RR-3

CITY OF VANCOUVER

ADMINISTRATIVE REPORT

Report Date: May 2, 2017
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TO: Vancouver City Council

FROM: General Manager of Engineering Services

SUBJECT: Congestion Management Strategy

RECOMMENDATION

THAT Council adopt the Congestion Management Strategy as outlined in this report

REPORT SUMMARY

In 2012, City Council approved the Transportation 2040 Plan. At its foundation, the plan enhances overall mobility and access in the City by enabling more trips to be made by walking, cycling, and transit, and reducing the need to drive. Continuing to prioritize these more space-efficient modes encourages a mode shift that reduces the number of cars on the road today, improves health outcomes for those using active modes, results in more reliable and cost-effective transit service and helps ensure that future population and job growth does not result in gridlock.

Transportation 2040 also acknowledges the importance of motor vehicles as part of the City's transportation mix and contains policies intended to minimize congestion or mitigate congested-related impacts. These include making it easier for people to find parking through improved curb space management and wayfinding, optimizing traffic signal timing, and supporting comprehensive regional mobility pricing.

Regionally, our population is growing, and with that, so are the demands and pressures to support the movement of more people and more goods. With more people leaving their personal vehicles at home and choosing to take transit, walk, or cycle, we are finding an increased need to build infrastructure to support the growth of these more sustainable modes, such as signals and crosswalks for pedestrians, wider sidewalks, cycling facilities, and more transit.

While these are positive indicators of a growing and thriving city, they result in increased demand that can result in impacts to traffic flow on the street network. Achieving efficient, reliable travel is important to support the economy and future prosperity of the region. This is why it is important for us to be working on a Congestion Management Strategy that will support our economy, honour or transportation hierarchy of active transportation first, and find ways to continue to use our streets more efficiently.

The proposed Congestion Management Strategy is based on the following five key goals with associated action items as detailed in this report:

1. Improve monitoring of traffic conditions and trends
2. Improve road safety
3. Ensure a smart and efficient transportation system
4. Coordinate street use
5. Prioritize people and goods movement

The strategy builds on Transportation 2040 policies such as Moving Towards Zero Traffic Fatalities and emerging directions including the TransLink 10-Year Investment Plan. It provides direction on identifying and monitoring congestion, developing strategies to address impacted areas, and tracking progress and results.

Emerging technologies in software and transportation data collection will play a vital role which staff will explore and utilize to monitor progress, track trends, and implement initiatives as part of the Strategy. The emphasis will be on maintaining reliability of the network, prioritizing efficient transportation modes, while fully considering overarching City transportation priorities such as safety, accessibility, and goods movement.

PREVIOUS DECISIONS

In October 2012, Council unanimously approved the Transportation 2040 plan. The plan includes specific directions to prioritize sustainable transportation modes, improve accessibility and safety for all with a focus on vulnerable road users, and consider impacts to transit, commercial vehicles, and general traffic flow prior to reallocating road space.

In November 2015, Council unanimously adopted the Renewable City Strategy, which includes directions to use land use and zoning policies to develop compact communities that encourage active transportation and transit, and to enhance and accelerate the development of complete streets and green infrastructure.

CITY MANAGER'S/GENERAL MANAGER'S COMMENTS

The City Manager and General Manager of Engineering Services support the recommendations of this report.

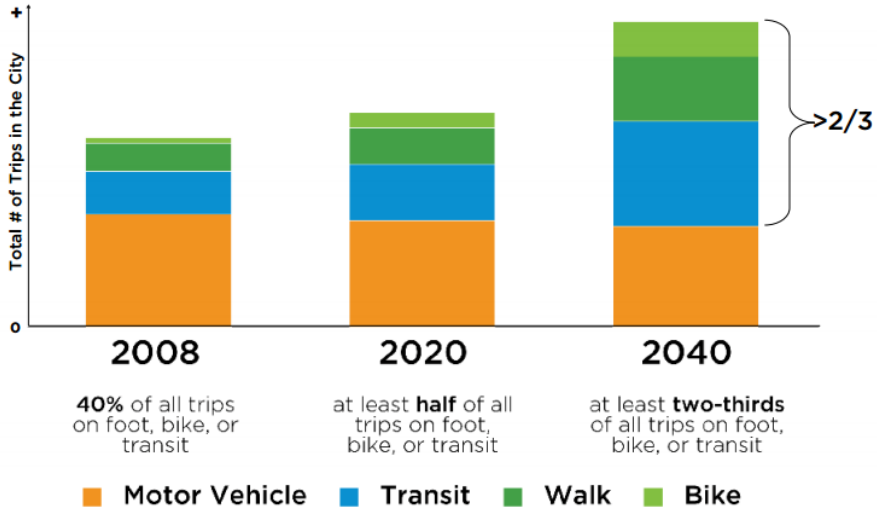
This report formalizes the City's goals to address traffic congestion which focuses on establishing and maintaining a consistent, reliable and safe road network. The proposed Strategy is consistent with and builds on policy directions established as part of the Transportation 2040 Plan.

REPORT

Vancouver is one of the few major cities in North America without a freeway system. The decision not to put a freeway through the downtown set the stage for Vancouver's green and livable style that we know today. Additionally, the limits of physical space geographically have led to a compact city that is almost completely built-out. It also means that our street space is limited and serves a multitude of purposes, from traffic movement to event space and business activity (such as filming or construction). Our vibrant, active city also has an increasing number of people choosing to walk and cycle. This leads to slowed traffic, as well as busier sidewalks and crosswalks. This means we must prioritize walking, cycling, and transit to accommodate growth.

Vancouver has a history of prioritizing sustainable modes of transportation including walking, cycling, and transit. Since the 1997 Transportation Plan, the policy to prioritize active modes and public transit has guided the direction of transportation and planning projects across the City. In 2012 City Council approved Transportation 2040 which sets specific targets to increase the sustainable transportation mode share to 50% of all trips by 2020, and two-thirds of all trips by 2040. Recent studies have shown that the City has achieved the 2020 target.

Mode Share Target for 2020 and 2040



For all trips originating in the City of Vancouver.
Source: Data and analysis based on TransLink Trip Diaries. Opinions expressed do not necessarily represent the views of TransLink.

It is important to recognize in the chart above that even though the mode split for the motor vehicle decreases from 60% in 2008 to 33% in 2040, the total number of trips by motor vehicle is not expected to significantly decline. Vancouver's street network will continue to carry significant volumes of motor vehicles for the foreseeable future.

While the total number of private vehicles may remain similar over the years, there will always be an increasing number of new transit, goods movement, and emergency services as more residents and jobs are located in the City. The continued reliability of our street network is critical to ensuring efficient movement for modes of vehicles including buses, trucks, and emergency vehicles.

Particular to transit is the opportunity to review our street network performance with TransLink's 2015 Transit Service Performance Review. The Vancouver/UBC area is noted to have the most bus routes where speeds are trending downward. Increasing congestion is likely a contributor to this trend. Other factors, such as overcrowding at bus stops and buses bunching, also contribute to decreasing average travel speeds.

Street space allocation, signal programming, and network design are the keys to managing congestion. In addition, congestion management strategies that more directly enhance the speed and reliability of transit will also provide more people moving capacity along our frequent transit corridors and help to minimize the operating costs.

DEFINITION OF CONGESTION

Defining congestion in a Vancouver context is essential to developing a strategy. Based on a recent study completed by the Public Sector Digest (PSD) —*"An Analysis of Traffic Congestion and Policy Solutions for Canadian Municipalities"* — it was found that there is no single broadly accepted definition of traffic congestion. The chart below outlines two main categories of traffic congestion and specific definitions that are currently used.

DEFINING CONGESTION		
Physical Definitions of Traffic Congestion	"The state of **being overcrowded**, especially with traffic or other people."	Collins Dictionary
	"The way in which **vehicles interact to impede each other's progress**"	UK Federal Government DoT
	"A physical phenomenon relating to the manner in which **vehicles impede each other's progression** as demand for limited road space approaches capacity	Joint Transportation Research Centre
	"An **excess of vehicles on a portion of roadway** at a particular time resulting in speeds that are slower…than normal or 'free flow' speeds."	US DoT FHWA
	"The **incremental delay** caused by interactions among vehicles on a roadway, particularly as **traffic volumes approach a roadway's capacity**."	Victoria Transportation Policy Institute
Relative Definitions of Traffic Congestion	"The difference between **users' expectations** of the road network and how it actually performs."	UK Federal DoT
	"Difference between the roadway system **performance that users expect** and how the system actually performs."	Joint Transportation Research Centre
	"The **level at which** transportation system performance **is no longer acceptable** due to traffic interference	Southwestern Pennsylvania Commission (US)

Source: An Analysis of Traffic Congestion and Policy Solutions for Canadian Municipalities, PSD

Based on this research it can be seen that the definition of congestion can vary from jurisdiction to jurisdiction based on their individual transportation goals and objectives.

Definitions of congestion that are based on a freeway approach to transportation planning would not be appropriate in a Vancouver context. Instead, definitions based on a grid and signalized network of arterial streets designed to support safety, sustainability, business access and liveability are a better fit.

In Vancouver, it is more appropriate to measure success based on consistency and travel time reliability (i.e predictable travel times depending on the day of week and time of day). Reliability of cars, transit, and goods movement affects economic productivity as employees travel to and from work and meetings, make deliveries and service calls, etc. It is important to determine a baseline understanding of travel times on our streets, to monitor for consistency and reliability, and then to take action to address areas that are causing congestion.

A focus on safety and accessibility, as well as increases in people walking, cycling, and taking transit (including measures to provide those modes with additional priority), may result in slower speeds overall but measures can be put in place to maintain travel time reliability.

INNOVATION & TECHNOLOGY

Recent advancements in technology have now made it increasingly possible and affordable for cities to gather vital information on how its citizens use and interact with the transportation system. Technology such as Smart Street Lighting is allowing cities to gather large volumes of data such as traffic volumes, parking occupancy, travel speeds and travel mode for all road users. Additionally, mobile phone technology and apps are also allowing users to share crowd-sourced traffic data and in some cases these apps can automatically detect if users are on foot, cycling, taking transit or in a private auto simply based on data collected from the smart phones' sensors. This data is critical in helping city officials make informed decisions on the transportation network.

Furthermore, the emergence of the Connected and Automated Vehicle is expected to be the most significant and disruptive technology in transportation since the introduction of the private auto. It will be critical for cities to pro-actively work with senior levels of government and industry to consider and implement technology in roadway infrastructure to monitor and support the operation of Connected and Automated Vehicle technology.

As part of the City's Congestion Management and Digital Strategies staff will explore and consider adopting new technologies to support emerging technologies in communication and transportation to optimize the street network.

CONGESTION MANAGEMENT STRATEGY

Few jurisdictions in Canada have a formalized congestion management strategy. Based on a review of existing strategies and current direction in City policies including the Transportation 2040 Plan, staff propose the goals of a Congestion Management Strategy to include the following:

1. Improve monitoring of traffic conditions and trends
2. Improve road safety
3. Ensure a smart and efficient transportation system
4. Coordinate street use
5. Prioritize people and goods movement

The following sections of the report provide further details on each of the five goals of the Congestion Management Strategy, and identify specific objectives to be delivered as part of this plan.

1. IMPROVE MONITORING OF TRAFFIC CONDITIONS AND TRENDS

As part of measuring congestion and tracking progress of the Strategy, it is important that baseline conditions be measured throughout key arterial streets in the City. Once baseline conditions are established, it can be better understood where there are hot spots for congestion. Vancouver is already recognized as leaders in deploying automated technology for counting bikes. In addition, a customized traffic data management system has recently been developed to store and manage large volumes of data that is collected for all modes of transportation.

As previously noted in the Innovation & Technology Section, staff will explore and implement new technologies to capture trends in travel time and reliability to help make informed decisions to address congestion. The following are the initiatives staff will undertake in 2017 to monitor the operation of street network:

INITIATIVE	STATUS	RECOMMENDATION	EST ANNUAL COST
a) Use data to establish baseline travel times (and thus reliability) along major arterial streets across the City	NEW	Allocate capital funding annually from existing Transportation Monitoring Program to explore new and efficient technologies to capture data such as corridor travel times and traffic volumes Consider the use of crowd-sourced data from mobile phone apps to capture road use activity and information sharing	$100k
b) Traffic monitoring and enforcement of street use 7 days per week	Underway	Traffic monitoring by two full-time staff assigned to review and enforce the use of streets 7 days per week	$150k
c) Utilize traffic control with VPD Traffic Authority (TA): the VPD Traffic Authority designation is unique as these are not full members but have the ability to control traffic and provide police presence at traffic closures	Underway	Consider expanding Traffic Authority use to high traffic conflict locations during peak times to support safe and efficient movement; expand VPD Traffic Authority program to provide more resources	TBD
d) Enhance monitoring with traffic cameras and emerging technologies	NEW	Develop plan and cost of expanding traffic camera monitoring to include cameras at every major intersection. Deploy emerging technologies such as smart street lighting to begin capture traffic volumes and related data on road use	TBD
e) Develop annual report on travel time reliability on major corridors and changes related to improvements	NEW	Staff report back to Council annually in the Spring	-

2. IMPROVE ROAD SAFETY

As previously mentioned, improving road safety and working towards zero transportation related fatalities is a target approved by City Council as part of the Transportation 2040 Plan. Further, by reducing the frequency and severity of collisions on the City's roadways, the network will operate more effectively and efficiently. Therefore, the action items and objectives of Zero Traffic Fatalities and the Congestion Management Strategy should be complementary and support each other. Listed below are specific initiatives from the Transportation Safety Strategy which will be integrated as part of the Congestion Management Strategy:

INITIATIVE	STATUS	RECOMMENDATION	EST ANNUAL COST
a) Complete Corridor and Intersection Safety Studies	NEW	Allocate capital funding from existing Traffic Safety Program to conduct safety studies along major arterials to identify safety concerns and recommendations for mitigation measures	$250k
b) Identify and address safety hotspots	NEW	Work with ICBC and VPD to prioritize and address safety hotspots in the City for counter measure improvements such as signals, crosswalks, and curb bulges	$1M
c) Improve Street Lighting at intersections	Underway	Continue initiative – Identify and target up to 20 key intersections annually for enhanced lighting with LED technology funding from existing annual Street Lighting Program	$150k
d) Conduct Collision Conflict Analysis	Underway	Allocate capital funding from existing Transportation Safety Program to partner with academia to use leading technology such as video analytics to proactively study intersections with potential conflicts. Develop mitigation measures to address safety concerns	$75k
e) Work collaboratively with Partners	Underway	Share collision and hospitalization data with ICBC, VPD, Vancouver Coastal Health, and BC Ambulance which will assist in identifying key locations, trends and severity of crashes.	
f) Pedestrian Safety Campaign	Underway	Funded from Annual Transportation Safety Capital Program	$35k

3. ENSURE A SMART AND EFFICIENT TRANSPORTATION SYSTEM

As previously noted in the Innovation & Technology Section, the application of technology will play a vital role optimizing the City's transportation system especially given the limited physical space and an almost completely built-out street network in Vancouver.

Since 1986, the City has operated a centralized traffic signal management system which has evolved over time with advancements in technology. The system has been a key component in ensuring that signals can communicate with each other to optimize operations, maintain a coordinated network, and allow staff to monitor and manage the system remotely. Furthermore, the deployment of traffic cameras has continued to expand over the years to facilitate staff in monitoring traffic conditions and make adjustments as conditions change on the roadway over time.

Staff will continue to explore new and emerging technologies in monitoring and data collection including smart street lighting and infrastructure to support connected and automated vehicles as part of this goal. Additionally, it is equally important that the City's infrastructure is resilient and well-maintained to support efficient and reliable operation. The following are key initiatives staff will undertake in 2017 to manage and monitor the existing street network:

INITIATIVE	STATUS	RECOMMENDATION	EST ANNUAL COST
a) Corridor signal timing review	NEW	Signal timing review calibrated with travel time data. Goal to optimize reliability and increase safety on the corridor.	$20-25k
b) Review peak period parking regulations	NEW	Review peak period parking regulations and identify and implement changes to support transit service expansions as well as enhance reliability and safety on arterials in the City	$20-25k
c) Implement Spot improvements for transit operations	NEW	Consider measures such as extending no parking regulations at street corners to improve transit service and reliability	$15-20k
d) Expand Intelligent Transportation Systems (ITS)	NEW	Develop strategy to update the existing centralized traffic signal management system and signal controller technology and plan for emerging technologies such as connected and automated vehicles	TBD
e) Maintain operation of signals during power outages	Underway	Continue to implement battery back-up to all major intersections in the City through existing Signal Program Capital Funding. Currently there are 138 intersections with battery back-up	$150k
f) Increase communication and public awareness of traffic impacts	Underway	Expand use of Electronic Variable Message Signs (VMS) and static advisory signs to educate road users on upcoming impacts and proactively communicate traffic impacts in social media, radio, and print	-
g) Implement Parking Management Strategy	Underway	Implementation of dynamic pay parking rates to adjust for demand and enable people to more easily and quickly find available parking	

4. COORDINATE STREET USE

A key component of supporting the reliable operation of the City's street network is to manage and coordinate impacts related to construction, development and events. A number of initiatives have already been implemented to support coordination of street use. The following identifies key action items staff will initiate in 2017 as part of the Strategy as well as those initiatives already underway:

INITIATIVE	STATUS	RECOMMENDATION	EST ANNUAL COST
1. Review Street Use practices related to private construction and development	NEW	Conduct a best practices review of major Cities in North America to determine street use related to development, when street use is supported, and appropriate fees	$25-50K one time cost for study
2. Develop Construction Traffic Management Manual	NEW	Develop and finalize CTMM through 2018 which outlines acceptable traffic management practices to minimize and coordinate traffic impacts and ensures traffic restrictions are identified during the development permit phase	-
3. Support transit and active modes at construction sites	Underway	Continue best practices to support transit and active modes in traffic management plans at construction sites	-
4. Strategically plan street use	Underway	Continue initiative lead by Engineering Project Management Office to proactively plan street use impacts across Departments, utilities, private development, film and events.	-
5. Manage street use data and coordinate impacts	Underway	Utilize software systems to better manage street use data and coordinate impacts. Make data open to the public and software developers. Seek and support partnerships with software developers to share street use data	-

5. PRIORITIZE PEOPLE AND GOODS MOVEMENT

As previously noted, Vancouver has a history of promoting sustainable modes of transportation. Current policies including the Greenest City Action Plan, Renewable City Strategy, and Transportation 2040 have positioned Vancouver to be a leader in sustainable transportation. Listed below are key initiatives currently under development which will support prioritizing people movement and reduce congestion:

INITIATIVE	STATUS	RECOMMENDATION	ANNUAL COST
a) Mobility pricing	Underway	Support TransLink in exploring the possible implementation of an integrated and coordinated approach to pricing mobility services in Metro Vancouver to improve fairness, efficiency, travel reliability, and support	-

INITIATIVE	STATUS	RECOMMENDATION	ANNUAL COST
		continued investment in the regional transportation system through new revenues	
b) Support rapid transit implementation	Underway	Develop a Rapid Transit office within the City to support the planning and design of the Millennium Line Broadway Extension of the Skytrain, SkyTrain station upgrades and future rapid transit lines.	$1.3M
c) Develop Complete Streets Policy Framework	Underway	Report to Council with recommendation on a Complete Streets Policy	-
d) Rail Transportation & Safety	Underway	Support the development and implementation of a grade separation strategy and grade crossing safety upgrades	TBD
e) Commercial Vehicle Working Group	Underway	Work with TransLink and local municipalities to standardize regulations and streamline permitting process for commercial vehicles in the Lower Mainland	TBD

Related Issues

Financial

The estimated annual costs identified in the recommendations in this report will be funded through existing Transportation Capital Programs. Staff will identify additional funding needs through the Capital Budget process if required.

Environmental

The proposed Congestion Management Strategy supports the Transportation 2040 objectives which, taken together, are expected to reduce emission, increase health, and have a positive effect on the environment.

CONCLUSION

Staff recommend that Council adopt the Congestion Management Strategy as outlined in this report which provides a plan to maintain reliability on the street network, prioritize efficient transportation modes, while fully considering overarching City transportation priorities such as safety, accessibility, and goods movement.

If approved, staff will move forward on identifying and monitoring congestion, developing strategies to address impacted areas, and tracking progress and report back to Council annually with the results.

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