strategies.

f.   Develop post-event intervention and review processes.

g.   Integrate resilience and hazard, risk, and vulnerability analyses into long-range transportation planning including climate-resilient transit-oriented communities including housing and other buildings.

4.4.7.   [**RESILIENCY ICON**] Prioritize investment in modes, corridors, and technologies with the **greatest capacity to adapt** to shocks, stresses, and changing conditions.

   a.   Avoid locating fixed transportation infrastructure in areas with unmitigated climate or natural hazards.

   b.   Avoid expansion of permanent transit infrastructure into hazardous areas. Where risk is unavoidable, such as in existing settlements, use risk-mitigation or climate change adaptation strategies in the expansion of transit infrastructure. (M2050 1.2)

   c.   Develop a more flexible and resilient transportation system by advancing low-cost, low-emission travel options, such as active transportation and transit (such as described under Goal 1), to create additional layers of transportation in the event of a disruption.

   d.   Build in long-term flexibility for transportation facilities and corridors to be repurposed over time, such as unused rail corridors to multi-use paths, high-occupancy vehicle lanes to transit-only lanes, and underground parking to community amenity space.

4.4.8.   [**RESILIENCY ICON**] Update **state of good repair** programs (see also 2.4) to account for resiliency that will:

   a.   Prioritize funding for seismic upgrades to bridges, guideways, and infrastructure.

   b.   Establish a framework for consistent identification and prioritization of resilient investments when upgrading and building new transportation assets.

   c.   Make informed decisions that include a full understanding of site hazards, risks, and vulnerabilities, including future environmental, social, economic, technological and health risks.

   d.   Prioritize bus-based transit investments over other inflexible investments in areas with known severe flood risk.

   e.   Develop safe-to-fail protocols for regional infrastructure and assets.

   f.   Identify, review, and develop actions to minimize gaps in addressing certain hazard areas, such as cyber security on automated systems and climate change impacts on infrastructure.

   g.   Incorporate resiliency approaches into fleet operations by supporting long term maintenance facility planning.

   h.   Future-proof infrastructure designs to be prepared to response to expected impacts of increased extreme weather events.

5. GOAL FIVE | Carbon-Free Choices for Everyone

Where we are today	Where we want to be	
"Where I live, and for the trips I need to make, I need to use a car whose emissions aren't good for my neighbourhood or the planet. I'd like my travel to be emissions-free."	We have many transportation choices which are **carbon-free**, supporting local and global efforts to tackle climate change…	…such that by 2030, we have lowered carbon pollution from light-duty vehicles by **65%** over 2010 levels**;** and have **eliminated carbon pollution from transport altogether** by 2050.

The world is on currently track for over 3°C of global warming by the end of the century, bringing severe and harmful consequences to ecosystems and communities around the world. Climate impacts — such as extreme weather, heat waves, and wildfire smoke — are already being felt in our region and are expected to intensify. Plainly: we are in the midst of an accelerating climate emergency.

To avoid the worst impacts of climate change, the United Nation's Intergovernmental Panel on Climate Change (IPCC) warns that we must limit global warming to 1.5°C. This means slashing carbon pollution globally by 45% below 2010 levels by 2030, and reaching net zero emissions by 2050.

In 2008, the Metro Vancouver region set bold climate action targets and in 2019 updated them to align with the current IPCC targets. However, despite these bold targets and despite the urgency, our region has barely managed to achieve a 1% reduction in GHG emissions since 2010. With only eight years left to achieve a further 44% reduction — incrementalism will not suffice if the region is to come close to meeting our climate targets.

The IPCC warns that this global 2030 target is not merely an interim milestone — rather it must itself be met in order to avoid sending the global climate system past critical thresholds that we are now on the cusp of crossing. While technology may play a more significant role in helping meet our 2050 target — in order to achieve a 5–10% reduction in GHG emissions every year for the remainder of this decade to meet our 2030 target — we need significant, urgent, and immediate action by all levels of government on the scale of the mobilization this country realized during World War II.

Transportation is both a contributor to the problem and a major part of the solution. In Metro Vancouver, transportation is the largest-single source of greenhouse gas emissions, with on-road transportation responsible for 35% of regional emissions. While every sector must do its part to mobilize all available ideas, tools and resources to meet our region-wide targets, the transportation sector — particularly light-duty vehicles — must play a leading role. Fortunately, the transition to a carbon-free transportation

Reducing emissions of all types

The purpose of this goal is to reduce or eliminate greenhouse gas emissions stemming from transportation in the region – but also other health-harming air contaminants, such as nitrogen dioxide, volatile organic compounds, and particulate matter. The emission of GHGs and air contaminants is highly correlated, and so when this Goal area speaks of moving to low or zero emissions, it generally covers all tailpipe emission. This means that addressing climate change also supports better lung health, particularly for people who live alongside busy roads.

system — which is also supported by strategies and actions from Goals 1 to 4 — will yield numerous co-benefits. Not the least of which include cleaner air and quieter streets, energy savings, and new economic development and job opportunities spurred by innovation in the zero emission transportation sector.

Accordingly, the headline target for this goal is focused on light-duty vehicles — committing us to urgently reduce carbon pollution from light-duty vehicles by 65% over 2010 levels by 2030. Our region has set this more ambitious target for light-duty vehicles because:

- Heavy-duty vehicles are vital to our economy and currently have fewer options to transition to move to zero emissions. They will require additional support to meet region-wide targets while maintaining economically viability and competitiveness.

- Electric propulsion technology is further advanced and more economically viable for light-duty vehicles; and

- Light-duty vehicles generally turn over more quickly than do buildings, industry, or heavy-duty vehicles.

While no one can escape the rapidly accelerating impacts of climate change, these impacts do and will affect people differently based on who they are, where they live, and the resources at their disposal. Often, those who contributed least to carbon pollution will experience the worst impacts. Accordingly, climate justice is a key perspective that Transport 2050 brings to these actions — linking the call for climate action with the call for social equity, both globally and here within our own region.

The following pages describe what it will take to achieve our region's goals of **reducing carbon pollution from light-duty vehicles by 65% over 2010 levels by 2030 and eliminating carbon pollution from transport altogether by 2050:**

- Reducing the overall energy requirements of the transportation system by rapidly shifting as many passenger trips as possible to the **most energy-efficient modes**: walking, rolling, cycling, and transit; in order to **reduce the kilometres driven by vehicles**. Accomplishing dramatic shifts in a short period of time will require a combination of regulations, design interventions, and incentives.

- Rapid transition of vehicle fleets to electric by increasing the availability and affordability of this technology for both light and heavy-duty vehicles.

- Ready access to low carbon refueling and charging infrastructure.

- Considering the **upstream and downstream emissions** involved in manufacturing, transporting, and disposing of transportation assets and infrastructure. We need to better account for and factor these emissions into our purchasing and investment decisions.

On Resiliency & Carbon-Free Choices

Carbon-free policy actions will reduce our dependence on fossil fuels, which are imported. A shift to more locally-produced renewable energy – such as electricity or biofuels – will increase the region's ability to weather shocks and disruptions to fossil fuel supply chains.

The widespread adoption of electric vehicles – in commercial, fleet, or individual applications – has the potential to support regional resilience by serving as distributed power storage during outages.

5.1.   Reduce the energy requirements of the transport system

Achieving a carbon-free transportation system requires reducing the energy needed to power the system. This is accomplished by shifting trips to energy-efficient modes in ways that align with the street design and speeds outlined in the people-first streets approach under Goal 4. Many of these actions reflect other strategies and actions in this document. Others are adapted from the Regional Goods Movement Strategy.

Actions:

5.1.1.   **Shift trips** to the most **energy-efficient modes**. Many of the strategies and actions under Goals 1, 2, 3, and 4 focus on increasing the attractiveness and competitiveness of alternatives to the automobile — all of which are needed to help enable this mode shift.

Figure 26 – Energy efficiency by mode of transportation

5.1.2.   Design **energy-efficient cities**, with **slower overall travel speeds** and more compact land use. Refer to strategies 1.1 and 1.2 for specific actions, and the people-first streets approach proposed under Goal 4.

   a.   Coordinate industrial land use and transportation needs of the freight sector per Action 2.2.1 to promote efficient use of lands that considers transportation emissions implications.

5.1.3.   Support carriers specializing in **smaller, zero-emission freight vehicles**. This includes supporting cargo bicycles and small-scale automated neighbourhood delivery pods for last-mile freight applications in **low-speed and pedestrianized zones** in the urban parts of the region by:

   a.   Designing urban bikeways and parking areas to accommodate these types of vehicles.

   b.   Establishing infrastructure and operating standards for these types of vehicles in order to prioritize the safety and comfort of people walking, biking, and rolling — especially for people with disabilities.

   c.   Providing administrative, technical, and financial support and incentives to freight and logistics companies to incorporate these types of vehicles into their fleets.

   d.   Supporting industry and municipalities in the development of neighbourhood logistics hubs where appropriate as outlined in 1.4.2.b.

5.2.   Transition to zero-emissions vehicles

Already in British Columbia, around one-in-ten new vehicles sold is electric. We should continue to support this trend, which will do much of the heavy lifting in reducing transportation GHGs in our region. This strategy includes key actions to support the transition towards zero-emission vehicles — of all types.

For medium and heavy-duty vehicles, technology to support the shift to zero emissions is at earlier stages of development and commercialization. For this sector, many of the actions below will take some time to become viable and so are expected to have a larger impact over the long term.

New challenges will also arise with the transition to electric vehicles. These include a greater dependence on our province's hydroelectric power resources, challenges to ensuring equitable access to EVs, a lack of mechanisms to ensure that electric vehicle road users pay a fair share towards regional transportation funding, loss of fuel tax revenues (which currently comprise 25% of TransLink's revenue sources), and the possibility that a much lower per-kilometre operating cost will encourage more driving. A significant increase in driving and traffic congestion, particularly when paired with automation, will compromise some of our other goals.

Some of the strategies and actions in this section aim to address these new challenges:

Actions:

5.2.1. Increase availability and access to **electric bikes, scooters, and other forms of electric micromobility**, which can make active transportation more accessible to more people. A number of actions under Goals 1 through 4 speak to increasing access to and awareness of micromobility in general. Some specific actions that support electrified micromobility could include:

   a. Providing rebates or tax discounts to reduce the cost of electrified bikes, cargo bikes, and scooters.

   b. Designing e-micromobility charging into public facilities and bike parkades to extend range.

5.2.2. Accelerate the **electrification of light-duty passenger vehicles**. This action builds on the existing momentum to transition the light-duty passenger vehicle fleet to zero emissions. This category of vehicle includes commercial vehicles used for passenger movement.

   a. Immediately accelerate the BC *Zero-Emissions Vehicle Act* such that by 2030 all new light-duty vehicles sold in B.C. are zero emission (instead of 2040).

   b. Develop requirements for light-duty vehicles such as low- or zero-emissions zones, or vehicle emissions levies with rebates for replacing older vehicles.

   c. [**EQUITY ICON] [RECONCILIATION ICON**] Make electric vehicles more affordable through measures such as incentives, loans or vehicle scrappage programs for older and more polluting vehicles, prioritizing access for low-income residents, Indigenous peoples living in on-reserve communities and small businesses (including drivers of the gig economy who rely on their vehicles to earn income).

   d. Secure commitments from government, quasi-governmental and institutional organizations in the region to immediately begin procuring zero-emission vehicles for all light-duty vehicles in order to fully transition to zero-emissions fleets by 2030.

   e. Prioritize electrification of high-annual-VKT shared-use mobility fleets, including ride-hailing, taxis, and carshare vehicles, through collaboration, incentives, and regulation. [see 1.3.6.d]

   f. Incentivize the adoption of zero-emission vehicles by reflecting an appropriate cost of carbon consistent with achieving regional, provincial and federal and GHG reduction targets into pricing mechanisms (such as where fees are paid for licensing, parking, pick-ups, and drop-offs) or through restricting physical access for non-zero-emissions vehicles in urban areas.

   g. Explore options to accelerate the retirement of older, more polluting vehicles such as through temporarily increasing funding for vehicle scrappage programs targeting gasoline or diesel vehicles with poor fuel economy and high usage.

   h. Establish requirements for all automated vehicles, and any other newly developed transportation modes, to be zero emission ahead of BC *Zero-Emissions Vehicle Act* requirements.

5.2.3. Support the transition of **medium and heavy-duty vehicles** to low-emissions in the near-term, and zero emission over the long-term, as technologies become more commercially viable for this sector:

   a. Ensure that **all public transit vehicles** purchased moving forward are zero emissions.

   b. Introduce low- or zero-emissions zones in Urban Centres and Frequent Transit Development Areas (FTDAs).

   c. Ease travel-time restrictions for low and zero-emission freight vehicles in certain areas and/or corridors.

   d. Provide preferential parking, loading, and unloading zone access for low or zero-emission freight vehicles.

e.   Introduce loans, tax credits, and grants for purchasing and leasing low- and zero-emission freight vehicles and agricultural equipment.

f.   Explore emissions-based licensing, parking, and pick-up and drop-off charges.

g.   Support measures that help accelerate the turnover of truck fleets as near-zero and zero-emission vehicles and autonomous technology become commercially viable and available.

h.   Establish standards for carbon-neutral delivery certification that increases industry and public exposure to and demand for zero-emission freight vehicles.

i.   Expand the ZEV Act to introduce sales requirements for medium and heavy-duty vehicles.

5.2.4.   Ensure that the **price of carbon** is aligned with the ability of the region to meet the greenhouse gas reduction targets with consideration of the full suite of actions and strategies. This will require that the senior government carbon pricing regimes be adjusted over time, or that a regional carbon price be considered to supplement.

Carbon-free public transportation

TransLink, in addition to planning the regional transportation system, is responsible for operating public transportation in Metro Vancouver. With over 200 trolley-electric and battery-electric buses, and a fully electrified SkyTrain network, TransLink has a substantial fleet that does not generate tailpipe emissions. TransLink has adopted a Low Carbon Fleet Strategy which charts a path to reducing greenhouse gas emissions from transit vehicles by 45% by 2030 and transitioning to a fleet operating entirely on renewable energy by 2050.

5.3.   Support ready access to low carbon fuels for the transportation system

To support the transition to zero-emission vehicles, renewable fuels (such as renewable diesel, hydrogen, renewable natural gas and biofuels) and charging systems will need to be accessible for vehicles of all sizes. This will need to be supplemented by low emission alternatives to conventional fuels, where vehicles are unable to fully transition to zero emissions.

Actions:

5.3.1.   Urgently complete a network of **EV charging** infrastructure for **light-duty passenger vehicles**:

a.   Coordinate with all levels of government to develop a Regional Electric Vehicle Charging Strategy, which evaluates the availability of charging infrastructure to support the transition to electric vehicles and considers options for filling identified gaps.

b.   **[EQUITY ICON] [RECONCILIATION ICON]** Prioritize the development of incentive or loan programs or regulatory changes (such as EV-readiness requirements in new buildings) to support charging infrastructure in: low income communities; Indigenous communities; and in rental apartments, secondary suites and subsidized housing.

c.   Rapidly develop a public network of vehicle charging stations that support taxis, ride hailing, and shared mobility vehicles.

d.   Expand the availability of electric vehicle charging in residential, commercial, industrial, and institutional buildings.

e.   Work towards regional standards for electric vehicle charging, including design standards, data and communications protocols, and vehicle connectors. Standards will allow for more efficient interoperability and a better user experience.

  f. Develop a coordinated approach for deployment of standard electric vehicle charging infrastructure, maintenance, and storage facilities for shared AV fleets.

5.3.2. Develop a robust network of **EV charging** and **zero-emission refueling** infrastructure for **commercial** freight and work vehicles and transit buses, including:

  a. Develop a Zero-Carbon Refueling Strategy to support refueling and charging infrastructure for commercial vehicles, in particular medium and heavy-duty trucks and buses, and agricultural equipment. Include identifying where refueling stations are needed for different fuels including electricity, hydrogen, renewable diesel, and others, especially along freight routes identified in Action 2.2.3. Consider opportunities to leverage public investment in bus charging infrastructure for commercial vehicle use.

  b. Establish incentives (including loans, tax credits, grants) for purchasing, leasing and piloting refueling or charging infrastructure for zero-emission freight vehicles and agricultural equipment.

  c. Explore the viability of sharing public fast-charger access between heavy commercial vehicles.

  d. Establish incentives to support charging infrastructure in existing commercial, institutional and industrial buildings, and EV-readiness requirements in developments.

5.3.3. Continue to decrease the **carbon intensity** of transportation fuels, through increasing the stringency of the BC Low Carbon Fuel Standard and the Federal Clean Fuel Standard, per direction in the *Climate 2050 Transportation Roadmap*.

5.3.4. **[RESILIENCY ICON]** Enable access to renewable **biofuels** for this region through strategic investments locally and abroad.

5.3.5. Work with BC Hydro to ensure sufficient and stable **renewable power** to support the mass transition to **electric mobility**, including:

  a. **[RESILIENCY ICON]** Exploring measures to encourage off-peak vehicle charging to reduce pressure on the grid.

  b. **[RESILIENCY ICON]** Supporting the growth of a diversity of renewable power sources, including locally distributed power generation.

  c. **[RESILIENCY ICON]** Exploring vehicle-to-grid capabilities which could provide peak load leveling and backup power in the event of disruptions.

5.4. Account for and reduce upstream and downstream emissions in the transportation system

Beyond the operation of transportation, emissions are also generated from the construction, maintenance, and end-of-life management of infrastructure. This includes indirect emissions result from raw materials extraction, manufacturing, or processing, transportation, and end-of-life management of transportation infrastructure and assets, including roadways and other public assets, private and public vehicles and fuels and energy. Concrete——widely used in transportation infrastructure — is particularly carbon-intensive and accounts for eight percent of global greenhouse gas emissions and can account for up to 92%[12] of the lifecycle emissions of major transportation projects. These actions aim to account for and minimize these upstream and downstream emissions.

Actions:

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[12] refers to a 30-year lifecycle. *RTS GHG Estimation Methods and Results by Steer. January 15 2020*

5.4.1.   Incorporate **lifecycle greenhouse gas emissions into business cases** for major transportation investments in this region.

5.4.2.   Establish a **carbon value** that reflects current scientific consensus of the price per tonne of greenhouse gas emissions needed to reach Provincial and regional greenhouse gas reduction targets and incorporate that carbon value into business cases for major transportation investments and significant program or policy decisions in this region.

5.4.3.   Leverage public sector buying power to establish **sustainable procurement** standards that stimulate innovation towards low- or zero-emission transportation products and services.

5.4.4.   Use **lifecycle greenhouse gas emissions assessments** as a basis for advocating to senior levels of government or internationally for measures to reduce upstream emissions.

Part F: Making It Happen: Strategies for Implementation

The foundations of past regional transportation planning in Metro Vancouver have been strong coordination with regional growth management, an integrated approach to considering all transportation modes together and holistically, a geographic comprehensiveness within a coherent "commuter-shed", and the ability to manage regional services at the regional level collaboratively across different levels of government.

These elements have been a hallmark of the region's success over the past two decades. But the continued growth of the region and our neighboring communities, the quickly evolving marketplace of new mobility services and technologies, and the connection of transportation with reconciliation, social equity, and resilience mean that the long-standing foundational elements described above are both more important than ever and will need to be bolstered to prepare us for the next 30 years.

The implementation strategies in this section build on these foundations in describing how we will plan, make decisions, fund, and organize ourselves to deliver on the goals and targets of Transport 2050.

6. How We Will Plan and Make Decisions

These actions describe the principles that guided the development of Transport 2050, and that we will adhere to in implementing the strategies and actions.

6.1.   Act with urgency

We will elevate and accelerate work on policy areas where near-term actions are crucial — in particular in responding to the climate emergency, supporting Indigenous reconciliation and addressing social inequity. We acknowledge that some longstanding regional concerns have not been addressed holistically and will act for purposeful change moving forward. We will work to harness the windows of opportunity to act quickly on urgent issues by focusing resources in the next five years through policy, regulatory and investment decisions.

6.2.   Prepare for uncertainty

We will prepare for change, uncertainty, and risk through proactive solutions that value adaptability, innovation and resiliency. We recognize today's decisions cannot fully account for changes that region will experience in the future. In response, we will prioritize actions that not only benefit today's transportation system but also are flexible and adaptable to make us resilient against a range of possible futures. We will also use comprehensive performance monitoring to track progress relative to desired outcomes and drivers of change.

6.2.1.   Update the **Regional Transportation Strategy** every five years to:

- a.   Incorporate feedback from comprehensive regional transportation monitoring, as outlined in Part G.
- b.   Consider new actions to address changing conditions, as needed.
- c.   Coordinate with updates to the Regional Growth Strategy.
- d.   Incorporate deepening understanding of shocks and stresses and new best practices to incorporate resilience.
- e.   Incorporate more detailed analysis from subsequent modal and thematic strategies.
- f.   Incorporate strategies and actions related to reconciliation through on-going engagement with Indigenous Nations.

6.2.2.   Use **scenario-planning** and **exploratory modelling** to test investments and initiatives against multiple plausible, but quite different, futures rather than against a single-point forecast future.

6.2.3.   Prototype, experiment, pilot and **innovate with purpose**.

     a.   Partner with key stakeholders, including disadvantaged individuals and groups, to pilot new solutions, such as mobility technology prototypes and service programs.

     b.   Develop key performance indicators to assess the efficacy of pilot solutions to support regional goals.

     c.   Monitor and evaluate innovative solutions before making them permanent and scaling them up.

     d.   Utilize performance evaluation of pilot solutions to inform decisions for future policies and funding.

6.3.   Be inclusive

We will ensure that transportation planning processes are accessible and inclusive of the people we serve, engaging with the public to identify issues, opportunities, aspirations, and solutions.

6.3.1.   **[EQUITY ICON]** Through engagement with disadvantaged groups and in partnership with local and regional governments and an invitation to Indigenous Nations and groups, develop a **Regional Social Equity Strategy** which establishes principles, objectives, strategies and measures of success to advance a more just, equitable and inclusive region — with a focus on transportation, housing and land use planning. This includes using frameworks that considers individual identities (listed below) that impact an individual's experience of social equity:

- Age
- Developmental diversity
- Disability
- Religion
- Ethnic and racial identity
- Socio-economic class
- Sexual orientation
- National origin and language
- Gender identity

6.3.2.   **[EQUITY ICON]** Update **engagement practices** and establish guidelines for social equity-based engagement approaches to make them more equitable and inclusive of everyone, including:

     a.   Identifying approaches that permit focus on unique community needs.

     b.   Focusing on building relationships through ongoing dialogue with disadvantaged groups.

     c.   Establishing and maintaining advisory bodies such as equity-based working groups, community advisory committees or an ongoing community advisory board, codesign labs.

     d.   Including disadvantaged groups in co-development processes.

     e.   Developing opportunities for regular input outside of formal engagement processes.

     f.   Identifying and removing barriers preventing disadvantaged groups from participating and providing input.

     g.   Identifying various methods and formats for engagement that incorporate practices that are familiar within communities.

     h.   Ensuring diverse representation in written and visual marketing and communications materials.

6.4.   Make evidence-based decisions

We will review, adapt and improve our methods for decision-making and investment choices to advance our region's goals and objectives. Using a structured decision process requires data as well as a clear understanding of values to evaluate key trade-offs between viable solutions. Limited data availability is a challenge that needs to be addressed with new data sources and methodologies. We will rely on both technical and values-based input and perform sound research to support our assessment to select the best possible outcome that achieves multiple objectives. We will ensure evidence is used in a way that reflects our values and priorities by:

6.4.1.   Collect **data** essential to planning, monitoring and evaluating against the desired outcomes of Transport 2050:

a.   Developing a robust regional and cross-jurisdictional transportation monitoring program with shared accountability and oversight and the data infrastructure, systems, resources, governance and management protocols in place to enable efficient and responsible data use and sharing with partner agencies.

b.   Monitoring headline targets and key performance indicators supportive of the goals of Transport 2050, and incorporate these measures into decision-making.

c.   Establishing inclusive performance guidelines for the road and transit systems to assess the effectiveness of investments and guide future investment decisions. These performance guidelines should adhere to strategy 6.4.1.c.

d.   Using real-time data to support planning for transportation infrastructure, as described in strategy 2.3.

6.4.2.   **Incorporate an equity lens into decision-making processes** that asks not just whether a policy or investment works but for whom it works and for whom it doesn't work. This is achieved by:

a.   Developing a **framework for community-based data** and research, including from disadvantaged groups, that outlines values and uses of data. The framework should be co-developed with relevant groups, including processes and data collection.

b.   Updating decision-making processes to include **social equity impact assessments**, which consider equity as a decision-making criterion to help inform prioritization of investments.

c.   Developing an **equity data strategy** that fills gaps in equity data and understanding by collecting demographic data to support social equity in transportation. This data strategy will include data related to personal safety, crime and policing and will consider lived experiences and qualitative data as a valuable evidence to triangulate quantitative data.

d.   Developing an **equity impact model** to understand the effects of decisions on equity.

e.   Adopting best practices for reaching diverse populations using appropriate channels, methods and materials and sharing data back to the community for transparency.

f.   Developing a transparent public-facing tool to explore equity.

6.5.   Ensure transparency

We will ensure our decision-making processes are transparent and accessible to the people we serve. It is our priority for the public to understand the decision-making processes at play. We will achieve this by providing opportunities to hear from and communicate with the public to inform key decisions.

6.5.1.   Publish an **annual progress report and public dashboard** on the implementation status of Transport 2050, including actions on equity and reconciliation.

6.5.2.   **[RECONCILIATION ICON]** Establish information sharing methods with Indigenous Nations and support **ongoing dialogue** on the implementation of Action Plans.

6.5.3.   Establish **open data policies and portals** for key transportation data sets, while adhering to responsible data use principles per 6.7.5.

6.6.   Collaborate with organizations, agencies and partners

We will continue to collaborate with Indigenous organizations, other public agencies, private partners and non-profit community agencies, to deliver a seamless transportation system that embodies the region's values and supports local and regional initiatives. Input and implementation by different levels of government and sectors are required to fully realize the benefits of Transport 2050. Collaboration will ensure local and regional perspectives are considered and solutions that maximize benefits for users are valued.

6.6.1.   Each partner is strongly encouraged to develop **implementation plans** in support of Transport 2050. These plans may include costing, potential funding sources, prioritization and phasing of initiatives, implementation targets, and roles and responsibilities.

6.7.   Channel private sector innovation towards achieving public benefits

We will work to ensure decisions and innovations prioritize benefit for the general public and in support of regional goals. We will continually evolve by being open, creative, and nimble and by purposefully exploring new solutions and where suitable, channeling them to maximize regional benefits. We recognize the region's transportation system includes various public and private services and interests that are reflective of different priorities and values. Through partnerships, collaboration, and engagement, we will strive for all services and decisions, including implementation of new mobility technologies, to be guided by public benefit.

In particular, the move to more heavy reliance on digital technology needs to be accompanied by measures to improve equity, privacy, transparency and accountability while still leaving opportunities to leverage the significant potential public benefit from big data and artificial intelligence-powered products. This approach is in contrast to the current trends being advanced by "**surveillance capitalism**" firms to actively undermine transparency, privacy, and individual autonomy.

6.7.1.   Develop a **legislative framework to support Mobility-as-a-Service (MaaS)** for both passengers and freight — allowing mobility providers of all sizes and all sizes of marketing budgets to compete on price and service quality, rather than on market capture and monopolistic powers.

6.7.2.   Establish or identify a regional or Provincial entity to function as an **urban data trust**, responsible for managing the mobility data warehouse (or "mid-layer") including:

a.   Receiving real-time standardized mobility data via API from all mobility service providers licensed to operate in the region.

b.   Auditing and validating that data.

c.   Consolidating the sharable read-write data on vehicle availability, location, capacity, price, and booking for all transportation services and making it available via API to any licensed third-party aggregator in order to enable an open and competitive ecosystem of third-party aggregator apps offering trip planning, booking, and payment for all services from a single interface.

6.7.3.   Establish a regional **Transport System Manager** function with the ability to license/permit a broad range of mobility service providers for operation in the region. A regional approach is intended to provide a simplified one-stop shop for industry, prevent a patchwork of local regulation, maintain a level playing field for open, fair, competition, establish consistency in requirements across mobility industry sectors (such as data requirements), support service provision to underserved communities, including providing incentives to industry to achieve equity goals, and be nimble enough to respond and adapt to new technologies and business models that could come into play in this region over the next 30 years.

6.7.4.   Require mobility service providers licensed or permitted to operate in this region to **share real-time mobility data** via API with the urban data trust for the purposes of:

a.   Retrospective planning analysis and forecasting input.

b.   Auditing and enforcement of license terms and conditions in support of regional and local objectives.

c.   Dynamic system management.

d.   Enabling an open and competitive Mobility-As-A-Service ecosystem.

6.7.5.   Require all proposed digital innovations described throughout *Transport 2050* be consistent with the approach to **responsible data use** and in accordance with BC Privacy Commissioner guidance.

6.7.6.   Pursue a **people-first technology approach** for transportation system elements that features:

a.   Transparent and easy to read terms and privacy policies for any service asking to use personal data.

b.   Data traceability, enabling everyone who consents to share data with a service to be able to easily trace where it goes and how it's used in plain and accessible language.

c.   Collaborative and decentralized machine learning that focuses on privacy and anonymity by not centralizing user data with a single large platform company.

d.   Result traceability and algorithm testing that explains how AI predictions were made, in order to help fix biased results.

SIDEBAR: What is surveillance capitalism? Where digital and smart city innovations are introduced to extract and accumulate personal data in order to predict and control human behavior as a means to maximize revenue and market control.

6.8.   Balance multiple demands for limited space

Achieving our ambitious goals for 2050 will require rethinking and evolving how we use our streets. Priorities for pedestrian, cycling, transit, goods movement, and driving will need to be considered and reconciled along corridors where important needs for these different modes have been identified and overlap.

In corridors that are constrained and there is not sufficient road space to accommodate all needs, prioritizing the movement of people and goods means that, as compared to today's approach, we will need to give greater consideration to needs related to walking, cycling, transit, and goods movement over that of general purpose traffic that is significantly comprised of single-occupant vehicles. When and where different modes receive greater consideration will be influenced by land use context and the role a street segment plays to the overall functioning of each modal network.

6.8.1.   For areas of the street dedicated to mobility, apply the following **space allocation and prioritization principles** when people using multiple different modes of transportation — including walking, rolling, cycling, transit, light-duty personal cars and commercial vehicles of all sizes — are vying for space on a particular street that is too narrow to accommodate all interests at all times:

a.   Urban Centres and Frequent Transit Development Areas are the places where we give greater priority to walking, cycling and transit and have greater tolerance for slower speeds of travel for general purpose traffic, while maintaining access for commercial vehicles.

b.   Between Urban Centres and Frequent Transit Development Areas, along **frequent transit** corridors, or on corridors where high levels of **transit passenger delay** are experienced, we give greater priority to transit.

      c.   Along Major Bikeway Network corridors we strive to provide bikeways that are comfortable for most people to use. If space is constrained on a street and there are no opportunities to establish a bikeway on a parallel street, then we give greater priority within those space constrained streets to establishing critical cycling connections to create a useful, connected cycling network.

      d.   For key connections to and within manufacturing and industrial areas, we give greater priority to goods movement.

6.8.2.   Develop a more detailed **streets management framework** that considers land use and different modal networks — including walkways, bikeways, transit, and driving people and freight — and assess relative modal priorities for each street segment in the region in ways consistent with the goals of Transport 2050. This framework will help to reconcile overlapping priorities where specific street segments have both limited space in the right-of-way and high importance for multiple networks.

7. How We Will Fund

Delivering the vision and goals of Transport 2050 will require funding. This section speaks to the need for developing sustainable funding sources for transportation in this region which supports the goals and values of *Transport 2050.*

7.1.   Align funding with regional values

We will ensure transportation funding sources reflects our regional values (as outlined in the Transport 2050 Goals) in which inequities and unaffordability are not exacerbated, access to transit is supported, private benefit from public investment are recaptured for public benefit, and there is a balance of contributions from usage fees and from taxes to ensure stable and resilient revenue.

7.1.1.   Examine funding sources for transportation in the region that **capture the value of public investment** in transportation to different beneficiaries.

7.1.2.   Update existing funding sources and establish new sources that **advance regional goals and objectives**, and monitor the impacts of funding sources on regional objectives.

7.1.3.   Balance the use of gas and carbon tax to **address urgent climate change needs** in the near term, while transitioning to a longer-term funding source for transportation as fossil fueled vehicles are phased out of use.

7.1.4.   Per strategy 3.3, ensure that transportation funding sources balance goals such as emissions reductions and demand management with consideration of ability to pay.

7.1.5.   Make **efficient and effective investment decisions** that make the best use of public dollars

    a.   Reduce future capital, operation and maintenance funding burdens by supporting land use patterns that minimize distances and trips. (see *list of land use actions*).

    b.   Prioritize investment and improvements in modes that **increase cost efficiency** in meeting regional goals.

    c.   **Factor full life-cycle costs** (including operations, maintenance and upstream and downstream greenhouse gas emissions) into transportation infrastructure decisions, to ensure prioritization of infrastructure that is most cost-efficient and financially sustainable over the long-term, relative to person throughput. (see also action 5.4.1 and 5.4.2).

8. How We Will Organize Ourselves

Establishing effective governance, relationships, and organizations is essential to achieving the ambitious actions outlined in *Transport 2050*.

8.1.   Collaboration with Indigenous Nations

We will work with Indigenous Nations and regional partners to ensure the implementation of Transport 2050 adheres to the implementation of both UNDRIP and the DRIPA Action Plan. This will include support for inclusive regional governance processes that will be required to implement the strategies and actions identified as priorities through the Transport 2050 Indigenous Advisory Council (IAC).

Through the Transport 2050 IAC, we have consistently heard from non-treaty Indigenous Nations that an enhanced and well-defined role in governance and representation in decision-making are key interests. Through ongoing engagement with Indigenous Nations and partners, on the implementation of Transport 2050, the role of Indigenous Nations in the governance will be further defined.

8.2.   Build inclusive workplaces and organizations

Diversity within transportation organizations at all levels is critical to meeting the needs of the region and the communities we serve. In order to effectively understand equity challenges that many people in this region face, the transportation industry needs to reflect the broad ranging and diverse communities it serves. This section contains actions to advance inclusion in the transportation sector.

8.2.1.   Work collaboratively and within public agencies to increase social **equity, diversity, and inclusion** in areas such as:

   a.   Hiring and recruitment

   b.   Retention, promotions, and career development

   c.   Discipline and separation

   d.   Diverse and equitable leadership

   e.   Organizational culture

   f.   Providing equity, diversity and inclusion (EDI) training for everyone involved in the planning and implementation of transportation in this region

8.3.   Align governance frameworks with the needs of tomorrow's transportation system

As the region embarks to implement the strategies and actions in T2050, we will likely need to introduce new mechanisms and structures of oversight and governance to address emerging priorities (such as a growing region, new technologies, and new business and service delivery models) and the policy integration we are seeking for issues such as equity, affordability and resilience.

8.3.1.   Establish a collaborative mechanism (such as a task force, special purpose panel or policy makers forum) to initiate local, regional and provincial conversations addressing the evolution of regional transportation governance. Provide this task force with a mandate to report on options to modernize regional transportation mandate, authorities and structures to best govern for the strategies of Transport 2050. The following principles would guide the work:

   a.   The scale of the planning or policy issue (local, regional, provincial) should drive the decision-making structures and mandate responsibilities.

   b.   Authorities and tools should be provided to enable fulfillment of mandate responsibilities.

Part G: Roles & Responsibilities: What Commitments Are Required — By Whom?

The broad range of strategies and actions set out in Part E and Part F represent a comprehensive picture of what is needed to achieve the goals and targets of Transport 2050. Success will require unprecedented levels of cooperation and coordination of many different partners across the region from governments to the private sector to community organizations. Because the strategies and actions are interdependent, it will be important that each group be able to act with confidence that the other partners are committed to parallel supporting actions.

For **local governments**, the most important actions are to make changes to local community plans and zoning in order to shape the nature and location of growth within the region, consistent with Metro 2050. In addition, the local walkways, bikeways, streets, and curbsides for which they are responsible will need to be designed and managed in new ways consistent with the goals, targets and frameworks outlined in Transport 2050.

For **Metro Vancouver**, the most important actions are to support implementation of the transit-oriented regional growth concept in Metro 2050, including directing as much future growth as possible to Urban Centres and Frequent Transit Development Areas, supporting an abundant supply of transit-oriented affordable housing; expanding access to a quality network of regional parks and greenways; and managing and regulating air contaminants in the region, including greenhouse gases from transportation.

For **TransLink**, in addition to its role as regional transportation authority in providing an overarching framework in the form of Transport 2050, the most important actions are to ambitiously expand and accelerate regional investment in walkways, bikeways, and transit service; to co-facilitate and co-fund an ambitious reimagining of our region's streets including moving quickly to coordinate and fund significant transit priority measures and dedicated transit lanes across the Fast & Reliable Transit Network; to develop capabilities as a Transport System Manager operating a real-time mobility management system; and to help coordinate the diverse efforts needed to make this Strategy a reality.

For **Indigenous Nations**, the key interests shared through the Indigenous Advisory Committee included representation in governance, inclusion in decision-making, on-reserve transportation options, safe, well-lit and accessible bus shelters, improved access to employment, provision of on-reserve mobility assisted transit services (HandyDart), engagement in early transit systems planning and environmental protection. TransLink committed to building stronger business relationships with Indigenous Nations and working with partners, where applicable, to determine transit priorities and actions.

For the **Province of B.C.** the most important actions are to continue to develop the Provincial transportation system consistent with the aspirations of the region as outlined in Transport 2050, Metro 2050 and Climate 2050; supporting and co-funding the Fast & Reliable Transit Network as outlined in this Strategy, including by providing the region with revenue tools; to introduce policy measures and incentives to accelerate the decarbonization of the light-duty vehicle fleet; and to lay the digital infrastructure and regulatory foundations needed to effectively manage the automated, connected, electric and shared transportation system of tomorrow.

For the **Government of Canada**, the most important actions are to commit to supporting and co-funding the Fast & Reliable Transit Network as outlined in this Strategy; introducing thoughtful regulations to manage the arrival of automated vehicles; and to introduce policy measures and incentives to accelerate the decarbonization of the entire transportation sector.

ROLES AND RESPONSIBILITLIES

The following table identifies the potential role of each partner in working together to implement the strategies and actions within *Transport 2050*. These tables have been developed based on existing roles and responsibilities

for each topic area; however, as these actions evolve over time, these roles could also change, and therefore these tables should be treated as a suggested starting point only to demonstrate continued collaborative efforts. For some actions, which are particularly nascent, roles and responsibilities have not been identified; instead a note is provided to explore governance for these future-oriented initiatives. The table covers all strategies and actions — none has been omitted.

Translink will work with Indigenous Nations to understand their interests and priorities (e.g. transportation options for the community). Action plans will be developed to guide the shared implementation of the appropriate strategies and actions. The Plans will be shared directly with the Indigenous Nations.

Legend	
●	Indicates some role or responsibility to implement consistent with the descriptions on the previous page.

Actions	Short description	Local Govt	TL	MV	Prov (incl. Crown Corps)	Federal (incl. Crown Corps)	Private Sector / Community Orgs / Academia
1.1 Make active transportation the most convenient choice for shorter trips.							
1.1.1	Complete communities	●	●	●	●		
1.1.2	Walkable neighbourhood street networks	●					
1.1.3	Walkways	●	●	●	●		
1.1.4	Bikeways	●	●	●	●		
1.1.5	Shared micromobility	●	●		●		●
1.2 Make transit the most convenient choice for longer trips							
1.2.1	Transit-oriented regional growth	●	●	●	●		
1.2.2	Accessible, equitable, and inclusive transit system	●	●		●		
1.2.3	Frequent local fixed-route bus service	●	●				
1.2.4	Major Transit Network	●	●	●	●		
1.2.5	Express transit connections	*Requires further discussion on future governance*					
1.2.6	Demand-responsive transit service	●	●				●
1.3. For those who need to drive, help make it convenient and accessible							
1.3.1	Parking, pick-up and drop-off, and loading / unloading spaces	●	●		●		●
1.3.2	Network of local streets	●	●				
1.3.3	Network of regional roads	●	●		●		
1.3.4	Consistent truck route designation	●	●		●		●
1.3.5	Separated highways		●		●	●	
1.3.6	Shared vehicles	●	●				●
1.4 Provide many different choices conveniently together in one place.							
1.4.1	Mobility hubs	●	●		●		●
1.4.2	Convenient deliveries	●	●				●
1.4.3	Mobility-As-A-Service	*Requires further discussion on future governance*					
1.4.4.	Digital services	●			●	●	●
1.4.5	Telecommute		●				●
2.1 Make transit more reliable							
2.1.1	Transit priority	●	●		●		
2.1.2	Dedicated transit lanes	●	●		●		
2.1.3	Transit priority measures	●	●		●		

Actions	Short description	Local Govt	TL	MV	Prov (incl. Crown Corps)	Federal (incl. Crown Corps)	Private Sector / Community Orgs / Academia
2.1.4	Management and enforcement to minimize transit delay	●	●		●		
2.1.5	Transit priority planning and design		●		●		●
2.2. Make goods movement more reliable							
2.2.1	Land use needs of goods movement, industry and agriculture	●	●	●	●		●
2.2.2	Consolidation of goods and deliveries						●
2.2.3	Road capacity	●			●		●
2.3 Make driving and parking more reliable							
2.3.1	Urban data trust	*Requires further discussion on future governance*					
2.3.2	Dynamically manage curbspace	●	●				
2.3.3	Dynamically management of AVs and other road users	*Requires further discussion on future governance*					
2.3.4	Inform real-trip trip choices		●		●		●
2.3.5	Integrated pricing and fares between mobility providers.	*Requires further discussion on future governance*					
2.3.6	Commute trip reduction programs	*Requires further discussion on future governance*					
2.3.7	TDM programming	●	●				
2.3.8	TDM in multi-family and commercial buildings	●	●				●
2.4 Maintain transportation infrastructure in a state of good repair.							
2.4.1	Monitor asset condition	●	●		●		
2.4.3	Sufficient and timely funds for state of good repair	●	●		●	●	
3.1 Make living close to frequent transit more affordable.							
3.1.1	Rental housing adjacent to transit	●	●	●	●		●
3.1.2	Land speculation	●	●		●		●
3.1.3	Parking management	●	●	●			
3.1.4	Community-serving retail	●	●	●			
3.2. As a priority, invest in the most cost-effective and most affordable modes							
3.2.1	Transit service and active transportation in low-income areas	●	●		●		
3.2.2	Bicycles and micromobility devices at low cost.	●	●				●
3.2.3	Secure bike charging and parking in multi-family and rental buildings	●					
3.2.4	Subsidies for electric vehicles, e-bikes and bikes for low income individuals				●		●
3.3 Ensure that transportation taxes and fees are affordable for everyone							
3.3.1	Funding for transportation system	●	●	●	●		
3.4 Help people and businesses connect to more economic opportunities							
3.4.1	Access to local shopping	●			●		
3.4.2	Access to local jobs	●	●	●	●		
3.4.3	Access to markets, suppliers, customers and workers.		●		●		
3.4.4	Agricultural sector	●		●	●		
3.4.5.	Thriving transportation workforce		●		●		
3.4.6.	Just transition for transportation workforce		●		●		

Actions	Short description	Local Govt	TL	MV	Prov (incl. Crown Corps)	Federal (incl. Crown Corps)	Private Sector / Community Orgs / Academia
3.4.7.	Piloting and innovation		●	●	●	●	●
4.1. Eliminate traffic fatalities and serious injuries							
4.1.1	Speed limits	●			●		
4.1.2	People-first streets	●	●				
4.1.3.	People-first street typology	●	●				
4.1.4	Prioritize protection for road users with least physical protection	●	●		●		
4.1.5	Active transportation facilities	●	●	●	●		
4.1.6	Micromobility networks	●	●				
4.1.7	Vibrant, comfortable, inviting and inclusive public spaces	●	●	●			
4.1.8	Training and awareness for drivers		●		●		●
4.1.9	Traffic enforcement	●	●		●		
4.1.10	Commercial vehicle safety inspections		●		●		●
4.1.11	Advanced Drivers Assistance Systems (ADAS)		●		●	●	●
4.1.12	Deployment of AVs	*Requires further discussion on future governance*					
4.2. Ensure everyone feels welcome, comfortable, and physically secure while getting around.							
4.2.1	Wayfinding	●	●		●		
4.2.2	Room to move and sit on transit		●				
4.2.3	Comfortable transit experience		●				
4.2.4	Welcome and secure on shared transportation and transit	●	●		●		●
4.2.5	Community-based approach to community safety	●	●		●		●
4.2.6	Training for walking, cycling, transit skills		●				●
4.2.7	Art, design, landscape and cultural recognition	●	●		●		
4.3. Minimize transportation's adverse impacts on local communities							
4.3.1	Health and environmental impact assessments	●	●		●		
4.3.2.	Air emissions			●	●	●	
4.3.3	Water pollution	●	●	●	●		
4.3.4	Tree canopy and greenery	●	●	●	●		
4.3.5	Noise from road-based transportation	●	●		●		
4.3.6	Noise from rail-based transportation		●		●		●
4.3.7	Reduce neighborhood partition and social isolation	●	●	●			
4.4 Safely respond to and recover from disruptions and disasters							
4.4.1	Emergency and business continuity plans	●	●		●		
4.4.2	Emergency response trainings	●	●	●	●		●
4.4.3	Emergency operations framework	●	●	●	●		●
4.4.4.	Community-based approach to community safety	●			●		●
4.4.5	Critical infrastructure interdependencies	●	●	●	●		
4.4.6	Transportation resiliency strategy	●	●	●	●		
4.4.7	Capacity to adapt to shocks	●	●		●		
4.4.8	State of good repair	●	●		●		
5.1 Reduce the energy requirements of the transport system							
5.1.1.	Energy efficient modes	●	●		●		●

Actions	Short description	Local Govt	TL	MV	Prov (incl. Crown Corps)	Federal (incl. Crown Corps)	Private Sector / Community Orgs / Academia
5.1.2	Energy efficient cities	●		●	●		
5.1.3	Smaller, zero-emission freight vehicles	●	●		●		●
5.2 Transition to zero-emissions vehicles							
5.2.1	Access to micromobility	●	●		●		●
5.2.2	Electrification of light-duty passenger vehicles.				●	●	●
5.2.3	Low/Zero emissions medium- and heavy- duty vehicles	●	●		●	●	●
5.2.4	Carbon pricing	●			●	●	
5.3. Support ready access to low carbon fuels for the transportation system							
5.3.1	EV charging network for light-duty vehicles	●	●		●	●	●
5.3.2	EV charging and zero-emissions refueling infrastructure for commercial vehicles	●	●	●	●	●	●
5.3.3	Carbon intensity of fuels			●	●	●	
5.3.4	Renewable biofuels				●	●	●
5.3.5	Renewable power for electric mobility		●		●	●	●
5.4 Account for and reduce upstream and downstream emissions in the transportation system							
5.4.1	Lifecycle GHG into business cases	●	●		●		
5.4.2	Carbon value for decision-making	●	●	●	●		
5.4.3	Public sector sustainable procurement	●	●	●	●	●	
5.4.4	Upstream emissions		●		●	●	

Part H: Outcomes & Performance Monitoring

Transport 2050 intends to evaluate how well each strategy or action performs against each goal target. These indicators will be used to help evaluate against the associated target.

GOAL ONE | Convenient Choices for Everyone
We all have universally accessible choices allowing us to conveniently connect to opportunities without needing to rely on a car such that, by 2050, **active transportation and transit are competitive choices accounting for at least half of all passenger trips, with taxi, ride-hail, and car-share accounting for most of the remaining** passenger trips.
1.1   Make active transportation the most convenient choice for shorter trips • Percent of envisioned bikeway network completed • Percent of envisioned walkway network completed • Walkway/bikeway connectedness score, by traffic zone (nodes/segments ratio) • Percent of trips by walking, rolling, biking, scooters, or electric mobility (by distance, region, overall) • *A walkability index composed of, land use mix, commercial floor area ratio, intersection density, residential density, and sidewalk completeness [Metro 2050]* • *Total and change in number of community services and amenities in Urban Centres and Frequent Transit Development Areas, including, but not limited to, childcare, green space and land use mix [Metro 2050]*
1.2   Make transit the most convenient choice for most longer trips • Annual Service Hours (ASH) of transit by mode/service, total and per capita • Percent of trips by transit (by distance, region, and overall) • Percent of transit stations/stops/services that are universally accessible • *Total and change in trips by transportation mode [Metro 2050]* • *Percent of residents within walking distance of the Major Transit Network [Metro 2050]*
1.3. For those who need to drive, help make it convenient and accessible • Percent of regional light-duty fleet that is shared (e.g., car share, ride-hail) • Percent of regional light-duty fleet that is shared and accessible • Percent of public parking spaces that are priced and/or dynamically priced, on and off street • *Total and per-capita change in the number of actively insured vehicles [Metro 2050]*
1.4   Provide many different choices conveniently together in one place • Percent of trips accessed through mobility-as-a-service (MaaS) apps • Percent of stations/stops with easy connection to non-transit modes, by number of modes

GOAL TWO | Reliable Choices for Everyone
We all have reliable choices that get us where we need to go on time such that, **by 2050, we are all spending 20% less time stuck in congestion compared to today.**
2.1 Make transit more reliable • Percent of Frequent Transit Network (FTN) with bus lanes/all-day bus lanes • Transit travel time on top-20 of corridors • Person-hours of delay • On-time performance (%)
2.2. Make goods movement more reliable • Percent of peak-hour truck VKT on congested corridors • Travel time reliability on designated truck routes
2.3 Make driving and parking more reliable • Percent of peak-hour VKT on congested corridors

• Travel time reliability on Major Road Network
2.4 Maintain transportation infrastructure in a state of good repair
• On-time performance (%)
• Mean distance between failures
• Mean distance between service removals
• Backlog of investment needs ($)

GOAL THREE | Affordable Choices for Everyone

We all have affordable choices allowing us to easily live and move in this region such that, **by 2050, none of us — especially those of us with less wealth and lower incomes — need to spend more than 45% of our household incomes on housing and transport combined.**

3.1 Make living close to frequent transit more affordable
- Percent of housing units within 800M of MTN stops and stations that are affordable
- Percent of regional affordable housing units that are within 800m of MTN stops and stations
- Percent of income spent on housing, by neighbourhood transit accessibility score
- *Percent of regional dwelling unit growth located in Urban Centres, Frequent Transit Development Areas, and Major Transit Growth Corridors [Metro 2050]*
- *Percentage of affordable rental housing in new and redeveloped units in Urban Centres and Frequent Transit Development Areas [Metro 2050]*
- *Percentage of household income spent on housing and transportation expenses across the region and by tenure and income level [Metro 2050]*

3.2. As a priority, invest in the most cost-effective and most affordable modes
- Percent of income spent on transportation, by neighbourhood transit/walking/biking accessibility score
- Investments in cycling, walking, and transit infrastructure, by neighbourhood

3.3 Ensure that transport taxes and fees are affordable for everyone
- Percent of dollars raised for regional transportation linked to ability to pay

3.4 Help people and businesses connect to more economic opportunities
- Percent of employment within 800m of MTN stops/stations
- *Change in people plus jobs per hectare in Urban Centres, Frequent Transit Development Areas, and Major Transit Growth Corridors [Metro 2050]*
- *Percent of regional employment growth located in Urban Centres, Frequent Transit Development Areas, and Major Transit Growth Corridors [Metro 2050]*
- *Total and change in employment by sector in Urban Centres, Frequent Transit Development Areas, and Major Transit Growth Corridors [Metro 2050]*
- *Change in office floor area within Urban Centres, Frequent Transit Development Areas, and Major Transit Growth Corridors [Metro 2050]*
- *Average number of kilometres travelled for commute (region-wide) [Metro 2050]*
- *Average number of minutes travelled for commute (region-wide) [Metro 2050]*
- *Average trip length by transportation mode (region-wide) [Metro 2050]*

GOAL FOUR | Safe & Comfortable Choices for Everyone

We all have safe and comfortable choices that make us all healthier and happier and where we **reduce serious traffic injuries and fatalities by at least 5% annually until we reach zero before 2050.**

4.1. Eliminate traffic fatalities and serious injuries
- Number and percent of collisions resulting in serious injury or death, by demographic group
- Percent of street-kms by speed limit and design speed by typology
- Percent of people walking, cycling and rolling who rate feeling welcome and safe, by demographic group on Customer Feedback Survey

• *Total and per-capita change in annual vehicle kilometres travelled by transportation mode [Metro 2050]*
4.2. Ensure everyone feels welcome, comfortable, and physically secure while getting around
• Number of reported incidents aboard transit
• Percent of people who rate feeling welcome and safe on transit, by demographic group on Customer Feedback survey
4.3. Minimize transportation's adverse impacts on local communities
• Average/maximum decibels along road/rail network
• Number of air quality exceedances of annual objectives attributable to vehicular emissions
• Public realm quality score
• *Change in the percentage of regional total tree canopy cover within the Urban Containment Boundary [Metro 2050]*
4.4 Safely respond to and recover from disruptions and disasters
• Value ($) of transportation assets in identified high-risk areas
• Network redundancy index

GOAL FIVE | Carbon-Free Choices for Everyone
We have many transportation choices which are carbon-free, supporting local and global efforts to tackle climate change such that **by 2030, we have lowered carbon pollution from light-duty vehicles by 65% over 2010 levels; and have eliminated carbon pollution from transport altogether by 2050.**
5.1 Reduce the energy requirements of the transport system
• Total vehicle kilometres travelled, by mode
• Total and per-capita transportation energy consumption
• Percent of land use devoted to driving and parking
5.2 Support cleaner fuels and engines
• Percent of registered light-, medium- and heavy-duty vehicles that are zero or near-zero emissions
• Percent of new light-, medium- and heavy-duty sales that are zero or near-zero emissions
5.3. Support ready access to low carbon fuels for the transportation system
• Number of public Level 2 (or faster) EV chargers
• Percent of parking stalls in multi-unit buildings that have EV charging
• Transportation fuel consumption by fuel type
5.4 Reduce upstream and downstream emissions in the transport system supply-chain
• Total upstream, downstream and operational emissions in the transportation sector
• *Total and change in tonnes of regional greenhouse gas emissions related to land use, buildings, industry, agriculture, waste, transportation, and other emission sources in support of the regional target to reduce greenhouse gas emissions by 45% below 2010 levels by the year 2030 and to achieve a carbon neutral region by the year 2050 [Metro 2050]*

Part I: Glossary of Terms

Ability to pay	The principle that taxes should vary according to an individual's level of wealth or income. This concept could be extended beyond taxes to cover other costs within the transportation system.
Active transportation	Active transportation includes all human-powered forms of travel. Walking and cycling are the most common, but using a wheelchair or other mobility aid, running, scootering, skateboarding, and inline skating are all forms of active transportation. Electric bicycles, electric kick scooters, and other similar forms of personal "micromobility" devices are also considered alongside these purely human-powered forms of travel, and hold the potential to make active travel an option for more people to travel greater distances and "flatten" steep roadways.
Active transportation network	Active transportation networks are composed of paths, walkways, and bikeways
Advanced driver assistance systems (ADAS)	Advanced Driver Assistance Systems (ADAS) are systems developed to automate, adapt, and enhance vehicle systems for safety and better driving. Examples include adaptive cruise control, truck platooning technology, blind spot monitoring, and collision warning and avoidance systems.
Automated vehicles	Fully automated vehicles include cars, buses, trucks, drones, delivery robots, self-parking e-scooters, shuttles, and other vehicles that can perform all the functions of driving without a human operator by using sensors and other technology.
Bikeways	Bikeways is a broad term that encompasses a range of on- or off-street cycling facilities. Examples include painted bike lanes, traffic-protected bike paths, multi-use pathways that may be shared with pedestrians, and neighbourhood street bikeways where people bicycling share space with slow moving vehicle traffic. Bikeways often include pavement markings and signage to make it clear these spaces are meant for the exclusive or shared use of bicyclists.
Bikeway network	The term bikeway network collectively refers to all bikeway segments or corridors that are present in a given area. Ideally, these individual bikeway segments and corridors connect to one another to allow people to travel across the given area. However, often this is not the case, and bikeway networks can be discontinuous or fragmented.
Carbon neutral	Carbon neutral means that the region generates no net greenhouse gas emissions. This is achieved through the deepest greenhouse gas emission reductions possible across all economic sectors, with any remaining emissions balanced out by the carbon dioxide removed from the atmosphere by plants, trees, and soil in the region, or potentially through technological means.
Carpooling	Carpooling involves more than one rider sharing a vehicle. This could be either a privately owned vehicle, or a shared ride in a taxi or ride-hail vehicle. This is different than carsharing, or using vehicles which have shared or public access (non-private).
Carsharing	Carsharing is a membership-based service available to all qualified drivers in a community which allows access to automobiles for personal or corporate use. There are two models of carsharing: 1) Two-way carsharing: Requires the user to return the car from the same location where it was picked it up.	Adapted from Carsharing Association.

	One-way carsharing: Allows the user to pick up an available car from any location within a defined service area, and return it at any other location within the defined service area.	
Community-based approach	Approach in which communities have an active role and participate in highlighting and addressing the issues that matter to them.	Sourced from FASD Evaluation
Community-serving retail	Small-scale stores located in public spaces that are accessible by foot or public transit, and which provide goods and services appropriate for the daily needs of the neighboring residents.	
Commuter-shed	A commuter-shed is the territory adjacent to a metropolitan area that has a high degree of social and economic integration with the core as measured by commuting ties.	Adapted from https://www.newgeography.com/content/004965-americas-largest-commuter-sheds-cbsas
Compact communities	Compact communities are designed in a way that preserves more open space and makes more efficient use of land and resources. Compact communities are an essential ingredient to complete communities. Compact and complete communities are walkable, mixed use, and transit-oriented places where people can live, work, and play at all stages of life. These communities enable most people to have close access to a wide range of employment, health, social, cultural, educational, and recreational services and amenities.	
Compact urban forms	Please refer to "compact communities"	
Complete communities	Complete communities are walkable, mixed use, and transit-oriented places where people can live, work, and play, at all stages of their lives. Compact and complete communities enable most people to have close access to a wide range of employment, health, social, cultural, educational and recreational services and amenities	Sourced from draft Metro 2050 Plan
Connected vehicles	A vehicle which has the ability to communicate with other vehicles or infrastructure. Depending on features it has installed, a connected vehicle may be able to communicate with: - its occupants, such as through their mobile devices -with other vehicles and road users -with the surrounding transportation infrastructure, such as roadways and traffic lights -Internet based applications and other entities	Adapted from Transport Canada
Conventional services	Conventional transit services include bus, ferry (SeaBus), and rail (SkyTrain, Canada Line, and West Coast Express). Other services, such as Access Transit services are not included.	
COVID-19	An infectious disease caused by a coronavirus discovered in 2019.	
Critical infrastructure interdependencies	When the assets that are essential for the functioning of a society and economy of a country are interconnected and mutually dependent in many ways, both physically and through a series of communications and information technologies. These assets can include utilities, government services, agriculture, and other fundamental systems and services.	Adapted from the Office of Scientific and Technical Information (OSTI) of the Department of Energy
Custom transit services	Door-to-door transit services, such as HandyDART, for people whose mobility needs make it difficult for them to use conventional transit	
Cycling network	Please refer to "bikeway network".	
Dedicated transit lanes	Dedicated transit lanes are a portion of the street designated by signs and or markings for the preferential or exclusive use of transit vehicles, occasionally permitting limited use by other vehicles. Dedicated transit lanes are typically not physically separated from other traffic.	

Demand management	Please refer to "transportation demand management"	
Demand responsive transit	Demand-responsive transit plays a supporting role to meet the needs of those people who can't safely navigate the conventional transit system without assistance. Or — in some limited cases — to provide service in times and places with insufficient demand to warrant fixed-route service.	
Development contribution expectation	Policies in conjunction with interim rezoning policies intended to limit land value speculation in areas undergoing community planning.	Sourced from City of Vancouver
Digital access	Digital access is the ability to fully participate in digital society. This includes access to tools and technologies, such as the Internet and computers, that allow for full participation.	Sourced from http://laurabiancoedtech.weebly.com/digital-access.html
Digital connectivity	Digital connectivity refers to the network of wireless, wired and satellite technologies that drive all aspects of smart and future cities. It is a key component of modern economies and societies.	Adapted from the UNDP Global Centre for Technology, Innovation and Sustainable Development
Digital infrastructure	Digital infrastructure comprises the physical resources that are necessary to enable the use of data, computerised devices, methods, systems, and processes. Digital infrastructure has become indispensable to the functioning of society and the quality of life of its citizens.	Sourced from https://www.designingbuildings.co.uk/wiki/Digital_infrastructure
Disadvantaged individuals or groups	Groups or individuals who are disadvantaged because of race, colour, ancestry, place of origin, physical or mental disability or sex.	Sourced from Government of BC- BC Laws
Downstream emissions	Downstream emissions are emitted after a product or service leaves the company's control/ownership.	Sourced from https://www.goldstandard.org/sites/default/files/documents/draft_-_scope_3_best_practices_v1.5.pdf
Drayage	Drayage is the transportation of rail or ocean freight by truck to an intermediate or final destination; typically a short distance (e.g., from marine port to warehouse).	
Dynamically managed curbside	The use of technology to aggregate data sources from parking meters and different modes of transportation to adjust allocation or access cost of curb space based on planned or observed demands.	
E-commerce	The act of conducting business transactions that include selling information, services, and goods by means of computer telecommunications networks.	Adapted from Britannica.
E-health	The use of digital technologies and telecommunications, such as computers, the Internet, and mobile devices, to facilitate health improvement and health care services.	Adapted from Britannica.
E-learning	A form of education which uses various technologies to facilitate student-teacher and student-student communication.	Adapted from Britannica.
Electric vehicles (EV)	A generic term that usually includes any vehicle that plugs into an external electrical source, including both Battery Electric Vehicles that use only electricity; and, Plug-In Hybrid Electric Vehicles, that primarily use a battery but have an on-board gasoline engine to extend range. 'EV' does not usually refer to more traditional 'hybrid' vehicles that do not obtain electric power from an external source.	Sourced from City of Vancouver

Electric vertical take-off and landing vehicles (eVTOLs)	An electric vertical takeoff and landing (eVTOL) aircraft that uses electric power to hover, take off, and land vertically, oftentimes referred to as "drones".	
Express transit	Express transit provides fast and reliable service over longer distances both within and across regional boundaries. Travel times that are as fast or faster than driving are achieved by routing that is direct and largely separated from traffic.	
Family of Services	Refers to a collection of transit services that work together. Typically used in reference to the opportunity for people with disabilities to use a combination of fixed-route transit (e.g. SkyTrain, bus) and custom transit services (e.g. HandyDART) to meet their travel needs.	
Fine-grained networks	Please refer to "Street Network Granularity"	
Freeways	Also referred to as "separated highways" are a divided primary highway built for through traffic (as opposed to local traffic access) with two or more lanes in each direction of travel. These lanes are accessible via interchanges only.	Sourced from the Ministry of Transportation and Infrastructure.
Frequent transit	Frequent transit supports spontaneous trips, without needing to refer to a schedule. In the future, transit vehicles along frequent transit routes could be expected every 12, 10 or even 5 minutes as a minimum.	
Frequent Transit Development Areas (FTDAs)	Frequent Transit Development Areas (FTDAs) are intended to be additional priority locations to accommodate concentrated growth in higher-density forms of development. They are identified by Metro Vancouver member jurisdictions and located at appropriate locations within the Major Transit Growth Corridors. FTDAs complement the network of Urban Centres, and are characterized by higher-density forms of residential, commercial, and mixed uses, and may contain community, cultural and institutional uses.	
Gateway	The Greater Vancouver Gateway is a system of transportation infrastructure serving international trade in British Columbia's Lower Mainland. It is comprised of Port Metro Vancouver, Vancouver International Airport, various rail and truck intermodal facilities, US border crossings and a set of rail and highway links that connect those facilities with each other and the rest of BC and Western Canada.	Sourced from Greater Vancouver Gateway Council
Gentrification	A process in which a poor area (as of a city) experiences an influx of middle-class or wealthy people who renovate and rebuild homes and businesses and which often results in an increase in property values and the displacement of earlier, usually poorer residents.	Sourced from Merriam-Webster.
Goods	Goods are products, materials, or services. 'Goods' thus include physical products that we use or consume (e.g., food, gasoline, furniture, or clothing), materials that are used to make other things (fabric, rubber, lumber, precious metals, etc.), and services that a person provides as his or her job (for example, plumbing, carpet cleaning or computer repairs).	
Grade-separated	Grade separated refers to the vertical separation of transportation modes. This may refer to elevated or tunneled infrastructure that physically separates its operation from other users. Elevated SkyTrain sections, tunneled SkyTrain sections and railway bridges over streets are examples of grade separation in the Metro Vancouver Region.	
Green Waves	A green wave occurs when a series of traffic lights (usually three or more) are coordinated to allow continuous traffic flow over several intersections in one main direction.	Sourced from Wikipedia.

Greenhouse Gas (GHG)	Greenhouse gases are pollutants released into the air that increase the warming effect of the sun's radiation. Some greenhouse gases occur naturally in the atmosphere; others result from human activities such as fossil fuel combustion and land use changes. Greenhouse gases include: carbon dioxide (CO_2), methane (CH4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).	
Grid network	In the context of transit, a grid network is characterized by parallel routes serving common destinations. This approach to network design increases network connectivity and provides customers with a greater range of trip planning options	
Gridlock	Form of traffic congestion where continuous queues of vehicles block an entire network of intersecting streets, bringing traffic in all directions to a complete standstill.	Sourced from Wikipedia.
Heavy Duty Vehicles (HDV)	Heavy Commercial Vehicles (HCVs) are "heavy trucks" or "trucks", including straight trucks (single unit) that have3 or more axles or weigh 15 metric tonnes or more, and tractor semi-trailer combinations. Heavy trucks , or simply "trucks" is the colloquial reference to heavy commercial vehicles (HCVs) and isused interchangeably with the term HCV throughout this document.	
High Streets	The main street of a town or neighbourhood that is a focal point for businesses, shopping and civic amenities.	
Inclusion	The practice or policy of providing equal access to opportunities and resources for people who might otherwise be excluded or marginalized, such as disadvantaged groups (see disadvantaged groups).	Adapted from Dictionary.com.
Interoperable Services	Interoperability is generally defined as the ability of two, or more, transport systems to operate effectively and efficiently together to fulfil consumers' requirements of a transport system.	Sourced from article in Journal of Transport Geography.
Kiss and Ride	Locations near transit stations or exchanges where people can be dropped off or picked up by someone driving them by car to/from the transit station or exchange.	
Light duty vehicles (LDV)	Light duty vehicles (or light trucks) are trucks with two axles, and a gross vehicle weight less than 15 metric tonnes	
Light-duty passenger vehicles	Refers to passenger cars, sport utility vehicles (SUVs), vans and light trucks weighing up to 8,500 lbs.	Sourced from Transport Policy
Local Transit	Local transit provides extensive coverage and ensures that all development in the urban part of the region is within walking distance of transit. With short walks to stops, local transit is used for trips within each community or to connect to higher order transit services. Many local transit routes are already high-frequency.	
Long Combination Vehicle (LCV)	A vehicle combination up to 41 metres long, consisting of a tractor pulling two full-length semitrailers. In BC, LCVs require special permits to operate on Provincial highways and municipal roads.	Adapted from Province of BC.
Low-carbon Mobility	A range of transportation options that are lower in greenhouse gas emissions. These can include active modes (such as micromobility) but also zero-emission vehicles.	
Major bike network	Please refer to the Regional Cycling Strategy (2011) for a basic description.	

Major Transit Corridors	These corridors are part of the Major Transit Network — the highest order of transit in the region, with services that are high-capacity, high-frequency, fast, and reliable, travelling in dedicated rights-of-way all day, every day in both directions.	
Major Transit Growth Corridors (MTGC)	Major Transit Growth Corridors are areas along TransLink's Major Transit Network where member jurisdictions, in consultation with Metro Vancouver and TransLink, may identify new Frequent Transit Development Areas (FTDAs). These corridors are intended to extend approximately 1 kilometre from the roadway centerline in both directions. The intent of these corridors is to provide an overall structure for the region in an effort to support the regional planning principle of directing portions of growth towards Urban Centres and areas around transit.	
Major Transit Network (MTN)	The Major Transit Network (MTN) is the highest order of transit — with services that are high-capacity, high-frequency, fast, and reliable, travelling in dedicated rights-of-way all day, every day in both directions.	
Mayor's Council	The Mayors' Council on Regional Transportation is composed of 22 members — the Mayors from all 21 municipalities within the transportation service region and a representative from the Tsawwassen First Nation. The Mayors' Council appoints the Board of Directors (from a list of candidates identified by the Screening Panel) and the Regional Transportation Commissioner. The Mayors' Council reviews and provides input on TransLink's long-term transportation strategies and approves or rejects any plan that includes expenditures beyond those which can be funded by TransLink' existing funding sources and current borrowing limit.	
Medium duty vehicles	Medium-duty vehicles are commercial trucks with a gross vehicle weight rating of 10,001 lbs up to 26,000 lbs.	Sourced from The Balance Small Business
Micromobility	Micromobility includes both human-powered mobility devices (bikes, kick scooters, etc.) and electric assisted mobility devices, such as electric bikes and scooters, which can be personally owned or used in shared fleets.	
Microtransit	Small-scale public transit services that that can offer fixed routes and schedules, as well as flexible routes and on-demand scheduling.	Sourced from American Public Transportation Association
Mobility	The movement of people and goods, including sidewalks, bicycle lanes and protected bikeways, dedicated bus or light rail/streetcar lanes, and general purpose vehicular travel lanes.	Sourced from Curbside Management Practioner's Guide.
Mobility as a Service (MaaS)	An emerging type of service that enables users to plan, book and pay for a range of mobility services, such as transit, ride-sharing and micromobility-sharing services through a smartphone app.	Adapted from Wikipedia.
Mobility hubs	Dedicated zones or areas where a variety of transportation modes (e.g. transit, shared micromobility, ferry, etc) interface, allowing for seamless connections by transportation system users.	Sourced from UBC Sustainability Scholars Research
Mobility Service Provider (MSP)	Mobility service providers are organizations which can be public, private or co-operatively owned, that provide public or membership-based transportation services. Examples include car sharing companies, shared bike companies or public transit.	
Multimodal	Those activities that involve more than one mode of transportation, including transportation connections, choices, cooperation and coordination of various modes.	

Neighbourhood logistics hubs	A designated location in urban areas with a primary purpose to assist deliveries, including last-mile deliveries, through functions such as: centralizing inbound and outbound deliveries for multiple logistics companies, serving as a convenient drop-off or pick-up location, or facilitating transfers between different freight vehicle types.	
Network Design	The design of the transportation network including but not limited to road networks, railways, air routes, pipelines, aqueducts, and power lines.	Sourced from [Wikipedia](#).
Off-peak travel	Non-peak or non-rush hours. From 09:30 until 15:00 and from 18:30 until the last bus Monday to Friday and all day Saturday, Sunday and holidays.	
One-way carsharing	Please refer to "carsharing".	
Passenger-directed vehicle (PDV)	Passenger directed vehicles are those where the passenger, or their representative, determines where the vehicle travels (see ride-hailing).	Sourced from [Province of BC.](#)
Peak period	The period where the greatest level of demand for transit or other transportation services or infrastructure is experienced and service is provided. Peak periods on the roadway network and transit typically coincide with rush hour.	
People-first streets	People-first streets prioritize safety, livability, and connection through the reallocation of road space, currently oriented to cars, for use by people walking, biking, rolling, or taking transit.	
Rail corridors	Rail Corridor means a linear, continuous strip of real property that is used for rail service. The term includes the corridor and structures essential to railroad operations, including the land, buildings, improvements, rights-of-way, easements, rail lines, rail beds, guideway structures, switches, yards, parking facilities, power relays, switching houses, rail stations, any ancillary development, and any other facilities or equipment used for the purposes of construction, operation, or maintenance of a railroad that provides rail service.	Adapted from [Law Insider](#)
Rapid transit	Rapid transit refers to fast, frequent, reliable and high-capacity public transit. Many different kinds of technology can deliver this level of service, whether on rubber tires or rails. It is the full separation from road traffic that makes rapid transit fast and reliable and able to move large volumes of people.	
Regional cycling strategy	The Regional Cycling Strategy provides guidance on how cycling can help realize the region's goals. The Strategy sets out a shared course of action for TransLink, municipalities, and other partners.	
Regional Growth Strategy (RGS)	Metro Vancouver's long-term, regional land use plan which is currently under development. It will replace the region's previous regional plan, the Livable Region Strategic Plan (LRSP), which was adopted in 1996. Under the SCBCTA Act (see SCBCTA in Glossary), the purpose of TransLink is to provide a regional transportation system that supports Metro Vancouver's Regional Growth Strategy.	
Reliability	Reliability is the ability of transit to operate on schedule. Consistent and predictable operations reduce travel time variability and dwell times, which can be a major source of delay to transit.	

Remote work	Working style that allows professionals to work outside of a traditional office environment. Employees do not commute to a central place of work, such as an office building, warehouse, or store.	Adapted from Wikipedia.
Resilience	The capacity of individuals, communities, organizations and natural systems to prepare, avoid, absorb, recover, and adapt to shocks and stresses through the preservation, restoration, and adaptation of essential functions. Resilience also involves learning from shocks and stresses to build back better.	
Ride-hailing	Ride-hailing is booking rides and paying for car service through a smartphone app with a transportation network service provider (see transportation network service).	Adapted from City of Vancouver.
Right-of-way (ROW)	A right-of-way is a type of easement granted or reserved over the land for transportation purposes, such as a highway, street, footpath or bicycle path.	Adapted from Wikipedia
Road usage charging	Mobility Pricing refers to the decisions that our region needs to make on how to balance taxes and user fees when paying for different parts of the transportation system. One such type of user fee is road pricing: a tool used to manage demand and increase the efficiency and fairness of our transportation network, while raising funds for transportation infrastructure.	
Robo-taxis (or automated vehicle taxis)	Ridesharing or taxi service operated by fully automated vehicles.	
Rolling	Includes a range of self-propelled or low-speed electric personal transportation, such as wheelchairs or scooters, which, together with walking and cycling, are forms of active transportation.	
Separated highways	Separated highways are divided primary highways built for through traffic (as opposed to local traffic access) with two or more lanes in each direction of travel. These lanes are accessible via interchanges only.	
Service layers	The transit network is comprised of several different service layers, each with their own set of service characteristics (span of service, frequency, route design) and unique role within the network. These different layers work together to serve a wide range of different customer markets, origins, and destinations.	
Service level	The transit network is comprised of several different service layers, each with their own set of service characteristics (span of service, frequency, route design) and unique role within the network. These different layers work together to serve a wide range of different customer markets, origins, and destinations.	
Shadow carbon price	A notional market price (a "shadow" price) for carbon in internal corporate financial analysis and decision-making processes. A shadow carbon price is generally expressed in terms of dollars (currency) per tonne of carbon dioxide (CO_2) or carbon dioxide equivalent (CO_2e).	Sourced from Smart Prosperity Institute
Shared micromobility	Any small, human or electric-powered transportation solution such as bikes, e-bikes, scooters, e-scooters or any other small, lightweight vehicle that is being used as a shared resource between multiple users.	Sourced from Shared Micromobility Playbook.
Shared mobility	Transportation services and resources that are shared among users, either concurrently or one after another. This includes public transit; micromobility (bikesharing, scooter sharing); automobile-based modes (carsharing, rides on demand, and microtransit); and commute-based modes or ridesharing (carpooling and vanpooling).	Sourced from Shared Use Mobility Center.
Shared vehicles	Please refer to "shared mobility"	

Sprawl	The rapid expansion of the geographic extent of cities and towns, often characterized by low-density residential housing, single-use zoning, and increased reliance on the private automobile for transportation.	Sourced from [Britannica]().
Street Network Granularity	Describes the level of scale or detail of the street network, with the following as the two extremes: • Fine-grained street network is one with a higher degree of connectivity, shorter blocks, more intersections and more route options in a given area. Coarse grained street network is one with a lower degree of connectivity, longer blocks, fewer intersections and fewer route options in a given area.	
Surveillance capitalism	An economic system centered around the commodification of personal data with the core purpose of profit-making.	Sourced from [Wikipedia]().
Sustainable procurement	Sustainable procurement is the adoption of social, economic and environmental criteria alongside the price and quality considerations into procurement processes and procedures.	Sourced from the [Chartered Institute of Procurement and Supply.]()
Systemic barriers	Policies, procedures, or practices that unfairly discriminate and can prevent individuals from participating fully in a situation.	Sourced from [Council of Ontario Universities.]()
Systemic discrimination	Systemic discrimination can be described as patterns of behaviour, policies or practices that are part of the structures of an organization, and which create or perpetuate disadvantage for racialized persons or other disadvantaged groups.	Sourced from the [Ontario Human Rights Commission]().
Teleworking	Please refer to "remote work"	
Transit priority	Giving transit priority over regular traffic. Transit priority measures include dedicating lanes for public transit vehicles, changing infrastructure and policy to improve bus speeds and reduce dwell times at stops, and giving public transit vehicles preferential treatment in the general traffic flow through traffic control measures and signal priority. Implementing these measures requires coordination and partnership with local municipalities.	
Transit-oriented affordable housing (TOAH)	Affordable rental housing for lower-income households in Metro Vancouver in locations with good access to frequent public transit.	Sourced from [Metro Vancouver.]()
Transit-oriented communities (TOC)	Transit-oriented communities are places that, by their design, allow people to drive less and walk, cycle, and take transit more. In practice, this means they concentrate higher-density, mixed-use, human-scale development around frequent transit stops and stations. They also provide well-connected and well-designed networks of streets, creating walking- and cycling-friendly communities focused around frequent transit.	
Transit-oriented development (TOD)	Please refer to "transit-oriented communities".	
Transload	Transload is the transfer of goods from the vehicle/container of one mode to another, en route between a shipper and a receiver.	
Transportation demand management (TDM)	The application of policies, strategies, and initiatives that aim to reduce travel demand, specifically that of single-occupancy private vehicles, or to redistribute this demand in space or time.	
Transportation network services (TNS)	Companies that provide app-based passenger directed services (see ride-hailing).	

Travel demand	The amount and type of travel people would choose under specific conditions, taking account factors such as the quality of transport options available and their prices.	Sourced from Victoria Transport Policy Institute
TravelSmart	TransLink's Transportation Demand Management (TDM) implementation program (see Transportation Demand Management). It promotes awareness and delivers education and information on a wide array of trip reduction initiatives and travel-option choices, including transit, cycling, walking and ride-sharing.	
Two-way carsharing	Please refer to "carsharing"	
Universal Basic Mobility (UBM)	Universal Basic Mobility would be a system of partnerships and/or policies that provide a minimum level of mobility to all members of society irrespective of ability of pay. UBM could be implemented in a variety of ways, ranging from basic free mobility for all (e.g., free public transit) to approaches involving progressive options based on ability to pay.	Sourced from Bloomberg.
Upstream emissions	All industrial activities from the point of resource extraction to the project under review. The specific processes included as upstream activities will vary by resource and project type, but in general they include extraction, processing, handling and transportation.	
Urban air mobility (UAM)	A safe and efficient aviation transportation system that will use highly automated aircraft that will operate and transport passengers or cargo at lower altitudes within urban and suburban areas. See eVTOL.	Sourced from Federal Aviation Administration.
Urban centre	Urban centres are intended to be the region's primary focal points for concentrated growth and transit service. They are intended as priority locations for employment and services, higher density forms, mixed residential tenures, affordable housing options, commercial, cultural, entertainment, institutional, and mixed uses.	
Urban containment boundary	The Urban Containment Boundary is a stable, long-term, regionally defined area for urban development that protects Agricultural, Conservation and Recreation, and Rural lands from developments requiring utility infrastructure and from auto-oriented, dispersed development patterns.	Sourced from Metro Vancouver.
Urban data trust	An "urban" data trust is a secure and reliable central-repository and clearinghouse for a wide variety of urban data, including mobility data, to facilitate real-time system optimization, Mobility-As-A-Service, and real-time trip choices for freight and passenger movement. The specific governance structure and legal framework of this urban data trust remains to be defined.	
Urban heat island (effect)	An urban heat island, or UHI, is a metropolitan area that's a lot warmer than the rural areas surrounding it.	Sourced from National Geographic.
Vehicle connectors	A device that, by insertion into an electric vehicle inlet, establishes an electrical connection to the electric vehicle for the purpose of power transfer and information exchange.	Sourced from Electric Power Research Institute
Vision Zero	A strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.	Sourced from Vision Zero
Zero-emissions vehicles (ZEV)	A vehicle that has the potential to produce no tailpipe emissions. They can still have a conventional internal combustion engine, but must also be able to operate without using it. These include vehicles that are: battery-electric • plug-in hybrid electric • hydrogen fuel cell	Adapted from Transport Canada.

Part J: Topic Indices

Walking

Actions	Short description
1.1.1	Complete communities
1.1.2	Walkable neighbourhood street networks
1.1.3	Walkways
1.4.1	Mobility hubs
2.3.4	Inform real-trip trip choices
2.4.1	Monitor asset condition
2.4.2	Sufficient and timely funds for state of good repair
3.1.4	Community-serving retail
3.2.1	Transit service and active transportation in low-income areas
3.4.1	Access to local shopping
3.4.2	Access to local jobs
4.1.2	People-first streets
4.1.3	People-first street typology
4.1.4	Prioritize protection for road users with least physical protection
4.1.5	Active transportation facilities
4.1.7	Vibrant, comfortable, inviting and inclusive public spaces
4.2.1	Wayfinding
4.2.6	Training for walking, cycling, transit skills
4.3.4	Tree canopy and greenery
4.4.5	Critical infrastructure interdependencies
4.4.6	Transportation resiliency strategy
4.4.7	Capacity to adapt to shocks
4.4.8	State of good repair
5.1.1	Energy efficient modes
5.1.2	Energy efficient cities

Cycling

Actions	Short description
1.1.1	Complete communities
1.1.2	Walkable neighbourhood street networks
1.1.4	Bikeways
1.4.1	Mobility hubs
2.3.4	Inform real-trip trip choices
2.4.1	Monitor asset condition
2.4.2	Sufficient and timely funds for state of good repair
3.2.1	Transit service and active transportation in low-income areas
3.2.2	Bicycles and micromobility devices at low cost
3.2.3	Secure bike charging and parking in multi-family and rental buildings
3.2.4	Subsidies for electric vehicles, e-bikes and bikes for low income individuals
3.4.1	Access to local shopping
3.4.2	Access to local jobs
4.1.2	People-first streets
4.1.3	People-first street typology
4.1.4	Prioritize protection for road users with least physical protection
4.1.5	Active transportation facilities
4.2.1	Wayfinding

4.2.6	Training for walking, cycling, transit skills
4.3.4	Tree canopy and greenery
4.4.5	Critical infrastructure interdependencies
4.4.6	Transportation resiliency strategy
4.4.7	Capacity to adapt to shocks
4.4.8	State of good repair
5.1.1	Energy efficient modes
5.1.2	Energy efficient cities

Micromobility

Actions	Short description
1.1.1	Complete communities
1.1.2	Walkable neighbourhood street networks
1.1.4	Bikeways
1.1.5	Shared micromobility
1.4.1	Mobility hubs
1.4.3	Mobility-As-A-Service
2.3.1	Urban data trust
2.3.4	Inform real-trip trip choices
2.3.5	Integrated pricing and fares between mobility providers
3.2.1	Transit service and active transportation in low-income areas
3.2.2	Bicycles and micromobility devices at low cost
3.3.1	Funding for transportation system
3.4.1	Access to local shopping
3.4.2	Access to local jobs
3.4.3	Access to markets, suppliers, customers and workers
3.4.7	Piloting and innovation
4.1.4	Prioritize protection for road users with least physical protection
4.1.6	Micromobility networks
4.2.6	Training for walking, cycling, transit skills
5.1.1	Energy efficient modes
5.1.2	Energy efficient cities
5.2.1	Access to micromobility

Transit

Actions	Short description
1.2.1	Transit-oriented regional growth
1.2.2	Accessible, equitable, and inclusive transit system
1.2.3	Frequent local fixed-route bus service
1.2.4	Major Transit Network
1.2.5	Expand transit connections
1.2.6	Demand-responsive transit service
1.4.1	Mobility hubs
1.4.2	Convenient deliveries
1.4.3	Mobility-As-A-Service
2.1.1	Transit priority
2.1.2	Dedicated transit lanes
2.1.3	Transit priority measures
2.1.4	Management and enforcement to minimize transit delay
2.1.5	Transit priority planning and design
2.3.1	Urban data trust

2.3.4	Inform real-trip trip choices
2.4.1	Monitor asset condition
2.4.2	Sufficient and timely funds for state of good repair
3.1.1	Rental housing adjacent to transit
3.1.2	Land speculation
3.1.4	Community-serving retail
3.2.1	Transit service and active transportation in low-income areas
3.3.1	Funding for transportation system
3.4.1	Access to local shopping
3.4.2	Access to local jobs
3.4.3	Access to markets, suppliers, customers and workers
4.1.7	Vibrant, comfortable, inviting and inclusive public spaces
4.1.11	Advanced Drivers Assistance Systems (ADAS)
4.1.12	Deployment of AVs
4.2.1	Wayfinding
4.2.2	Room to move and sit on transit
4.2.3	Comfortable transit experience
4.2.4	Welcome and secure on shared transportation and transit
4.2.5	Community-based approach to community safety
4.2.6	Training for walking, cycling, transit skills
4.3.1	Health and environmental impact assessments
4.3.2	Air emissions
4.3.3	Water pollution
4.3.4	Tree canopy and greenery
4.3.6	Noise from rail-based transportation
4.3.7	Reduce neighborhood partition and social isolation
4.4.5	Critical infrastructure interdependencies
4.4.6	Transportation resiliency strategy
4.4.7	Capacity to adapt to shocks
4.4.8	State of good repair
5.1.1	Energy efficient modes
5.1.2	Energy efficient cities
5.3.2	EV charging and zero-emissions refueling infrastructure for commercial vehicles
5.3.3	Carbon intensity of fuels
5.3.4	Renewable biofuels
5.3.5	Renewable power for electric mobility
5.4.1	Lifecycle GHG into business cases
5.4.2	Carbon value for decision-making
5.4.3	Public sector sustainable procurement
5.4.4	Upstream emissions

Driving

Actions	Short description
1.3.1	Parking, pick-up and drop-off, and loading / unloading spaces
1.3.2	Network of local streets
1.3.3	Network of regional roads
1.3.5	Separated highways
1.4.5	Telecommute
2.3.1	Urban data trust
2.3.2	Dynamically manage curbspace

2.3.3	Dynamically manage AVs and other road users
2.3.4	Inform real-trip trip choices
2.3.6	Commute trip reduction programs
2.3.7	TDM programming
2.3.8	TDM in multi-family and commercial buildings
2.4.1	Monitor asset condition
2.4.2	Sufficient and timely funds for state of good repair
3.1.3	Parking management
3.2.4	Subsidies for electric vehicles, e-bikes and bikes for low income individuals
3.3.1	Funding for transportation system
3.4.4	Agricultural sector
4.1.1	Speed limits
4.1.2	People-first streets
4.1.3	People-first street typology
4.1.4	Prioritize protection for road users with least physical protection
4.1.8	Training and awareness for drivers
4.1.9	Traffic enforcement
4.1.12	Deployment of AVs
4.3.1	Health and environmental impact assessments
4.3.2	Air emissions
4.3.3	Water pollution
4.3.5	Noise from road-based transportation
4.3.7	Reduce neighborhood partition and social isolation
4.4.5	Critical infrastructure interdependencies
4.4.6	Transportation resiliency strategy
4.4.7	Capacity to adapt to shocks
4.4.8	State of good repair
5.2.2	Electrification of light-duty passenger vehicles
5.3.1	EV charging network for light-duty vehicles
5.3.3	Carbon intensity of fuels
5.3.4	Renewable biofuels
5.3.5	Renewable power for electric mobility
5.4.1	Lifecycle GHG into business cases
5.4.2	Carbon value for decision-making
5.4.3	Public sector sustainable procurement
5.4.4	Upstream emissions

Shared Vehicles

Actions	Short description
1.3.1	Parking, pick-up and drop-off, and loading / unloading spaces
1.3.6	Shared vehicles
1.4.1	Mobility hubs
1.4.3	Mobility-As-A-Service
2.3.1	Urban data trust
2.3.4	Inform real-trip trip choices
2.3.5	Integrated pricing and fares between mobility providers
3.3.1	Funding for transportation system
3.4.2	Access to local jobs
3.4.3	Access to markets, suppliers, customers and workers
3.4.7	Piloting and innovation

Freight

Actions	Short description
1.3.1	Parking, pick-up and drop-off, and loading / unloading spaces
1.3.3	Network of regional roads
1.3.4	Consistent truck route designation
1.3.5	Separated highways
1.4.2	Convenient deliveries
2.2.1	Land use needs of goods movement, industry and agriculture
2.2.2	Consolidation of goods and deliveries
2.2.3	Road capacity
2.3.1	Urban data trust
2.3.2	Dynamically manage curbspace
2.3.4	Inform real-trip trip choices
2.4.1	Monitor asset condition
2.4.2	Sufficient and timely funds for state of good repair
3.4.3	Access to markets, suppliers, customers and workers
4.1.10	Commercial vehicle safety inspections
4.1.11	Advanced Drivers Assistance Systems (ADAS)
4.3.1	Health and environmental impact assessments
4.3.2	Air emissions
4.3.3	Water pollution
4.3.5	Noise from road-based transportation
4.3.6	Noise from rail-based transportation
4.4.5	Critical infrastructure interdependencies
4.4.6	Transportation resiliency strategy
4.4.7	Capacity to adapt to shocks
4.4.8	State of good repair
5.1.3	Smaller, zero-emission freight vehicles
5.2.3	Low/Zero emissions medium- and heavy-duty vehicles
5.3.2	EV charging and zero-emissions refueling infrastructure for commercial vehicles
5.3.3	Carbon intensity of fuels
5.3.4	Renewable biofuels
5.3.5	Renewable power for electric mobility
5.4.1	Lifecycle GHG into business cases

Social Equity

Actions	Short description
1.1.5	Shared micromobility
1.2.2	Accessible, equitable, and inclusive transit system
1.2.6	Demand-responsive transit service
1.3.4	Consistent truck route designation
1.3.6	Shared vehicles
2.1.5	Transit priority planning and design
2.3.7	TDM programming
3.1.1	Rental housing adjacent to transit
3.1.2	Land speculation
3.2.2	Bicycles and micromobility devices at low cost
3.2.4	Subsidies for electric vehicles, e-bikes and bikes for low income individuals
3.3.1	Funding for transportation system
3.4.5	Thriving transportation workforce
3.4.6	Just transition for transportation workforce

4.1.4	Prioritize protection for road users with least physical protection
4.1.5	Active transportation facilities
4.1.7	Vibrant, comfortable, inviting and inclusive public spaces
4.2.4	Welcome and secure on shared transportation and transit
4.2.6	Training for walking, cycling, transit skills
4.3.4	Tree canopy and greenery
4.4.6	Transportation resiliency strategy
5.2.2	Electrification of light-duty passenger vehicles
5.3.1	EV charging network for light-duty vehicles

Reconciliation

Actions	Short description
1.1.5	Shared micromobility
1.2.1	Transit-oriented regional growth
1.2.2	Accessible, equitable, and inclusive transit system
3.1.1	Rental housing adjacent to transit
3.4.5	Thriving transportation workforce
4.2.4	Welcome and secure on shared transportation and transit
4.2.6	Training for walking, cycling, transit skills
4.2.7	Art, design, landscape and cultural recognition
5.2.2	Electrification of light-duty passenger vehicles
5.3.1	EV charging network for light-duty vehicles

Resiliency

Actions	Short description
4.2.3	Comfortable transit experience
4.2.7	Art, design, landscape and cultural recognition
4.3.1	Health and environmental impact assessments
4.4.1	Emergency and business continuity plans
4.4.2	Emergency response trainings
4.4.3	Emergency operations framework
4.4.4	Community-based approach to community safety
4.4.5	Critical infrastructure interdependencies
4.4.6	Transportation resiliency strategy
4.4.7	Capacity to adapt to shocks
4.4.8	State of good repair
5.3.4	Renewable biofuels
5.3.5	Renewable power for electric mobility

Persons with Disabilities

Actions	Short description
1.1.5	Shared micromobility
1.2.2	Accessible, equitable, and inclusive transit system
1.2.6	Demand-responsive transit service
1.3.6	Shared vehicles
2.1.5	Transit priority planning and design
4.1.4	Prioritize protection for road users with least physical protection
4.1.5	Active transportation facilities
4.1.7	Vibrant, comfortable, inviting and inclusive public spaces
4.2.1	Wayfinding
4.2.2	Room to move and sit on transit

4.2.4	Welcome and secure on shared transportation and transit
4.2.6	Training for walking, cycling, transit skills
5.1.3	Smaller, zero-emission freight vehicles

Labour

Actions	Short description
2.3.3	Dynamically manage AVs and other road users
2.3.6	Commute trip reduction programs
3.4.2	Access to local jobs
3.4.5	Thriving transportation workforce
3.4.6	Just transition for transportation workforce
3.4.7	Piloting and innovation
4.1.8	Training and awareness for drivers
4.1.11	Advanced Drivers Assistance Systems (ADAS)
4.1.12	Deployment of AVs
5.1.3	Smaller, zero-emission freight vehicles