

Final Report

Goods Movement Study for Winnipeg and its Metropolitan Region

Produced by MORR Transportation Consultants and David Krieger Consulting Inc. for

Final Report

Transportation 2050:

Goods Movement Study for Winnipeg and its Metropolitan Region

Prepared by

MORR Transportation Consulting Ltd.
Winnipeg, Manitoba

and

David Kriger Transportation Policy and Research
Ottawa, Ontario

Submitted to

City of Winnipeg

Winnipeg Metropolitan Region

March 2022

TABLE OF CONTENTS

EXECUTIVE SUMMARY v

Policy Context v
Existing Network vi
Strategic Plan viii

1 INTRODUCTION 1

2 POLICY CONTEXT 4

2.1 Key Documents 4
2.2 Regulatory Review 26
2.3 Summary Highlights 35

3 EXISTING NETWORK 35

3.1 Condition and Capacity of Goods Movement Network 35
3.2 Performance of Goods Movement Network 69
3.3 Considerations for the Goods Movement Plan 94

4 ISSUES AND OPPORTUNITIES 97

4.1 Issues Involving Goods Movement 97
4.2 Opportunities for Goods Movement 106
4.3 Truck Route Network Update 108
4.4 Summary 110

5 STRATEGIC FRAMEWORK 111

5.1 Strategic Actions 113
5.2 Economic Analysis of Strategic Actions 126
5.3 Implementation Plan 132

APPENDIX A: SAMPLE OPPORTUNITIES FOR IMPROVED GOODS MOVEMENT 144

TABLE OF FIGURES

Figure 1: Winnipeg Metropolitan Region. 3
Figure 2: Dynamic Transportation Planning and Land Use Model 7
Figure 3: Conceptual Major Street and Highway Network 9
Figure 4: Goods Movement Map from 2011 Transportation Master Plan 13
Figure 5: Winnipeg Airport Area Recommended Improvements – Broad Area 18
Figure 6: Winnipeg Airport Area Recommended Improvements – Proximate to Terminal 18
Figure 7: Airport Campus Development Plan 20
Figure 8: Proposed Infrastructure Improvements 22
Figure 9: CentrePort Land Use Map 34
Figure 10: Winnipeg CMA Defined by Statistics Canada 36
Figure 11: Tonnage Distribution by Mode Between 2015 and 2017 37
Figure 12: Value Distribution by Mode in 2015 38
Figure 13: Proportion of Truck Freight Tonnage (11.3 Million) Transported from Winnipeg CMA in 2017 39
Figure 14: Proportion of Truck Freight Tonnage (15.5 Million) Transported to Winnipeg CMA in 2017 . 40
Figure 15: Proportion of Rail Freight Tonnage (3.6 Million) Transported from Winnipeg CMA in 2017.. 43
Figure 16: Rail Freight Tonnage Entering Winnipeg 44
Figure 17: Major Generators of Trucking Activity in Winnipeg 48
Figure 18: Metropolitan region Truck Activity Generators 50
Figure 19: Winnipeg Designated Truck Route Network. 56
Figure 20: Winnipeg Long Combination Vehicle (LCV) Network. 57
Figure 21: Metropolitan Region Truck Route Network. 59
Figure 22: 2018 Winnipeg Pavement Condition on Truck Routes. 61
Figure 23: Metropolitan Region Pavement Condition 63
Figure 24: Winnipeg Railway Network. 65
Figure 25: Metropolitan Region Railway Network. 66
Figure 26: Airports in Winnipeg and the Metropolitan Region. 68
Figure 27: Winnipeg Average Daily Truck Traffic Volume. 70
Figure 28: Winnipeg Single Unit Truck Average Daily Volume. 71
Figure 29: Winnipeg Articulated Truck Average Daily Volume. 72
Figure 30: Metropolitan Region Annual Average Daily Truck Traffic Volume. 74
Figure 31: Metropolitan Region Single Unit Truck Annual Average Daily Traffic Volume. 75
Figure 32: Metropolitan Region Articulated Truck (Single Trailer) Annual Average Daily Traffic Volume. 76
Figure 33: Metropolitan Region Articulated Truck (Multiple Trailer) Annual Average Daily Traffic Volume. 77
Figure 34: Cross-Product (x1000) of Average Daily Traffic and Average Daily Trains 79

Figure 35: Train Activity at Winnipeg Truck Route Crossings (2019) 80
Figure 36: Average Total Daily Blockage Duration at Winnipeg Truck Route Crossings (2019). 81
Figure 37: Location of Fatal and Major Injury Collisions Involving Trucks (2012-2018). 84
Figure 38: Location of Injury Collisions Involving Trucks (2012-2018). 86
Figure 39: Location of Injury Collisions Involving Single Unit Trucks (2012-2018). 87
Figure 40: Location of Injury Collisions Involving Articulated Trucks (2012-2018) 88
Figure 41: Weekday AM Peak Period Average Travel Speeds 90
Figure 42: Weekday PM Peak Period Average Travel Speeds 91
Figure 43: Weekday AM Peak Period Travel Time Variability 92
Figure 44: Weekday PM Peak Period Travel Time Variability 93
Figure 46: Recommended Truck Route Network 109
Figure 46: Goods Movement Strategic Framework 112

TABLE OF TABLES

Table 1: Key Documents 4
Table 2: Complete Streets and Goods Movement 11
Table 3: Implementation, Funding, and Monitoring for Goods Movement3F 14
Table 4: Top 10 Commodities Moved by Truck To and From Winnipeg CMA in 2017 41
Table 5: Top 10 Rail Commodities Moved From and To Winnipeg CMA in 2017 45
Table 6: Air Cargo Traffic at Canadian Airports in 2017 47
Table 7: Common Truck Types Operating in Winnipeg and Metro Region 52
Table 8: Long Combination Vehicles (LCVs) 54
Table 9: Roadway Kilometre Length of Pavement Condition Rating by Road Class 62
Table 10: Cargo Airlines and Freight Forwarders Operating in Winnipeg Richardson Airport 67
Table 11: Total Collisions and Truck Collisions by Collision Severity from 2012 to 2018 (MPI Data) 82
Table 12: Issue Themes and Categories 98
Table 13: Land Use and Network Planning 98
TAble 14: Managing the Use of the Network 102
Table 15: Sustainable Urban Goods Movement 105
Table 16: Disruptors and New Technologies 106
Table 17: Issues and Potential Opportunities 107
Table 18: Actions for Strategic Objective A - Protect the viability of goods movement in land use planning and development 114
Table 19: Actions for Strategic objective B - Promote seamless intermodal connectivity 116
Table 20: Actions for Strategic Objective C - C. Collaborate with regional partners to increase goods movement safety, efficiency, and reliability and ensure inter-jurisdictional coordination of plans and policies. 117

Table 21: Actions for Strategic Objective D - Invest in transportation infrastructure and operational improvements to improve the movement of goods and anticipate new technologies..... 119
Table 22: Actions for Strategic Objective E - Improve the services provided for goods movement in the last mile 121
Table 23: Actions for Strategic Objective F - Prioritize data collection on freight-related issues to help with decision making and, going forward, support the development of improved analytical tools... 123
Table 24: Implementation costs and Potential Funding Sources 126
Table 25: Goods Movement Implementation Plan 133

EXECUTIVE SUMMARY

Winnipeg (also referred as city) has played a significant historical role in western Canadian goods movement and continues to be a prominent freight transportation hub within national and international multimodal supply chains.

Due to its central geographical location, Winnipeg is a key intermodal and freight hub with over 1,800 lane-kilometers of designated truck routes in the city and serving as a key destination on the main lines of Canadian Pacific (CP), Canadian National (CN), Burlington Northern Santa Fe (BNSF), Central Manitoba Railway (CEMR) and Greater Winnipeg Water District (GWWD) railway networks.

In recent years, the Winnipeg Metropolitan Region has become the fastest-growing area of Manitoba and the province's economic hub. The region, which includes Winnipeg and 17 municipalities surrounding it, is home to two-thirds of Manitoban's population, and has positioned itself as the economic engine of the province. The region has become the operations hub for numerous large trucking firms that could directly compete with the railroads. These companies strategically serve destinations along Canada's east-west Trans-Canada Highway corridor and the north-south mid-continent corridor, including western Canada's second busiest port-of-entry for trucks at Emerson-Pembina. The trucking activity in the region is extremely diverse, facilitating long-distance inter-city hauls by truckload (including Long Combination Vehicle (LCV) operations), less-than-truckload, and bulk carriers, and intra-city activity by couriers and drayage operators.

This goods movement strategy was developed as one of the inputs to Winnipeg's Transportation Master Plan 2050 (TMP2050) with the goal of providing direction in city building and guidance for the City's investment and stewardship as it relates to the safe and efficient movement of goods. This strategy is also intended to serve as a blueprint for the Winnipeg Metropolitan Region to ensure continued economic growth in coordination with Winnipeg, its largest city.

Policy Context

The following are key highlights regarding the policy context within which this strategy was developed:

- *The importance of goods movement to the local economy and Winnipeg's role as a hub in continental and international trade. The development of this goods movement study is explicit in recognizing this critical aspect of Winnipeg's economic engine.*
- *The airport area, 24-hour air operation, and continued development of CentrePort as focus areas for goods movement. This is a key freight generator and attractor of goods and as such, there are specific actions that ensure the efficient and seamless movement of goods by the different modes to and from this location.*
- *Winnipeg's role as a rail and intermodal hub. A strong goods movement strategy ensures that Winnipeg cements its current role and enhances it through collaboration with its Metropolitan Region.*
- *The importance of links within and into and out of downtown for goods. This is an important aspect that needs to happen within a context of complete streets and sustainable transportation. As a result, actions that are developed to accomplish this service to downtown, recognize the dynamic interaction between various users of the transportation system in this area of the city.*

- *Success of the Winnipeg Metropolitan Region is critical to the City of Winnipeg's success in goods movement. This requires increased collaboration and cooperation between the City of Winnipeg and the Region, hence recognizing that many goods movement issues and their solutions are regional in scope.*
- *Continued relevance of the strategic objective of safe, efficient, and equitable movement of people, goods, and services. Actions that address these issues align with those identified in the Winnipeg Road Safety Strategy document.*
- *Large scale multimodal logistics hubs are attractive land uses and demands related to e-commerce are growing. This results in increased need for connectivity between current and future industrial developments outside the city and the intermodal hubs and CentrePort inside the city, to ensure that the resultant traffic uses desired corridors.*

Existing Network

Key considerations for the development of strategies for the safe and efficient movement of goods in Winnipeg and its Metropolitan Region are:

- There is significant demand for freight transportation in Winnipeg and its Metropolitan Region, with over 28 million tonnes of freight moved on an annual basis, representing over $70 billion per year. Approximately 80% of the tonnage and 90% of the value of freight is moved by truck.
- Over one half of the tonnage leaving Winnipeg and its Metropolitan Region by truck is comprised of minerals, waste, and fuels (these are commodities that typically weigh out). Over 60% of the tonnage entering Winnipeg and its Metropolitan Region by truck is comprised on plastic and chemical products, and manufactured products (these are commodities that may cube out or weigh out, depending on the product). The movement of freight by rail includes mainly agricultural products (nearly one half of all tonnage moved from Winnipeg and it its Metropolitan Region by rail); and metal, plastic, and chemicals (accounting for one-half of all tonnage moved into Winnipeg and its Metropolitan Region by rail).
- Most of Winnipeg's trucking companies are in the northwest and east areas of the city, close to key freight generators such as the Winnipeg Richardson International Airport, CentrePort, north Inkster industrial park, and St. Boniface industrial park. These are also near or on Route 90 or Lagimodiere Boulevard, with easy access to the Perimeter Highway.
- Winnipeg has an extensive truck route network, with 715 kilometres of road providing full time access to Winnipeg's commercial, industrial, and other destinations. Nearly 15% of this network is also accessible to long combination vehicles (LCVs) for important access to the provincial road network and some key destinations within the city.
- While the RTAC road network in the Metropolitan Region is extensive, at 681 kilometres in length, about half is limited to 62,500 kg versus 63,500 kg. In particular, there are gross vehicle weight (GVW) discontinuities at the transition from Highway 2, Highway 3, Highway 6 and Highway 59 South to the Perimeter Highway, where the incoming roads are classified at lower maximum GVWs

than the Perimeter Highway. These discontinuities may result in either lower productivity for those trucks that need to travel on the Perimeter Highway or increased number of weight-related violations.

- Pavement condition in Winnipeg, for the most part, is classified as good; however, this is not the case in the Metropolitan Region. Of the 833 kilometres of truck routes in Winnipeg, nearly 70% are classified as having either new or good pavement, 20% have fair pavement, and nearly 10% have poor pavement condition. In the Metropolitan Region, of the 1,767 kilometres of RTAC, A1, and B1 roads, 23% are classified as having good pavement condition rating, 50% have fair pavement, and 34% have poor pavement condition rating. This is an important consideration given that in Winnipeg, the greatest truck volumes are attributed to CentrePort Canada Way, Route 90, Lagimodiere Boulevard, Inkster Boulevard, Logan Avenue, and Keewatin Street. These streets, for the most part, have good pavement condition ratings, with some portions with fair or poor pavement condition. In the Metropolitan Region, the greatest truck volumes are attributed to the Perimeter Highway, Highway 1, Highway 75, and Highway 7. Except for Highway 7, which has a good pavement condition rating, all other high-volume roads have fair pavement conditions, which has important implications for truck operating costs.

- Single unit trucks operate mainly along Route 90, the southern portion of Lagimodiere Boulevard, Pembina Highway, Main Street, the downtown area, and the central west area of Winnipeg. Comparatively, articulated trucks operate mainly along CentrePort Canada Way, Lagimodiere Boulevard, Route 90, the Perimeter Highway and other provincial roads in the Metropolitan Region. This confirms the pickup and delivery nature of single unit trucks and the long-haul application of articulated vehicles. In addition, as it pertains to the Metropolitan Region, most articulated trucks with more than one trailer operate in the west and south perimeter highways and the TransCanada Highway west. This highlights the critical importance of the Perimeter Highway both as a gateway into the west and south of the province, and as the pain portal for trucking into and out of Winnipeg.

- Being located at the junction of the CN and CP lines, Winnipeg has an extensive railway network, with nearly 1,000 kilometres of Class 1 railways serving the region (Winnipeg and its Metropolitan Region). In Winnipeg, most of the crossings with cross-product over 200,000 are in the east side of the city, in Transcona, on the CP line, except for the Shaftesbury Boulevard crossing in the southeast area of the city. There is also high activity at four crossings on the CN line in Transcona near the intermodal terminal. In addition, there is extensive train-induced delay on key truck routes such as Marion Street, Mission Street, Messier Street, Fermor Avenue, Panet Road, and McGillivray Boulevard. In some instances, this delay can exceed three hours per day. This is important due to the associated greenhouse gas emissions and decreased productivity associated with this daily delay on the movement of goods.

- With respect to collisions involving trucks, while trucks account for a relatively low proportion of total collisions, the severity outcome associated with these collisions is significant. In Winnipeg, trucks accounted for 11% of all fatal collisions and 5% of all major injury collisions over the seven-year period between 2012 and 2018. Pedestrians and cyclists accounted for more than 60% of

fatally injured victims involved in collisions with trucks. However, it appears that the victim was at fault in these collisions as the major contributing factor was identified as pedestrian error/confusion. With respect to major injury truck-related collisions, 6% involve VRU.

- In the Metropolitan Region, trucks accounted for 9% of all collisions on RTAC, A1, and B1 highways; however, they also accounted for 23% of all fatal and 9% of all injury collisions on those roads. The Perimeter highway is of particular importance as it accounted for 18% of all fatal and 50% of all injury collisions involving trucks on Metropolitan Region provincial roads. Locations of particular importance are:
    - The segment between Roblin Boulevard and PTH 3 (McGillivray Boulevard)
    - The segment between PTH 2 and PTH 75 (Pembina Highway)
    - The segment between PTH 7 (Brookside Boulevard) and PTH 8 (McPhillips Street)
    - The segment between St Mary's Road and Lagimodiere Boulevard
- With respect to travel speeds, they are lowest in the downtown area and on radial arterial routes leading into downtown for both the morning and afternoon peak periods. Further, travel time variability is more geographically distributed in the weekday afternoon peak period, with routes showing high travel time variability in all areas of the city, including most of downtown. Like in the weekday morning peak period, weekday afternoon peak period travel time variability is greater on major arterial routes than on minor arterial routes. This has significant implications for truck travel time, reliability, safety, and reduce emissions.

Strategic Plan

The strategic framework for goods movement in Winnipeg and its metropolitan region comprises the following strategic objectives:

A. Protect the viability of goods movement in land use planning and development.

B. Promote seamless intermodal connectivity.

C. Collaborate with regional partners to increase goods movement safety, efficiency, and reliability and ensure inter-jurisdictional coordination of plans and policies.

D. Invest in transportation infrastructure and operational improvements to improve the movement of goods and anticipate new technologies.

E. Improve the services provided for goods movement in the last mile.

F. Prioritize data collection on freight-related issues to help with decision making and, going forward, support the development of improved analytical tools.

Details about each strategic objective and associated actions follow.

TABLE ES1: ACTIONS FOR STRATEGIC OBJECTIVE A - PROTECT THE VIABILITY OF GOODS MOVEMENT IN LAND USE PLANNING AND DEVELOPMENT

Action #	Action	Description
A1	Approve the update to Winnipeg's truck route network and use the update method as the basis for regular network reviews and updates going forward.	A new systematic process for updating the truck route network to ensure objectivity in the process has been developed as part of this strategy. Approving this method and the resulting network will ensure that Council decisions on future updates to Winnipeg's truck route network can be informed objectively. Public Works Department should review the truck route network regularly to ensure that it is always current to meet needs as they emerge while providing a systematic way to address any concerns raised by residents or by Council and inform decisions objectively. This is in line with how other major Canadian cities update their own truck route networks. A critical update will be required when the WMR goods movement network is developed which is anticipated to start in 2021 as per the Winnipeg Metropolitan Region Regional Growth and Servicing Draft Plan 20-50.
A2	Designate a strategic goods movement network.	A Strategic goods movement networks (SGMNs), which is based on the truck route network, defines a priority network for goods movement, which in turn informs investment priorities for network improvements, asset management for road/intersection upgrades and operational/signalization reviews (i.e., ensuring that freight is always considered explicitly in budgeting and planning decisions). By definition, the SGMN ensures that major freight generators are properly connected with each other (see also Strategic Direction B). The SGMN also is used to identify and address potential conflicts between freight movement, rapid transit, Complete Streets and other existing or planned corridor uses - in this way, each need can be met. The SGMN also informs long-range corridor land use planning decisions. The SGMN serves as the spine of the City's multi-modal freight network, meaning it should include both road and rail networks, thereby informing decisions and priorities for grade separations. Where the truck route network is intended to be updated frequently, the SGMN can serve for several years before it needs updating (e.g., at the frequency of the OCP or TMP update).
A3	Develop freight supportive guidelines for incorporating goods movement into corridor planning, design, and operations.	Develop guidelines that explicitly consider goods movement in terms of land use and transportation planning, site design, road design and operations, and road maintenance. The guidelines would be supported by current practices for incorporating goods movement into policy documents and zoning by-laws. The guidelines should be used to inform the implementation of Complete Street corridors, corridors that have high levels of transit service, etc. They should also be used to inform priorities for corridor design: this avoids an either-or situation (either a Complete Streets corridor or a major truck corridor), so as to properly accommodate all needs in balanced and safe ways according to the context.

Action #	Action	Description
A4	Work with stakeholders to plan for the accommodation of long combination vehicles (LCVs) in future commercial / industrial developments.	The continued growth of LCV operations into and out of Winnipeg, coupled with the unique operational requirements of these vehicles, require that Winnipeg and surrounding municipalities explicitly consider them in the designation of future employment lands and the planning of road accesses. This will ensure an adequate supply of LCV-compatible industrial lands is available (including on-site circulation and trailer coupling / decoupling) and that access to those lands (geometric, structural and operational adequacy of the access roads and the associated intersections and interchanges) meets the needs of these vehicles.
A5	Implement a policy whereby the movement of goods is explicitly considered in all development proposals.	Goods movement is currently either not considered or minimally considered in land use plans (master plans and secondary plans). In the interest of achieving the city's economic development, land use planning, and sustainability aspirations, a policy should be developed to ensure that goods movement and access to developments by commercial vehicles is explicitly addressed in development proposals. The policy should contain guidelines to plan for off-street loading, including differentiating between the design needs for in-and-out couriers/express delivery and loading bays for longer-term loading / unloading; off-street circulation of trucks; vehicle parking and storage; opportunities to combine off-street loading among neighbouring properties; etc. These policies should align with the regional development blueprint set in the finalized WMR Regional Growth and Servicing Plan 20-50.
A6	Create a regional planning committee for development approvals.	The existing lack of coordination in planning approvals between jurisdictions in the Metropolitan region can result in safety and operational problems for freight transportation and other road users. It is essential that the movement of goods be recognized as a regional issue and in the absence of a Regional Planning Authority, there should be a committee charged with the evaluation of any development applications located near jurisdictional boundaries of members of the Metropolitan region.

TABLE ES2: ACTIONS FOR STRATEGIC OBJECTIVE B - PROMOTE SEAMLESS INTERMODAL CONNECTIVITY

Action #	Action	Description
B1	Maintain viability of Winnipeg Richardson airport as a 24/7 operation and continued development of CentrePort as focus areas for goods movement.	One key is to ensure that planned development on adjacent lands or beneath the airport flight paths does not inhibit the ability of these facilities to carry on freight operations during the night-time hours. For example, Toronto's Pearson Airport is subject to night-time curfews because flight paths are over residential areas, which developed after the airport was constructed. Hamilton International Airport has no restrictions because residential development has not been permitted beneath the flight paths. The Winnipeg Airport Vicinity Protection Area Regulation going into affect in November 2021 sets development restrictions around Winnipeg Richardson airport which supports the Winnipeg International Airport Noise Exposure Forecast Study and Planning Recommendations. This regulation should be considered in all future goods movement discussions and plans.
B2	Deploy corridor management planning adjacent to rail corridors.	The object is to limit the encroachment of residential development along key rail corridors, so as to avoid pressures for limiting freight activity and access to intermodal terminals and yards. Guidelines exist (see especially *FCM-RAC Guidelines for New Development in Proximity to Railway Operations*) and is endorsed buy the WMR Regional Growth and Servicing Plan 20-50 . The creation of a map that identifies the "key" rail corridors and which specific policies apply would be important. The policies should state what developers and the City have to do to achieve the desired outcome of limiting the encroachment of residential development.
B3	Coordinate with neighbouring rural municipalities to ensure the cross-boundary coordination of infrastructure to serve key freight generators that are located across or adjoining the City's boundaries.	CentrePort, which transcends the boundary with the Rural Municipality of Rosser, is a key example. One of the biggest inhibitors of CentrePort's development is the lack of servicing infrastructure. Coordinate with the RM to ensure servicing infrastructure is prioritized for this development to ensure continued economic development. CentrePort has been designated an employment area by the finalized WMR Regional Growth and Servicing Plan 20-50.

TABLE ES3: ACTIONS FOR STRATEGIC OBJECTIVE C - C. COLLABORATE WITH REGIONAL PARTNERS TO INCREASE GOODS MOVEMENT SAFETY, EFFICIENCY, AND RELIABILITY AND ENSURE INTER-JURISDICTIONAL COORDINATION OF PLANS AND POLICIES.

Action #	Action	Description
C1	Create a regional goods movement advisory council	The Council's role would be to provide advise to the City of Winnipeg and the Winnipeg Metropolitan Region on matters involving freight project priorities and policy considerations that affect the movement of freight into, around and out of Winnipeg and its metropolitan region. It would provide a forum for regional freight stakeholders to discuss public-private collaborations, public outreach, infrastructure development needs, and other topics related to goods movement. Membership could be comprised of representatives from the private and public sectors, economic development agencies, educational institutions (with involved in freight systems planning and design), the trucking association, the Winnipeg Richardson International Airport, CentrePort, and other key stakeholders interested in the freight industry.
C2	Coordinate with the provincial government to harmonize truck size and weight regulations in the Metropolitan Region	The existing discontinuities in gross vehicle weight regulations in the southwest area of Winnipeg and the Perimeter Highway can result in lower productivity or increased weight-related violations for trucks that must access the Perimeter Highway. By ensuring harmonization of regulations throughout the region, truck productivity can increase.
C3	Create a new position for a freight transportation coordinator within Winnipeg Public Works	This position would be responsible for the planning, design, operational, and regulatory issues associated with the movement of freight transportation in Winnipeg and its Metropolitan Region. This position will also be responsible for coordinating with Metropolitan Region municipalities on all issues involving freight transportation to ensure the safe, efficient, and environmentally friendly movement of goods in the region.
C4	Review snow clearing policies in the Metropolitan Region	In collaboration with Manitoba Infrastructure, each municipality in the metropolitan region should conduct a thorough evaluation of their snow clearing policies and their alignment with MI's policies to ensure freight and courier transportation is not hindered by existing policies or snow clearance priorities. Any policies that hinder freight transportation should be updated to ensure seamless mobility of freight vehicles of all sizes, including small vehicles, vans, commercial cargo bicycles, and others.

Action #	Action	Description
C5	Partner with the private sector, neighbouring municipalities, senior governments, and others to pilot new freight transportation solutions	Pilot projects can reduce costs and risks while also establishing partnerships with the private sector or other levels of government as new, innovative solutions are developed. Some of the actions recommended in this plan can be initially implemented in the form of a pilot to ensure success and to explore issues and opportunities resulting from their implementation. Recent examples elsewhere are the deployment by couriers of cargo bicycles in dense urban cores with the support of the municipality, for which Montréal, Toronto and New York City are recent examples; and an on-street loading management strategy for an urban corridor in New York City. For this action, the City and/or the Winnipeg Metropolitan Region should work with private industry to initiate pilot projects that can demonstrate improvements to the movement of goods to/from/through Winnipeg and its metropolitan region.

TABLE ES4: ACTIONS FOR STRATEGIC OBJECTIVE D - INVEST IN TRANSPORTATION INFRASTRUCTURE AND OPERATIONAL IMPROVEMENTS TO IMPROVE THE MOVEMENT OF GOODS AND ANTICIPATE NEW TECHNOLOGIES

Action #	Action	Description
D1	Review and update signal timing plans to enhance the flow of goods on Inner Ring Road corridors while maintaining a safe environment for all other users.	The review of signal timing plans to ensure coordination and progression along Inner Ring Road corridors (like Perimeter Highway) can improve goods movement efficiency and reliability by reducing delay and mitigating congestion associated with traffic signals. Although signal timing plans are regularly reviewed to improve conditions for all traffic, the intent here is to focus on how the changed timings can improve the flow of trucks.
D2	Investigate the feasibility of piloting a truck-only lane on a high truck volume corridor	The potential primary and direct benefits of truck lanes include travel time savings, reliability improvements, safety improvements, emission reductions, and increased truck productivity. In addition, separating trucks and cars can potentially increase capacity for general purpose lanes and reduce the probability of collisions between cars and trucks. Identify a corridor(s) with high truck volumes, sufficient right-of-way and appropriate configuration / operating conditions, and investigate the feasibility of implementing a pilot project for the introduction of truck-only lanes. Depending on the results from this pilot project, this concept could be expanded to other high-use corridors in Winnipeg.

Action #	Action	Description
D3	Complete the western extension of Chief Peguis Trail	Expedite the completion of the western extension of Chief Peguis Trail Extension West (CPTEW) to increase the efficiency of freight transportation in the northern area of Winnipeg.
D4	Evaluate the need for improved traffic control at key freight generators and attractors in Winnipeg and surrounding municipalities	Working in consultation with indurstry members, evaluate the need for traffic control (e.g. traffic signal or other type) at key freight generators and attractors in Winnipeg and municipalities in the Metropolitan Region (e.g., Symington Yards, CN Intermodal Terminal, and others)
D5	Conduct road safety assessments to improve truck safety on the Perimeter Highway	The Perimeter Highway accounts for more than 10% of all collisions involving large trucks in the region. There should be regional collaboration to conduct road safety assessments on the Perimeter Highway from the truck perspective to ensure geometric, operational, and other issues are addressed to improve truck safety.
D6	Investigate the feasibility of implementing fibre cables and other infrastructure to accommodate future/emerging vehicle-infrastructure communications.	Many cities are pro-actively installing new communications technology infrastructure whenever new roads are constructed and existing roads are rehabilitated, in order to anticipate the advent of vehicle-to-infrastructure (V2I) communications that enable/support such technologies as connected and autonomous vehicles.
D7	Evaluate the feasibility of an east-west freight corridor connecting CentrePort with Transcona and the CN Intermodal Terminal	Several issues inform the need to examine the feasibility of an east-west corridor connecting the airport, Centreport, and industrial areas in the west to key freight hubs in the east of Winnipeg, passing through or near downtown. In addition, such a corridor would represent an improvement at strengthening crosstown goods movement with the added benefits of potentially improving road safety and creating opportunities for applying urban design principles to the new facility, as identified in Complete Streets 2.0.
D8	Identify alternative routing options for east-west truck movements through downtown Winnipeg	Given that Action D7 is not something that could be realized in the near term, the City should investigate feasible alternatives for goods movement through downtown Winnipeg to ensure economic development continues to grow for east-west activity.

TABLE ES5: ACTIONS FOR STRATEGIC OBJECTIVE E - IMPROVE THE SERVICES PROVIDED FOR GOODS MOVEMENT IN THE LAST MILE

Action #	Action	Description
E1	Review provision and management of on-/off street loading areas and truck parking	The provision of on- and off-street loading and parking areas should be considered in tandem. This means reviewing the adequacy and location of loading spaces and their utilization and dimensions, the special requirements of courier / express delivery, opportunities to consolidate off-street loading especially in high-density areas, enforcement, opportunities to promote the safe use of carbon-neutral vehicles and especially bicycles, potential for deploying urban consolidation centres to manage downtown deliveries especially at construction sites, availability of loading spaces during the off-hours, provision of loading in pedestrian areas and more. City site plan approvals should mandate off-street loading space for all development applications where practical. Current bylaws should be reviewed to ensure that off-peak deliveries are not limited or prohibited.
E2	Investigate the feasibility of implementing a Vehicle Parking Reservation System for downtown Winnipeg and other areas of high loading demand	A Vehicle Parking Reservation System allows drivers to program or book a parking space online or via phone near the loading/unloading location. This is a technological innovation that would be new to Winnipeg and the Metropolitan Region where constant monitoring of loading/unloading queues takes place through tracking cameras.
E3	Promote / enable off-peak and flexible deliveries	As a way of reducing deliveries during congested times of day, the City should evaluate the potential for off-peak deliveries (OPD) and other means of making deliveries more flexible. These measures could include working with major retailers and transporters to pilot an OPD program downtown, deploying secure lockers to drop off parcels without having to go to a recipient's home, ensuring that high-rise condos and other residential areas are designed to be able to securely receive after-hours deliveries (e.g., night-time delivery of courier packages) and more.
E4	Support the transition to low-/zero-carbon freight vehicles	Although large urban delivery fleets are moving towards the use of electric vehicles (EV) and other alternative-fuel vehicles, it is financially challenging for the many independents and small fleet operators to do so. The City can help by working with senior governments to subsidize the purchases of EVs and other alternative technology vehicles, deploying public rapid-charging stations for EVs, designating priority loading areas for low-/zero-carbon vehicles, investigating the feasibility of urban consolidation centres (and, most likely, subsidizing their development) and more. This will align with future regional plans like the WMR's Zero Emission Vehicle (ZEV) Strategy Plan whose development is anticipated to start in 2024.

Action #	Action	Description
E5	Collaborate with private industry to investigate opportunities to promote and expand bicycle delivery systems.	Freight trucks can have difficulty operating on urban roads due to insufficient curb space to unload goods. Some couriers and transporters have found that cargo bicycles are cost-effective ways to avoid the time lost in searching for loading spaces (i.e., there is a business case, let alone the contribution to reducting GHGs, etc.) Cargo bicycles designated for freight transportation can provide a smaller and more flexible means of completing deliveries in the first or last mile of the supply chain (e.g. delivery of mail, courier delivery, package delivery, home delivery, etc.). Delivery systems friendly to these vehicles can include deployment of microhubs to enable quick transfer of goods from trucks to bicycles at strategic locations, proper signing for bicycle traffic, bicycle infrastructure, collaboration with businesses for the installation of parking facilities at the destination points and more.
E6	Investigate opportunities for moving goods via public transport.	Some cities have investigated the opportunity to move freight via public transport during the night-time, when public transport routes do not operate for the public. However, the evidence is that this works best on routes with high volumes of freight that are concentrated to/from a single origin or destination (e.g., mail from the central sorting depot, or waste being transported to a collection site). Nonetheless, the opportunity could be investigated.

TABLE ES6: ACTIONS FOR STRATEGIC OBJECTIVE F - PRIORITIZE DATA COLLECTION ON FREIGHT-RELATED ISSUES TO HELP WITH DECISION MAKING AND, GOING FORWARD, SUPPORT THE DEVELOPMENT OF IMPROVED ANALYTICAL TOOLS.

Action #	Action	Description
F1	Implement a systematic truck traffic screenline counting program across Winnipeg and key adjacent freight generators.	The City operates a traffic monitoring program that determines average daily traffic information, which is used for planning, design, operations, maintenance, and other services. The current count programs includes trucks but there are gaps and inconsistencies. Trucks should be counted by class and should be distinguished from other large vehicles such as transit buses. Data should be available for the commuter peak hours/periods as well as the inter-peak and 24-hours. The City should also identify the need for new screenlines that capture activity to and from major freight generators, and should work with the surrounding municipalities to ensure that key generators are also included in the screenline system (presumably on a cost-sharing basis). The data should be reported consistently and uniformly across the coverage area, much the same way that the MHTIS reports its data across the Province. The data should be counted at least annually at key screenlines. This system should result in the generation of an annual truck flow map for Winnipeg and the Metropolitan Region, which will require collaboration with Manitoba Infrastructure.
F2	Reinstate the Manitoba Highway Traffic Information System in the Metropolitan Region	Manitoba Infrastructure should reinstate the Manitoba Highway Traffic Information System focusing on truck traffic in the metropolitan region. This is an essential data source that is needed to inform decisions about planning, design, operations, and maintenance of transportation services pertaining to trucking.
F3	Design, develop and implement a region-wide establishment / truck origin-destination survey, supplemented by special generator surveys at key freight terminals	The available data sources, exemplified by the StreetLight GPS data used for the TMP freight model, predominantly capture medium/heavy trucks that operate in fleets and largely serve the regional / long-haul movement of freight. Although these sources are important, they miss a substantive part of the freight activity in and around the city; namely, smaller vehicles that engage primarily in urban deliveries as well as vehicles of all sizes that are owned / operated independently. Moreover, the GPS data, while providing 24/7 coverage, cannot capture information on what is being carried, in what units, to/from what land uses, and so on. Meeting these gaps is essential to transitioning to tour-based truck models, to match the same advancements in the passenger model and, from the freight perspective, allow operational and policy initiatives to be tested (e.g., the impact of off-peak delivery and the transition to smaller, carbon-neutral vehicles, which the GPS data cannot handle). To address these gaps, there is a need to conduct establishment / truck origin-destination surveys, which many cities use to expand and leverage their GPS. In these surveys, establishments (public- and private-sector businesses) are sampled to describe their activities and then a sample of their trucks is then asked to complete a trip diary for 1 or more days. The surveys should cover Winnipeg

Action #	Action	Description
		and the metropolitan region, recognizing both the integration of the city and its surrounding for freight movement and commensurate with the model's study area coverage. Special generator surveys should be added to the core establishment/truck OD surveys to capture activity at key intermodal terminals such as CentrePort and the rail intermodal terminals.
F4	Design, develop, and implement a commodity flow survey in the region and beyond	Commodity flow surveys describe the goods that are moved by all modes across a large region. They complement establishment/truck OD surveys which are focused on urban, road-based activity. Statistics Canada's Canadian Freight Analysis Framework (CFAF) is a start, but the data are not consistently defined, using available modal sources that are defined and detailed in varying ways for different modes and provided from varying sources. The US Commodity Flow Survey provides a more wholistic example with respect to sampling and capturing cohesive data. Notwithstanding CFAF's initiative, we recommend that the Province of Manitoba embark on its own commodity flow survey which would capture Province-wide commodity flows by all economic sectors over all modes (road, rail, marine and air). This would serve as the basis for understanding the impacts of multi-modal flows to, from and through Winnipeg and the metropolitan region. The data base would support economic development, land use planning, the planning of services and more, as well as serving for an eventual model of the supply chain as well. The Province-wide commodity flow survey would be updated approximately every 5 years to ensure there is a standard basis for measuring freight activity performance over time and to support future planning, investment, and economic development initiatives.
F5	Collect cargo data at the Winnipeg Richardson International Airport	Given that there are no current reporting requirements on air tonnage origin-destination transport, nor any detailed reporting on commodities and value of goods arriving at the airport, the creation of a database containing this information is important for proper performance evaluation, as well as to understand the demand for freight activity in Winnipeg related to the airport. Working in collaboration with the WAA and Transport Canada, encourage the creation and maintenance of freight activity databases containing the following information about freight transportation to, from, and through Winnipeg by air at the Winnipeg Richardson International Airport: commodities by value, commodities by tonnage; and commodities by origin, and destination.
F6	Modify the provincial collision report form	Addressing truck safety issues would benefit significantly from having a better understanding of the types of trucks involved in collisions, the characteristics of those vehicles, cargo being carried, and other specific issues pertaining to the units involved. The Manitoba collision report form should be modified to include a section that specifically deals with commercial vehicles so that it can be filled out by officers in cases where these vehicles are involved. The City and the Metropolitan Region should work with MPI and Manitoba Infrastructure to implement this important change.

Action #	Action	Description
F7	Use these data to develop advanced freight modelling tools to support policy, design, and operational needs.	Use the collected establishment / truck OD survey and counts to develop tour-based urban freight models across Winnipeg and the metropolitan region (building on the updated freight model that was developed for this study) to cover urban freight activity more completely on local and regional roads, as well as a Province-wide commodity flow model to estimate multi-modal freight movements to, from and through Winnipeg.

1 INTRODUCTION



CN Yards at The Forks
Photo: U of M Archives

Winnipeg (also referred as city) has played a significant historical role in western Canadian goods movement and continues to be a prominent freight transportation hub within national and international multimodal supply chains. Even before the arrival of the trans-continental railroads, Winnipeg's location at the confluence of the Red and Assiniboine rivers made it a natural centre for regional trade and economic activity. The Canadian Pacific Railway's decision to route its mainline track through Winnipeg (rather than Selkirk) propelled the city's economic development, particularly through the trade of agricultural commodities in what is now known as the Exchange District. A second trans-continental railroad, Canadian National Railroad, connected Winnipeg to western Canadian destinations along a more northern alignment. Today, several short-lines and the BNSF (a U.S.-based Class I railroad) also serve the city.

Due to its central geographical location, Winnipeg is a key intermodal and freight hub. There are over 1,800 lane-kilometers of designated truck routes in the city, and it is a destination on the main lines of Canadian Pacific (CP), Canadian National (CN), Burlington Northern Santa Fe (BNSF), Central Manitoba Railway (CEMR) and Greater Winnipeg Water District (GWWD) railway networks.

In recent years, the Winnipeg Metropolitan Region has become the fastest-growing area of Manitoba and the province's economic hub. The region, which includes Winnipeg and 17 municipalities surrounding it, is home to two-thirds of Manitoban's population, and has positioned itself as the economic engine of the province. The region has become the operations hub for numerous large trucking firms that could directly compete with the railroads. These companies strategically serve destinations along Canada's east-west Trans-Canada Highway corridor and the north-south mid-continent corridor, including western Canada's second busiest port-of-entry for trucks at Emerson-Pembina. The trucking activity in the region is extremely diverse, facilitating long-distance inter-city hauls by truckload (including Long Combination Vehicle (LCV) operations), less-than-truckload, and bulk carriers, and intra-city activity by couriers and drayage operators.

There is significant demand for freight transportation in Winnipeg and its Metropolitan Region, with over 28 million tonnes of freight moved on an annual basis, representing over $70 billion per year. Approximately 80% of the tonnage and 90% of the value of freight is moved by truck.

Since 2008, all three levels of government have invested in Winnipeg's freight transportation infrastructure through the development of CentrePort Canada, a 20,000-acre tri-modal inland port located in Winnipeg's northwest quadrant and shared between the city and the RM of Rosser. CentrePort provides space for companies to co-locate with transportation and logistics service providers, helps facilitate transloading

between modes, and offers business opportunities as part of its Foreign Trade Zone programs (e.g., duty deferral, sales tax relief, customs bonded warehousing).

In more recent years, e-commerce has created a paradigm shift in terms of how people purchase and receive goods. Various entrepreneurial methods of acquiring goods have been introduced and are now commonplace with many more to come. Supplies that were at one time only available by physically going to the store can now be ordered electronically and delivered directly to one's door. This is expected to evolve further, which will increase the pressure placed on the 'last kilometre' or the 'first kilometre' of goods movement in the city. E-commerce also has a significant impact on on-/off-street loading and parking and has spawned the (re)development of lands to support distribution centres. Other emerging disruptors and technologies will impact goods movement in Winnipeg, including connected and autonomous vehicles, electric vehicles, automated manufacturing and 3D printing. Congestion in downtown Winnipeg and elsewhere suggests the need to find better routes for trucks that are not originating from or destined to the central area of the city, at the same time as Complete Streets schemes look to better ways to manage truck circulation on urban roads. Congestion induced by delays at the city's many at-grade rail crossings is also an important issue.

In an effort to ensure that the transportation system supports quality of life and economic vitality through safe, efficient, connected, and barrier-free movement of people and goods, Winnipeg embarked on the development of an updated Transportation Master Plan (TMP) for the city. A key component of the TMP is this goods movement study, which is intended to provide direction in city building and guidance for the City's investment and stewardship as it relates to the safe and efficient movement of goods. The plan is also intended to serve as a blueprint for the Winnipeg Metropolitan Region to ensure continued economic growth in coordination with Winnipeg, its largest city. Additionally, the Winnipeg Metropolitan Region is currently drafting the it's Regional Growth and Servicing Plan which identifies goods movement study as a key action for the region.

The scope of the goods movement analysis comprises Winnipeg and the Winnipeg Metropolitan Region (henceforth Metropolitan Region). The Metropolitan Region is comprised of 18 jurisdictions as follows:

- City of Winnipeg
- City of Selkirk
- RM of Cartier
- RM of East St. Paul
- RM of Headingley
- RM of Macdonald
- RM of Ritchot
- RM of Rockwood
- RM of Rosser
- RM of Springfield
- RM of St. Andrews
- RM of St. Clements
- RM of St. François Xavier
- RM of Taché
- RM of West St. Paul
- Town of Niverville
- Town of Stonewall
- Village of Dunnottar

The geographic area of interest to this analysis is shown in Figure 1.

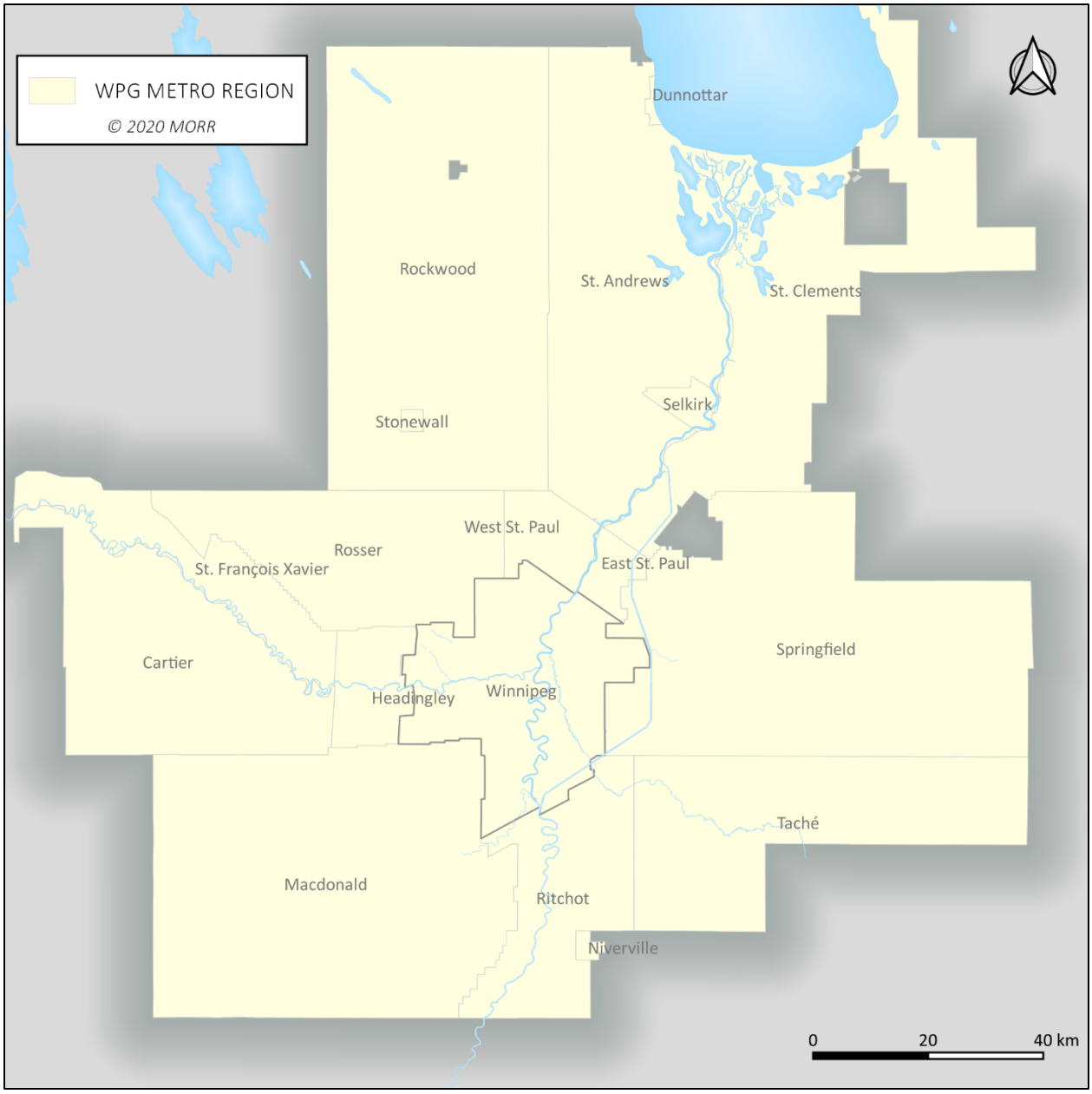


FIGURE 1: WINNIPEG METROPOLITAN REGION.

2 POLICY CONTEXT

2.1 Key Documents

There are nine key documents relevant to goods movement for the City of Winnipeg (see Table 1), which were explicitly considered in the development on the Goods Movement Strategy for Winnipeg and its metropolitan region. This section provides an overview of relevant goods movement-related content in each of these documents.

TABLE 1: KEY DOCUMENTS

Name	Source	Publication Date
OurWinnipeg 2045	City of Winnipeg	TBD
Complete Communities Direction Strategy 2.0	City of Winnipeg	TBD
Sustainable Transportation Direction Strategy	City of Winnipeg	2011
Transportation Master Plan	City of Winnipeg	2011
Employment and Commercial Lands Study	City of Winnipeg	2018
Winnipeg International Airport Master Plan 2033	Winnipeg Airports Authority	2015
Manitoba Capital Region Transportation Master Plan	Winnipeg Metropolitan Region	2014
Goods Movement Strategies Draft Background Report	City of Winnipeg	2010
Profile of Urban Goods Movement in Winnipeg	University of Manitoba Transport Information Group	1996
Regional Growth and Servicing Plan 20-50	Winnipeg Metropolitan Region	TBD
Securing Our Future: An Action Plan for Winnipeg Metropolitan Region	Winnipeg Metropolitan Region	2018

2.1.1 OurWinnipeg 2045



OurWinnipeg is the City's foundational planning document intended to guide 25 years of growth and development as per the City of Winnipeg Charter. The four direction strategies that fall under OurWinnipeg are Complete Communities, Sustainable Transportation, Sustainable Water and Waste Infrastructure, and A Sustainable Winnipeg.

OurWinnipeg places emphasis on the following six sustainable development goals:

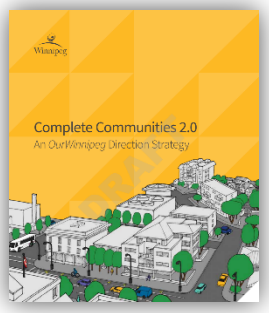
- Leadership and good governance
- Environmental resilience
- Economic prosperity
- Good health and well-being

- Social equity
- City building

While this plan, currently in its draft form, is largely silent on matters specific to goods movement, the Economic Prosperity goal has the following as one of its objectives:

"Make strategic use of community and regional assets to optimize local economic competitiveness: Enable resilient and diversified economic development that strengthens local business activities and workforce retention; connects people, goods and services; and builds on industry sectors and investments that secure Winnipeg's long term relevance in a competitive global economy"

2.1.2 Complete Communities 2.0



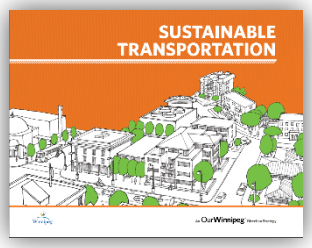
Complete Communities is one of four direction strategies that are being updated as support for OurWinnipeg 2045. The document, which is currently in draft form, is a citywide secondary plan that guides growth, development, and land use in the city, and whose primary focus is to describe Winnipeg's physical characteristics and introduce an Urban Structure that creates a framework for the city's future physical growth and development.

Important considerations from the document as it relates to goods movement are:

- With respect to Downtown, one of the mobility-related policies addresses "curbside management", calling for the study of curbside management best practices to ensure curbside space is managed equitably by the various users of this resource.
- As it relates to Corridors, Complete Communities is silent on the movement of goods along any type of corridor.
- Regarding Commercial Areas and Mixed-use Centres, the vision in Complete Communities is for these to be "vibrant and vital, providing access to goods and services necessary in creating complete communities . . ." However, no specific policies associated with the movement of goods are evident.
- For Employment Lands, the following are of relevance:
    - Goal 5 is to "buffer and protect Employment Lands from encroachment by other incompatible uses." Policy 5.3 calls for a review of truck routes and consideration of how they can best support Employment Areas.
    - Goal 7 is to "support high-quality design in the City's Employment Lands." Policy 7.1f states that loading facilities and large open storage areas should be in areas that minimize visual impact to other industrial uses and the street and are screened through appropriate fencing and landscaping

- Regarding the Airport Area, the vision in Complete Communities is that "The City of Winnipeg will support the role of the Winnipeg James Armstrong Richardson International Airport as a major transportation hub for passengers and cargo."
    - Goal 2 is to "collaborate with the Winnipeg Airports Authority on initiatives that capitalize on the airport's capacity to generate strategic economic development." Policy 2.1 calls for work with the Winnipeg Airports Authority and partners in the realization of the Airport Area as a major centre for goods distribution, manufacturing, and airport-related commercial/employment activity. Policy 2.2 relates to multi-modal transportation and it calls for collaboration with strategic partners and alignment of transportation planning and capital investments to promote multimodal transportation linkages to and from the airport.
- Complete Communities is silent regarding goods movement and the Winnipeg Metropolitan Region.
- Complete Communities is silent regarding goods movement as it pertains to Strategic Infrastructure and Resources.

2.1.3 Sustainable Transportation



Sustainable Transportation is one of four direction strategies that were prepared as support for OurWinnipeg. The document provides an outline of how transportation will be provided in Winnipeg in the future with an emphasis is on moving people, goods, and services in a way that is socially, environmentally, and economically sustainable. It represented a framework for the subsequent 2011 Transportation Master Plan, which is currently being updated.

Important considerations from the document as it relates to goods movement are:

- The Direction Strategy outlines a dynamic transportation planning and land use model as illustrated in Figure 2 and referenced throughout the document.

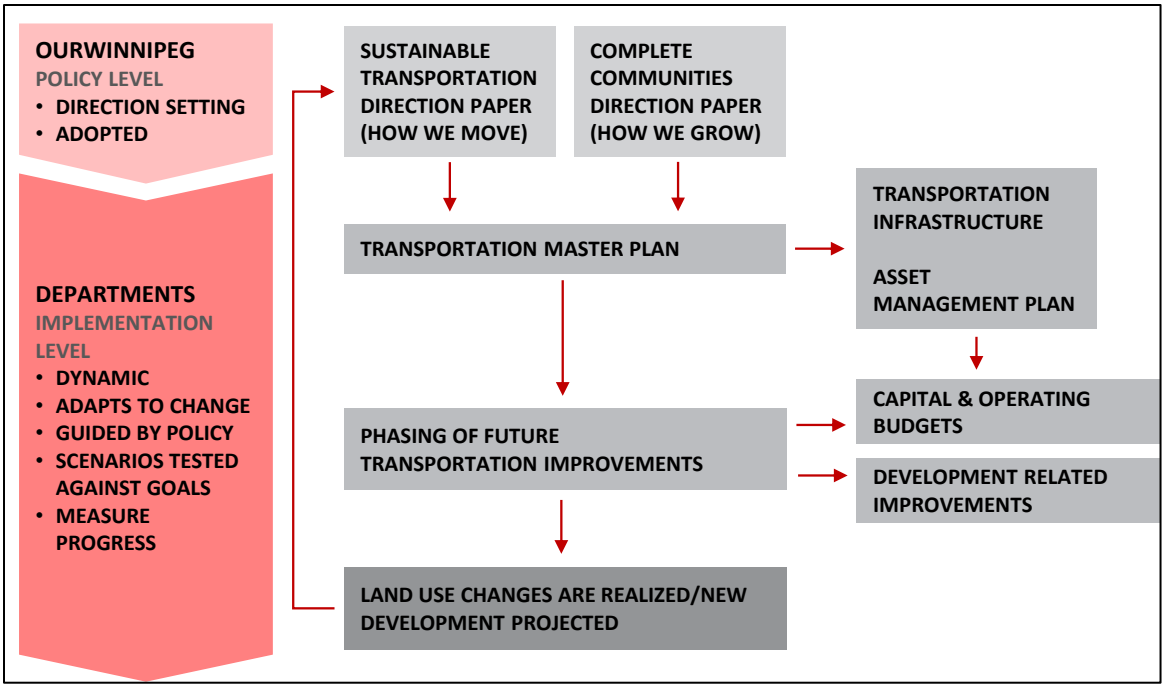


FIGURE 2: DYNAMIC TRANSPORTATION PLANNING AND LAND USE MODEL

- A strategic goal within the document is development of a safe, efficient, and equitable transportation system for people, goods, and services to ensure sustainable economic growth and an efficient, cost effective transportation system for the timely and equitable movement of goods, services and people.

- The development of a transportation planning computer model designed to incorporate all transportation modes together with their interaction with changes in land use will be a key component in the development of the Transportation Master Plan. This model has since been developed and is being updated as part of the Transportation Master Plan 2050. Sustainable Transportation envisioned the model to fully integrate transportation and land use planning, where alternate settlement patterns and transportation plans/services may be tested against their ability to achieve the goals of the policy. As the city grows over time, this tool is expected to allow for dynamic transportation planning that responds to changes in land use. When projections for certain land use changes and growth are realized (or not), the tool can help re-evaluate transportation planning needs, adjusting implementation as needed.

- Moving goods and delivering services efficiently within Winnipeg and through the surrounding region is a significant factor in economic competitiveness and prosperity. Yet the movement of goods and delivery of services also requires the management of air emissions, noise, excessive land consumption, collisions, spills, pavement damage, and increased road congestion. Attempting to balance these costs and benefits in a sustainable fashion is a significant challenge.

- Goods movement also creates significant infrastructure needs within the city and to and from the capital region (now the Winnipeg Metropolitan Region). Large volumes of goods being moved

through the city create other problems such as noise and intrusion. Reducing unnecessary goods movement and channelizing movement to reduce intrusion will be critical to Winnipeg's long-term health.

- The conceptual major street network illustrated included in Sustainable Transportation and shown in Figure 3, includes a component that could accommodate an improved level of urban goods movement around Winnipeg that minimizes intrusion into residential neighbourhoods while providing efficient access to key areas of the city. It also illustrates several conceptual additions to the Provincial highway network which link to or complete a major street improvement within the city.

- CentrePort is intended to be an inland port (developed and operational since). Containers that have landed on the Atlantic or Pacific coasts, and potentially through the port of Churchill, could be moved directly from the ship to CentrePort to be broken up or handled for ongoing processing. Similarly, outgoing shipments could be consolidated. Air cargo shipments moving through Winnipeg Richardson International Airport could be processed.

- Sustainable Transportation indicates that the Transportation Master Plan will reflect the opportunity and the need for more integrated planning, inter-municipal, and Provincial co-operation. The Transportation Master Plan will build on Winnipeg's strengths as a major city. It will also show Winnipeg's leadership in responding to the pressures caused by growth by accommodating that growth in a sustainable manner, basing it on integrating land use and transportation and on using infrastructure more efficiently. This approach will establish a strong urban core for Winnipeg within the Capital Region (now the Winnipeg Metropolitan Region) and will be the basis for an efficient regional transportation system. Coordinated planning of the regional transportation system will ensure that major areas of regional employment and residence are well-served by a variety of travel modes. While the Province is responsible for major roadway facilities within the Capital Region, several Winnipeg streets are also of regional significance, connecting to the provincial highway network and therefore serving regional populations.



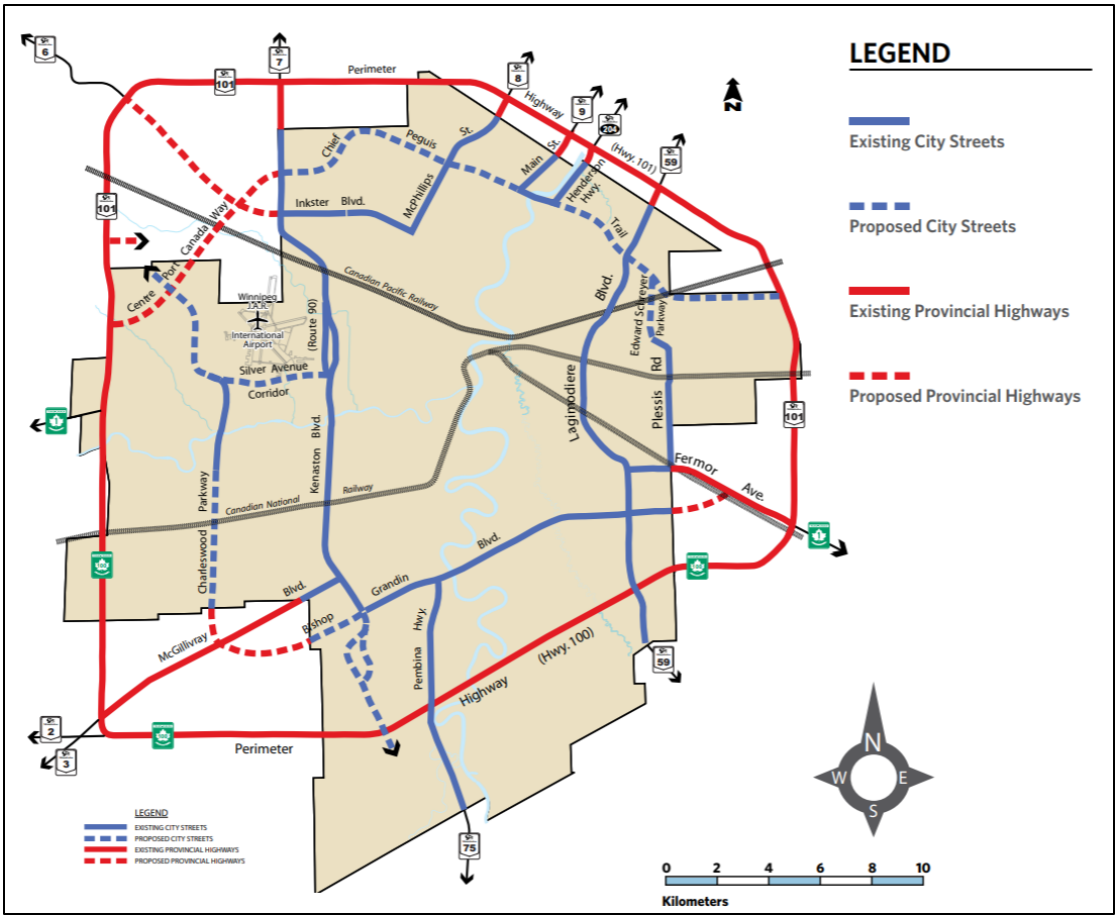


FIGURE 3: CONCEPTUAL MAJOR STREET AND HIGHWAY NETWORK

- The Sustainable Transportation Direction Strategy also involves an ongoing process of performance measurement tied to its Vision and Goals that monitors the desired outcomes and any influencing factors. This information will allow the City to assess the success of actions taken and provide guidance for further implementation. These measures are expected to have five basic characteristics:

    1. Diversity–should help measure social, economic, and environmental planning objectives.
    2. Usefulness–should be applicable to planning decisions.
    3. Easy to understand–experts as well as the general public should be able to interpret the information.
    4. Availability–the data should be readily available or proper resources should be devoted to adequately collect the required data.
    5. Comparability–the data should allow for comparison between various jurisdictions and institutions, as well as between time periods.

This list represents a desirable set of indicators for monitoring the implementation of Sustainable Transportation and resulting transportation performance. Many of these indicators require extensive data collection and not all may be achievable without additional data and staffing resources.

- In general, comprehensive performance measurement should be conducted every five years in conjunction with regular updates to this Direction Strategy and OurWinnipeg. Some indicators may be monitored more frequently, given the nature of their data and collection methods. Proper reporting is a key aspect of performance measurement because the knowledge generated by monitoring and analysis is only useful if decision makers and stakeholders are aware of it. A report card should be developed based on the performance measurement framework providing simple rating for progress towards each objective (e.g., very good progress, good progress, little change, negative progress, very negative progress). The performance measures provided for goods movement in the document are:

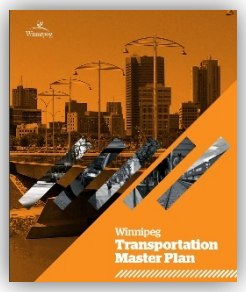
  Goal: An efficient and effective transportation system for people, goods, and services

  Measure: Goods movement conditions

  Performance indicators: off-peak road congestion (creating truck lanes and hazardous materials routes); directedness of truck routings modifying the regulatory framework to foster the use of more efficient vehicles (rewarding greener carriers through the permitting system)

2.1.4 2011 Transportation Master Plan

The 2011 Transportation Master Plan (TMP) is a Council approved document that presents an actionable long-term strategy to guide the planning, development, renewal, and maintenance of a multi-modal transportation system in a manner that is consistent with projected needs and aligned with the City's growth and the overall vision for a sustainable Winnipeg and region.



Important considerations from the document as it relates to goods movement are:

- Ensure an effective and sustainable goods movement network that includes key trade corridors and truck routes as part of the balanced, multimodal transportation system.
- A key strategic goal is a safe, efficient, and equitable transportation system for people, goods and services. To ensure sustainable economic growth that supports Winnipeg as the region's economic engine, an efficient, cost-effective transportation system for the timely and equitable movement of goods, services, and people is an essential element. To achieve this goal, Winnipeg will need to utilize technology such as Intelligent Transportation Systems (ITS) and other transportation systems management tools, transportation demand management, strategic major street network improvements, rapid transit, and other innovative ways to move people, goods, and services.

- Winnipeg is unique in that there are no major expressways through the city. Winnipeg's road network is intended to accommodate pedestrians, cyclists, transit, motorists, and goods movement. The street network consists of local streets that primarily provide access to individual properties, collector roads, and arterial roads. This is advantageous in that the "barrier effect" created by expressways in some other cities has been largely avoided; however, it can also significantly limit the efficiency of the network for longer distance trips and goods movement.
- A key direction is to balance the needs of all users to support complete communities and the urban structure. The Transportation Master Plan identifies the elements of complete streets, including goods movement, as shown in Table 2.

TABLE 2: COMPLETE STREETS AND GOODS MOVEMENT

<table>
<tr><th>Network</th><th>Road Category</th><th>Pedestrians</th><th>Cyclists</th><th>Transit</th><th>Parking</th><th>Motorist</th><th>Goods Movement</th></tr>
<tr><td rowspan="2">Provincial Road Network</td><td>Provincial Truck Highway</td><td colspan="2">Design AT into overpasses/interchanges</td><td rowspan="2">Potential express and regional bus service</td><td>Not Permitted</td><td rowspan="2">Primary focus</td><td rowspan="2">Provide direct access into goods movement facilities</td></tr>
<tr><td>Provincial Roads</td><td>Sidewalks in urban areas safe crossings</td><td>Paved Shoulders</td><td>Permitted when required</td></tr>
<tr><td rowspan="4">Winnipeg Road Network</td><td>Major Arterials</td><td>Sidewalks separated by boulevards</td><td>Separated bike facilities where road speed >50km/h</td><td>Diamond lanes, dedicated rapid transit, transit priority</td><td>Permitted in commercial areas</td><td>Maximize efficiency but design with regard for other road users</td><td>Primary roadways for heavy-duty vehicles</td></tr>
<tr><td>Minor Arterials</td><td>Sidewalks on both sides</td><td>Bike lanes or cycle tracks</td><td>Signal priority, enhanced bus stop amenities</td><td rowspan="3">Encourage on-street parking to reduce off-street parking requirements</td><td>Balance movement with other road user needs</td><td rowspan="3">Discouraged except for direct access to origin / destination</td></tr>
<tr><td>Collector</td><td>Sidewalks on both sides</td><td>Bike lanes or bike boulevards</td><td rowspan="2">Local on-street bus routes</td><td rowspan="2">Traffic calming measures, encourage low speed</td></tr>
<tr><td>Local</td><td colspan="2">Sidewalks and consideration for shared space</td></tr>
</table>

Legend

Primary Focus	Accommodate with caution	Discouraged

- Winnipeg is a key intermodal and freight hub due to its geographical location. Winnipeg is a destination on the main lines of the CPR, CN and BNSF railway networks, and provides direct connections to U.S. rail corridors. CN'S Symington yard is one of the largest in the world, with a capacity of over 3,500 rail cars. Winnipeg is also home to large, key CPR facilities and over 2,000 CPR employees. There are over 1,800 lane-kilometres of designated truck routes and more than 40 million goods movement trips are made within and through the city on an annual basis.

- The city has a well-established transportation infrastructure that accommodates more than 40 million goods movement trips annually. Large repair and intermodal facilities from the main Canadian railway companies, and the number one airport in Canada based on dedicated cargo freighters, are located in Winnipeg. This network is critical to the city's economy and support of the transportation and trade industries by providing over 1,800 lane-kilometres of designated truck routes.

- While productivity and efficiency are key elements to sustainable goods movement, priority on commercial transportation issues remains low in Winnipeg.

- Winnipeg's gross domestic product is projected to grow at an average of 2.5% compounded annually to 2030 and 88,000 new jobs are forecast by 2031 (conference board of Canada, 2007). Most of these jobs will be in the service industry or targeted to key strategic sectors including manufacturing and financial services.

- All employment sectors have unique locational characteristics and transportation needs. Providing and maintaining an effective road network to employment lands and large industrial centres will accommodate current and future goods movement demand. This will be key to reducing the growing pressures on transportation infrastructure and minimizing impacts to neighbouring residential and commercial developments.

- Balancing the needs of efficient and sustainable goods movement with those of Complete Communities will allow the City to remain economically competitive while maintaining neighbourhood liveability. One of directions here is to ensure an effective and sustainable goods movement network that includes key trade corridors and truck routes for a balanced, multi-modal transportation system. Provided enabling strategies to achieve this are:
    - Adopt and implement the goods movement network as identified in Figure 4.
    - Continue to work with the transportation industry to direct higher volumes of goods movement towards the network.
    - Continue to work with stakeholders such as the WAA to support the 24-hour operations of the James Armstrong Richardson international airport as a major centre for goods movement and commercial activity.
    - Explore and support opportunities for innovative goods movement and service that respond to changing delivery methods.
    - To reduce peak-hour demands, encourage sustainable loading and delivery practices, and review related city policies and design standards.

- Use ITS to minimize traffic flows and travel times while improving safety on the goods movement network.
- Use ITS to collect data on truck movements and volumes to improve efficiency of the transportation network.
- Continue to build on strategic partnerships with higher levels of government, key freight, rail and air agencies, and industry stakeholders.

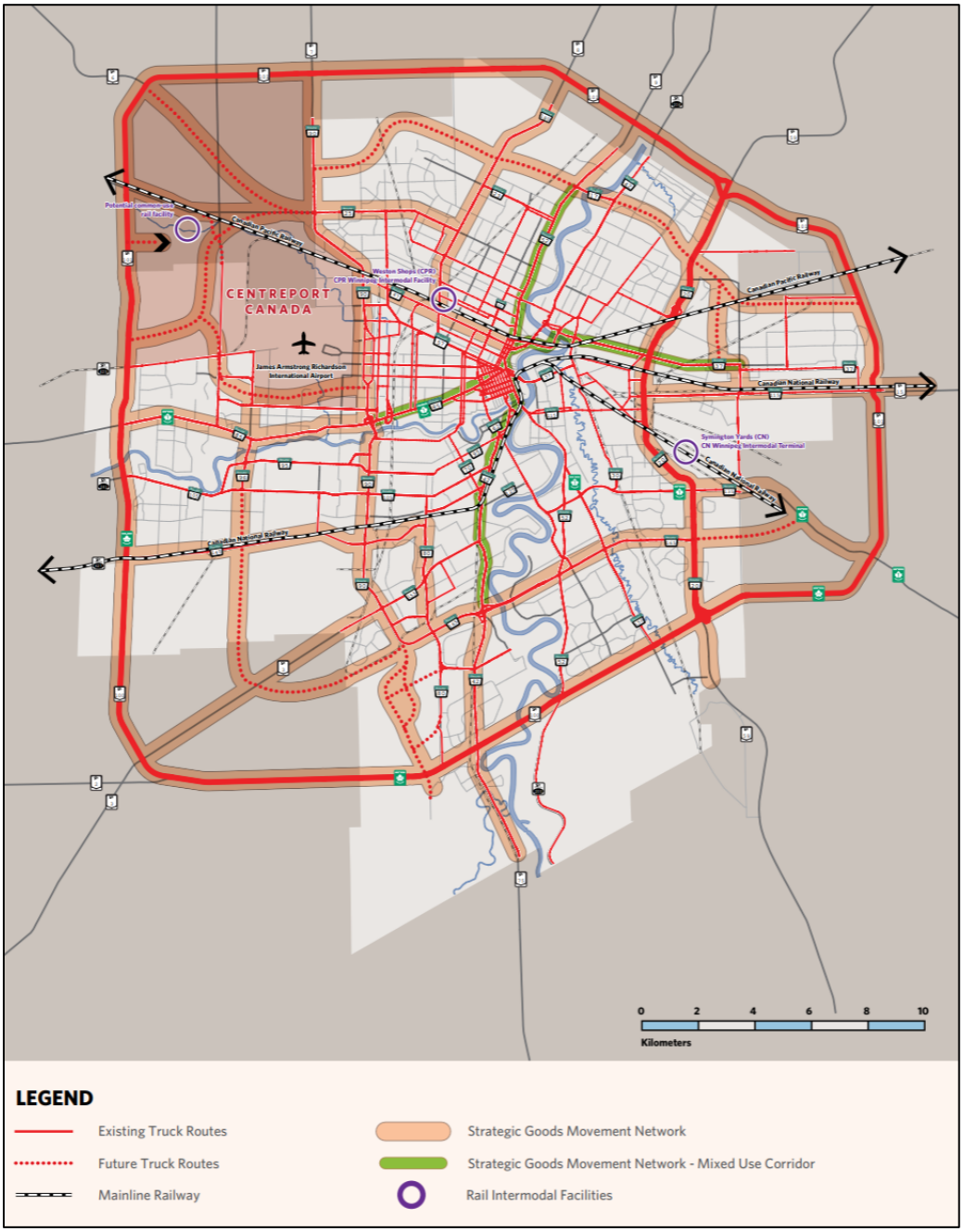


FIGURE 4: GOODS MOVEMENT MAP FROM 2011 TRANSPORTATION MASTER PLAN

- A comprehensive implementation, funding, and monitoring framework is essential as part of the Transportation Master Plan. With respect to goods movement, the 2011 TMP identifies the elements shown in Table 3 regarding implementation, funding, and monitoring.

TABLE 3: IMPLEMENTATION, FUNDING, AND MONITORING FOR GOODS MOVEMENT3F.1

Enabling Strategy	Timeframe			Support Key Strategic Goal #						Partners	Level of Effort	Capital Impact	Operational Impact
	Short	Medium	Long	1	2	3	4	5	6				
6.0 Goods Movement													
a) Adopt and implement the goods movement network (Map 5).	✓	■	■	●		●				Public Works, PPD	Medium	Medium	Low
b) Continue to work with the transportation industry to direct higher volumes of goods movement towards the network.	✓	■	■	●		●				Public Works, PPD	Low	None	None
c) Continue to work with stakeholders to support the 24-hour operations of airport.	✓	■	■			●				Public Works, Airport	Low	None	None
d) Explore and support opportunities for innovative goods movement and service that respond to changing delivery methods.	✓	■	■		●	●				Public Works	Low	None	None
e) Encourage sustainable loading and delivery practices and review related City policies and design standards.	✓	■	■			●			●	Public Works, PPD	Medium	Low	None
f) Use ITS to minimize traffic flows and travel times, and improve safety on the goods movement network.	✓	■	■			●				Public Works	Medium	Low	Low
g) Use ITS to collect data on truck movements and volumes to improve efficiency of the transportation network.	✓	■	■			●	●			Public Works	Medium	Low	Low
h) Continue to build on strategic partnerships with higher levels of government, key freight, rail and air agencies, and industry stakeholders.	✓	■	■			●	●	●		Public Works, CAO	Low	None	None

✓ Timeframe

- Actions initiated in earlier timeframe than 2011

● Key strategic goal

[1] Adapted from City of Winnipeg (2011), *Transportation Master Plan*. Map 8.

2.1.5 Employment and Commercial Lands Study



This study provided a comprehensive update of the City's commercial and employment (industrial) land needs to the year 2036 and made recommendations on how the City's land use policies should be updated.

Important considerations from the document, as it relates to goods movement are:

- The City faces a large shortfall of serviced employment lands to accommodate forecasted growth over the next 20 years.
- City competitiveness is being compromised by the fact that serviced industrial lands are not sufficiently being brought on-stream and that there is currently no clear vision or strategy to do so.
- Capital Region municipalities are becoming increasingly competitive.
- Existing OurWinnipeg/Complete Communities policy does not adequately protect and manage existing employment lands.
- There is more than enough vacant commercial land available in the city to accommodate forecasted growth over the next 20 years, and this surplus will inhibit retail intensification.

The report indicates that from a macro-economic perspective the City's economy is transitioning from goods to services production. Specific comments on goods movement in the report included:

- The goods movement sector is accommodated in a range of industrial building typologies reflecting the diverse subsectors that comprise the sector. This includes distribution centres, warehouses, fulfillment centres, delivery depots, logistics hubs, corporate office buildings of major logistics companies, trucking terminals, multi-tenant warehouses and terminals, cold storage buildings, and transportation yards.
- Increased outsourcing of manufacturing production to emerging global markets continues to drive the need for new consolidated, land-extensive warehousing facilities to store and manage the distribution of goods produced both locally and imported from abroad.
- Several factors have been changing the nature of the goods movement industry over recent years, including just-in-time manufacturing, e-commerce, and globalization. It is expected that the industry will continue to evolve and, in the near-term, the following trends are expected in Canada:
    - Just-in-time manufacturing will continue to be the industry norm, placing increasing emphasis on more frequent and smaller deliveries by truck transport.
    - Automation of distribution centres allows for more vertical storage; however, the need for numerous loading bays will dictate land requirements and the industry trend is for more and more bays at facilities.

- Larger facilities are a continuing trend versus smaller properties; typically, the larger the property, the lower the average employment density.
- Locations close to multi-modal facilities continue to be very attractive, with access to rail – this is generating increased demand for larger scale logistics hubs. Intermodal hubs typically require approximately 200 to 300 ha for intermodal infrastructure and loading/unloading areas. Express terminals are smaller (<100 ha).
- Increasing growth in e-commerce is anticipated to have a significant impact on employment growth and land demand related to the logistics sector. E-commerce sales in Canada have grown at a rate that is five times the pace of overall growth in retail trade. Online sales account for 6% of total Canadian retail spending. By comparison, U.S. online sales account for 9% of total spending. Delivery expectations within this sector are increasing on an annual basis. As delivery times decrease, it is anticipated that demand for regional fulfilment centres will increase; and
- Reverse logistics – approximately 25-30% of online merchandise is returned, which is generating increasing needs for dedicated return centres.

2.1.6 Winnipeg Richardson International Airport Master Plan 2033

The Winnipeg Richardson International Airport Master Plan is a strategic-level document based on aviation forecasts including anticipated passenger levels, cargo volumes, and aircraft movements. Each airport system (e.g., airfield, terminal ground access) is systematically reviewed against the predicted future direction of the industry and the locality.



Important considerations from the document as it relates to goods movement are:

- Winnipeg Richardson International Airport is one of Manitoba's most significant economic engines. An economic impact study completed in 2013 reported the airport contributes almost $3.6 billion in economic output, supports over 19,400 jobs, and creates wages greater than $810 million.
- Air cargo volumes are predicted to reach 282,000 tonnes by 2033, an average growth rate of 2.3% per year between 2013 and 2033.
- Connection of the airport to Winnipeg and beyond is a key theme. Ground access planning depends on collaboration with municipal and provincial governments and is integral to the future success of this airport in connecting goods and people to markets. To achieve this, the plan recommends that the road network be improved to facilitate commercial development, including a Cargo Road to Flight Road Connection, Ferry Road extension, Moray Street upgrade and extension, Dublin Avenue extension, and a future east-west corridor along Silver Avenue.

- Economic benefits are expected to grow with the anticipated increase in aviation activity for both passenger and cargo operations. Additional ongoing investments will further the efficiencies of the airport and create new revenue sources, such as commercial land development. For example, new businesses can be attracted to the airport to leverage the strong cargo network at the airport. The city and province also benefit through improved supply chain networks for area businesses, and global connections for business travelers.

Suggested road improvements from the Master Plan are shown in Figure 5 and Figure 6 and are described below:

Cargo Road to Flight Road Connection: A service road currently ends at the midway point between Cargo Road and Flight Road. Extending this road to connect with Flight Road will improve traffic connectivity and circulation in the Integrator and Aerospace Campus.

- Recommendation: Extension of existing east-west service road from Cargo Road to Flight Road.
- Trigger Point: Time with upcoming changes for new leases in the Integrator and Aerospace Campus.

Ferry Road Extension: There is currently a gap on Ferry Road that prevents connection between Ellice and Sargent Avenues. Removing the gap would also improve traffic connectivity in the Integrator and Aerospace Campus. However, this corridor currently facilitates airplane access to Apron V from the surrounding developments. Extending Ferry Road would result in eliminating airplane access to Apron V unless an elevated structure is put in place to bridge this gap.

- Recommendation: Extension of Ferry Road from Aviation Road to Allen Dyne Road.
- Trigger Point: Pending further review of the plan around Apron V and existing airside lot access east of Ferry Road.

Moray Street Upgrade and Extension: The Advance Manufacturing and Intermodal Campus is a key part of the commercial development strategy for the airport. The growth requires improved access with a main access road, as well as supporting future developments in the northern part of the site. With CentrePort Canada Way in place, there will be an opportunity to further enhance Moray Street as a north-south corridor by providing a future connection to CentrePort Canada Way further to the north.

- Recommendation: Upgrade the section of Moray Street north of Murray Park Road to the same 4-lane arterial standard that exists to the south. In addition to this upgrade, Moray Street should also be extended north of Saskatchewan Road.
- Trigger Point: Tied to the potential near-term opportunities for additional land development on the Advance Manufacturing and Intermodal Campus.

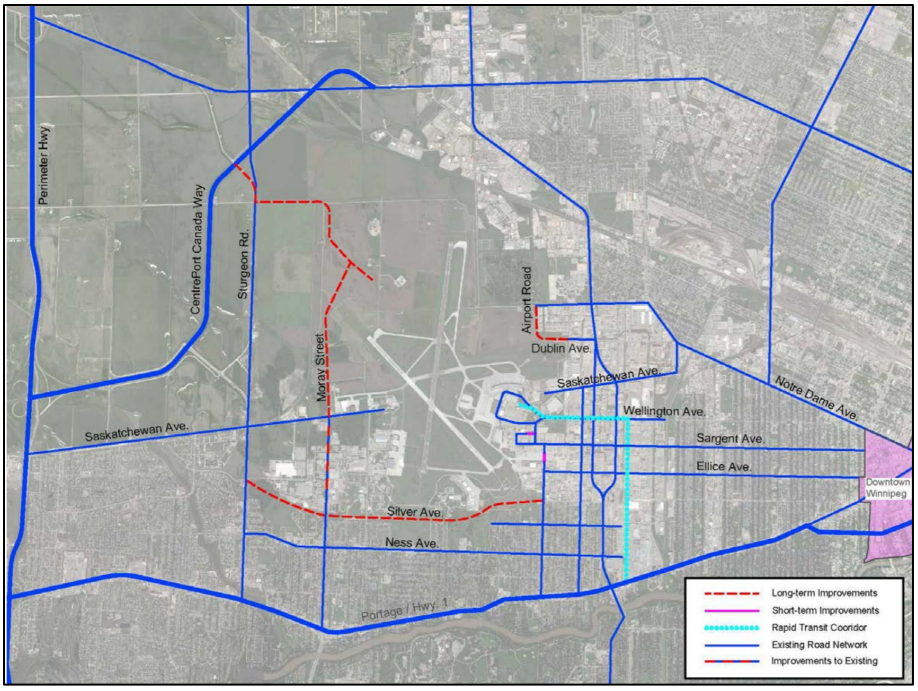


FIGURE 5: WINNIPEG RICHARDSON INTERNATIONAL AIRPORT AREA RECOMMENDED IMPROVEMENTS – BROAD AREA

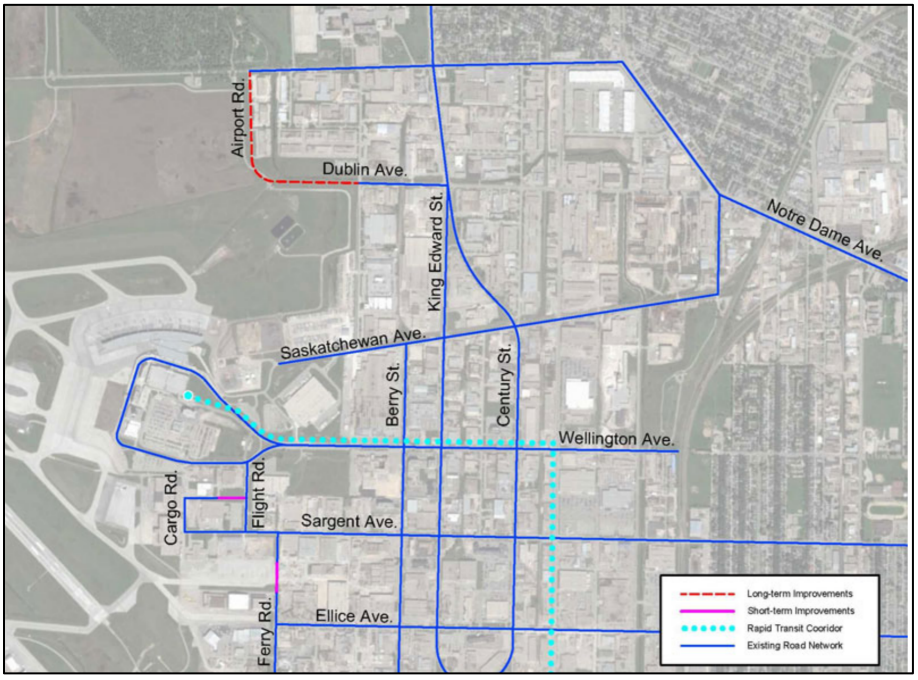


FIGURE 6: WINNIPEG RICHARDSON INTERNATIONAL AIRPORT AREA RECOMMENDED IMPROVEMENTS – PROXIMATE TO TERMINAL

Dublin Avenue Extension to Airport Road: Dublin Avenue is an east-west road that connects Sherwin Road to Kenaston Boulevard. Sherwin Road is a key link that will provide access to future commercial

developments within the Advance Manufacturing and Intermodal Campus. Extending Dublin Avenue to connect with Airport Road to the northwest would enhance connectivity and provide access to the future business park.

- Recommendation: Extend Dublin Avenue to connect with Airport Road to the northwest.
- Trigger Point: Potential leases associated with lands north of the terminal building in the Innovation Campus.

Silver Avenue Corridor: This route would provide east/west access immediately south of the airport. Construction of this route could occur in two stages—from Kenaston Boulevard to Sharp Boulevard, and from Sharp Boulevard to Sturgeon Road. The Silver Avenue corridor would provide additional capacity for east/west trucking routes, open lands east of Apron II for development, and support development of the Advance Manufacturing and Intermodal Campus plus lands west of the airport site.

- Recommendation: Complete an east-west connection along Silver Avenue in the long term.

Trigger Point: Future activity and linkages tied to existing users (DND) and requirements for greater connectivity for land development.

An Airport Campus Development Plan is included in the Master Plan. A description of two key aspects related to goods movement is described below and the plan is illustrated in Figure 7.

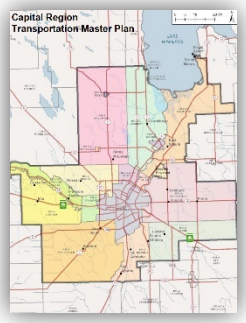
- Cargo Integrator & Aerospace Campus - Cargo Integrators and advanced manufacturing firms are grouped in and around the southeast area of the airport forming a cluster of logistic and aerospace economic activity. Leveraging the potential upstream and downstream economic activities associated with logistics and aerospace, this campus provides opportunity for increased value-added services and just-in-time operations, as well as advanced manufacturing assembly operations. Increased functionality is essential for growth and acceleration of logistics and aerospace in the campus, with improved road network, redevelopment, and allocation of economic activity into modern building facilities. Additionally, as part of increasing mobility across the campus, the planning and design of a link from the Integrator and Aerospace Campus to Airport Campus Centre increases the overall functionality and integration throughout YWG. Target economic clusters, tenants and end users include:
    - Courier and parcel logistics & distribution.
    - Value-added logistics & distribution.
    - Aerospace assembly & manufacturing; and
    - Advanced manufacturing.
- Advanced Manufacturing & Intermodal Logistics Campus - The Advanced Manufacturing & Intermodal Logistics Campus enables key economic clusters that will stimulate regional growth. The strategic direction for this campus facilitates integration of airport operations and emerging economic clusters that rely on serviced land near air, ground, and rail multimodal

facilities. This campus improves the airside/groundside interface through road improvements to provide businesses immediate access to the airport and the regional road system.



FIGURE 7: AIRPORT CAMPUS DEVELOPMENT PLAN

2.1.7 Manitoba Capital Region Transportation Master Plan



The Capital Region (now the Winnipeg Metropolitan Region) Transportation Master Plan provides a strategy to guide the planning and implementation of transportation system improvements and land use policies, to address both future development and the movement of people and goods within the Capital Region in a way that is socially, environmentally, and economically sustainable. The Plan considers all modes of travel – passenger vehicles, transit, active transportation, rail, and air services. It presents a long-term framework for a multi-modal transportation system to meet the forecast needs of the Capital Region over the next 20 years and beyond.

Important considerations from the document as it relates to goods movement are:

- A key strategic goal is to support economic development through the efficient movement of people and goods - In order to achieve sustainable economic development in the Capital Region, and to ensure the safe and efficient movement of goods through the Capital Region, enhancing the economic viability of Manitoba, an effective and efficient transportation system is an essential component that can be enabled through strategic transportation improvements and management tools.
- A second key strategic goal is to promote safety for all users of the transportation system - Safety and security for all users of the transportation system, including pedestrians and cyclists is an essential component to maintain and improve the quality of life in the Capital Region.

- In the RM of Headingly, trucks and through traffic using Roblin Boulevard is increasing and conflicting with local traffic.
- In the RM of Rosser, the introduction of CentrePort is forecasted to add a significant amount of industrial-related traffic. CentrePort Canada Way is anticipated to relieve traffic congestion on former PR 221 (Inkster Boulevard and Rosser Road) and to accommodate new traffic resulting from industrial development in CentrePort. However, there is evidence that trucks are infiltrating municipal roads.
- In the RM of St. Andrews, the St. Andrews Airport industrial park is projected to attract significant industrial development.
- Manitoba Infrastructure has identified certain corridors that have a high level of goods movement activity and/or will require improvements to accommodate anticipated goods movement needs. Of particular concern in this regard are proposed bypasses of built up areas (e.g., Headingley, St. Norbert and the Winnipeg Selkirk Corridor) and major river crossings (e.g., New Red River Crossing in the Lockport/Selkirk area).
- Key issues specific to the Capital Region, that may lead to the need for alternatives to the existing delivery method for transportation and land use are identified. The issue pertaining to goods movement is functional coordination. Under this issue, the Plan states that more coordinated planning and delivery of transportation services is required to achieve compatible transportation and land use, and to achieve intermodal coordination.
- One of the recommendations from this Plan is to undertake a Land Use and Internal Road Network Plan for CentrePort Canada. The purpose of this undertaking would be to outline the internal road network as well as additional modifications required to the adjacent existing road network (Sturgeon Road and PR 221). CentrePort will be served by CentrePort Canada Way, the future extension of Chief Peguis Trail, Inkster Boulevard, Route 90, and the Perimeter Highway. New development within CentrePort will generate a significant amount of pressure on the transportation system, with all modes experiencing an increase in frequency. Truck traffic, train and air traffic will increase as new industry is attracted to the area. The development of a transportation plan and land use plan for CentrePort would provide more detailed information related to impacts on the local transportation system.
- The plan recommends a series of infrastructure improvements based on a traffic modelling exercise and other input received through the planning process. Figure 8 illustrates these recommendations.
    - Undertake twinning or construction of additional lanes on several key routes to mitigate areas of existing and future congestion.
    - Construction of new interchanges to alleviate congestion and improve safety.
    - Undertake Development of New Bypasses and New Routes (e.g., Headingley bypass, St. Norbert Bypass, Oakbank corridor, Winnipeg-Selkirk corridor).

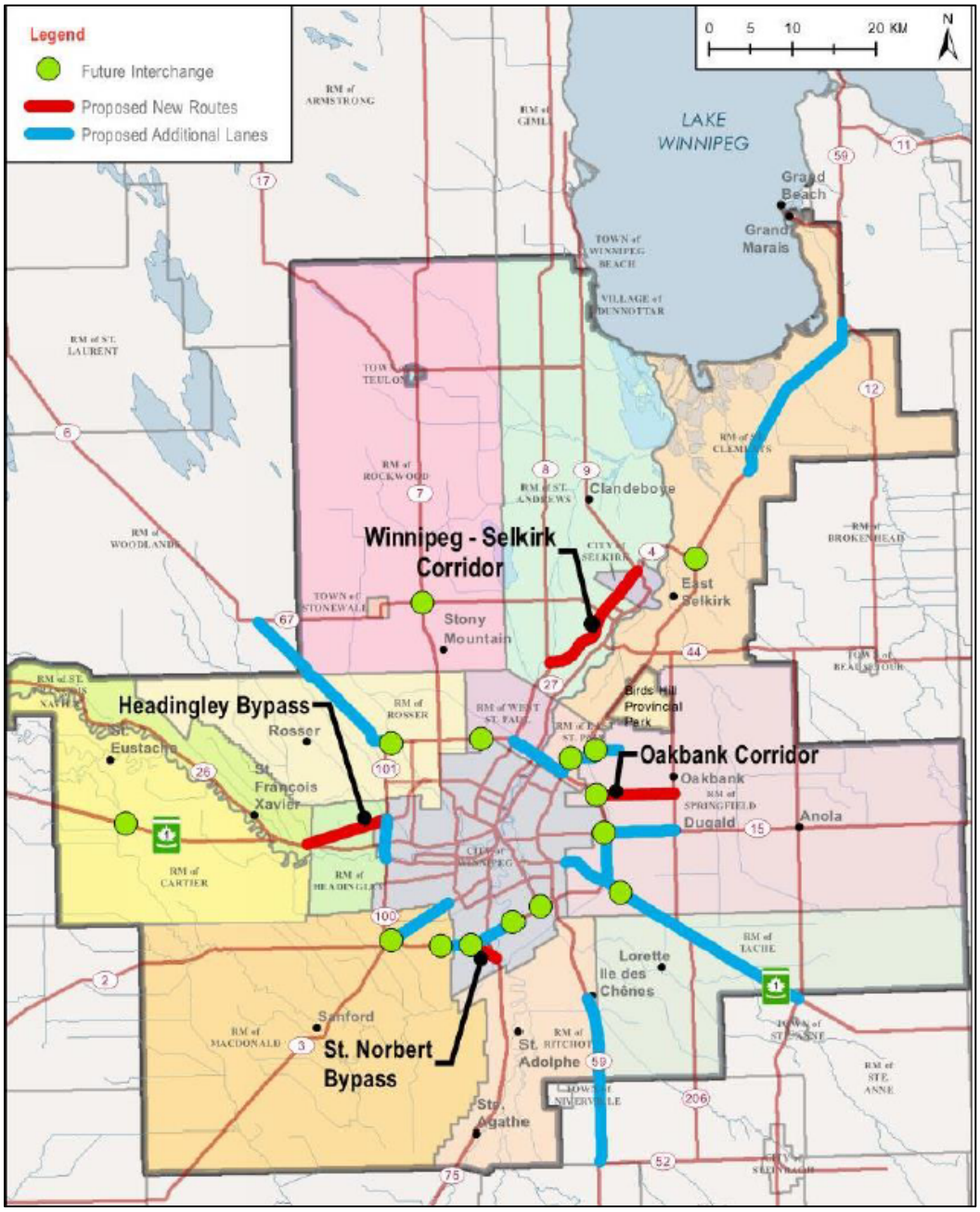
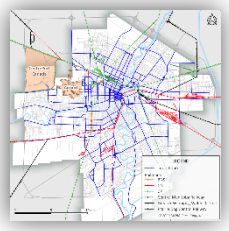


FIGURE 8: PROPOSED INFRASTRUCTURE IMPROVEMENTS

- Ensure new developments have access management plans prepared indicating where future highway accesses are to be located. Review and analyze issues on corridors where traffic from local development conflicts with through traffic.
- Develop a strategy to address needs of low speed highway users (e.g., agricultural equipment, oversized loads, etc.).

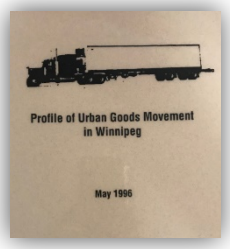
- The plan also provides a series of recommendations with respect to air and rail transport as follows:
    - Encourage commercial and industrial development that requires air service to locate adjacent to airports. Land near to airports can benefit significantly from their location by siting mutually beneficial land uses. Developers of such land should be encouraged to take advantage of their proximity to air service and focus development specifically to airport related commercial and industrial uses.
    - Undertake an at-grade crossing delay study. In the last few years, Canadian railways have been lengthening their sidings to 12,000 feet (over 3.65 km) to accommodate longer trains. CP Rail currently operates trains this long, representing an increase of 40 percent since 2008. While increasing train lengths is intended to maximize productivity, very long trains, when operating at low speeds can create long delays at level crossings, which poses a concern to mobility and vehicular freight movement, and potentially create issues for emergency service response times. To quantify the extent of such delay, it would be beneficial to identify all locations where delay resulting from rail crossings is an issue due to one or more of the following: (1) trains are frequent; (2) the crossing occurs at a location where traffic volumes is high; (3) delay at the crossing significantly delays freight movement by other modes such as truck; (4) delay poses a risk to rural residents in the event of an emergency (such as when a level crossing "cuts off" access to a number of homes).
- major method for goods movement in the region is by truck and the Perimeter Highway (PTH 100/101) is a major link in the goods movement system for the Capital Region, acting as both a bypass of Winnipeg for inter-city trucking and as an alternative intra-city route for urban goods movement. The following recommendations are provided in the Plan specific to goods movement:
    - Implement highway improvements that facilitate goods movement.
    - Undertake a Capital Region goods movement study.
- The Plan identifies performance indicators for the various strategic goals. The following indicators are identified for the "support economic development through the efficient movement of people and goods":
    - Number of signalized intersections operating at level of service (LOS) C or better. This will highlight intersections which may require attention.
    - Average peak period auto travel time (AM and PM) – Indicates the amount of time auto commuters are traveling per day on various routes and is an indication of potential capacity problems.
    - Average truck travel times – A measure of truck travel delay through a given area which provides an indication of transportation system effectiveness.

2.1.8 Goods Movement Draft Background Report



This draft document specifically on goods movement was used as an input to the 2011 Transportation Master Plan. The document's main components are a policy context review, a review of the existing road, rail, and air network, discussion of needs and opportunities, and strategies to enhance the goods movement network. Key outputs from this document are included in the 2011 TMP.

2.1.9 Urban Goods Movement Study



This is one of the first goods movement studies ever completed for Winnipeg with the intention of addressing goods movement as part of the planning process. The study discusses the importance of urban goods movement in Winnipeg, describes the existing transportation system serving the movement of goods as of 1996, and provides information about the demand for goods movement in the city. The study also develops information about truck flows by vehicle class based on 56 manual counts conducted by the City between 1990 and 1994. All information was placed on a GIS platform for further analysis and update.

2.1.10 Winnipeg Metropolitan Region Regional Growth and Servicing Plan 20-50

In 2019, the Province of Manitoba mandated the Winnipeg Metropolitan Region (WMR) to coordinate economic development, reduce red tape and duplication, and develop a strategy to co-ordinate land use and servicing in the Metro Region. 1.1.1 Winnipeg Metropolitan Region Regional Growth and Servicing Plan Draft Plan 20-50 is a by-product of that mandate. Plan20-50 is a 30-year regional plan that is the blueprint for a resilient, sustainable, and globally competitive Winnipeg Metropolitan Region. This plan provides the consistency and predictability required for investors to grow the economy and population of the region in a sustainable manner, supporting a high quality of life for all residents. Plan20-50 provides the pathway for our region to grow and prosper while maintaining the autonomy and local character that makes each of the 18 municipalities of the Winnipeg Metropolitan Region distinct. During the engagement events, convenient and easy goods movement was highlighted. This plan presents the current demographic and land use trends in the regions, assess its potential impact on the growth of the regions, recommends policy changes and future actionable tasks to achieve the goals set by the plan.

Under Policy Area 2: Investment and Employment, the plan identifies development of infrastructure and goods movement as a key goal. Objective of Infrastructure and Goods Movement policies is to facilitate investment and the growth and development of employment lands through protection of a safe, efficient, and environmentally friendly regional transportation network and trade infrastructure.

Key policies developed by this plan include:

1. To support economic competitiveness, quality of life and access to goods, municipalities shall plan for the efficient movement of people, goods and services to, from and within the Winnipeg Metropolitan Region with a focus on:

- Capitalizing on the Mid-Continent Trade and Transportation Corridor for road, rail, and air connectivity;
- Collaborating with the province and other stakeholders to coordinate the planning and development of regional transportation infrastructure to:
    - Optimize mobility and connectivity and ensure the long-term viability of Regional Roads as per Schedule 5 and employment areas; and,
    - Optimize the reliability and seamless movement of goods through the identification of priority routing and enhanced connectivity with Regional Roads, rail, and air transportation infrastructure.

2. To protect Regional Roads for priority access, municipal development plans shall limit direct access to Regional Roads and support grade separation intersections or other appropriate intersection upgrades and public transit connections where applicable.
3. To protect for the movement of goods and economic development, land use planning and development shall be coordinated to recognize the existing rail network and enhance its integration with existing and future Regional Roads, Regional Employment Areas, employment areas, and other industrial land uses, including:
    - Minimizing new at-grade rail crossings
    - Ensuring land use compatibility by encouraging municipalities to adopt Federation Canadian Municipalities (FCM) guidelines for land use in the vicinity of rail lines; and
    - Fostering collaboration in pursuit of rail rationalization and repurposing within the region.
4. To ensure land use compatibility, the Winnipeg James Armstrong Richardson International Airport and other airport lands in the region shall:
    - Be protected from land use and development that may adversely impact their operations and potential for future expansion, as per Transport Canada regulations;
    - Include commercial and industrial lands in adjacent areas as supported through municipal development plans; and,
    - Be considered in municipal servicing and transportation infrastructure plans to ensure future airport expansion requirements are considered in municipal development plans.

In conclusion the plan also identifies development a regional goods movement study as a priority. This plan will identify priority good movement routing to support system performance and enhance freight transportation opportunities. The development of this plan is anticipated in 2021.

2.1.11 Securing Our Future: An Action Plan for Winnipeg Metropolitan Region

This plan is the precursor to the Winnipeg Metropolitan Region Regional Growth and Servicing Plan Draft Plan 20-50 completed in 2018. This plan set the strategic growth plan for the Winnipeg Metropolitan Region and was adopted by the WMR board.

2.2 Regulatory Review

This section provides an overview of the regulatory framework around trucking, rail, and air transport in Winnipeg. The focus is on the regulations that are most impactful to the City of Winnipeg via the three modes of transport and most relevant to the Goods Movement study.

2.2.1 Trucking

The Provincial Highway Traffic Act (H60) is the principal document governing trucking in Manitoba, including the City of Winnipeg. The Act encompasses many elements, including, but not limited to:

- Vehicle registration and licensing
- Vehicle and equipment standards
- Offenses and penalties
- Towing
- Inspections
- Size and weight restrictions
- Rules of the road
- Jurisdiction of traffic authorities
- Vehicle permitting
- Speed limits

There are almost 50 regulations under the Highway Traffic Act that detail sections of the Act. Regulations that are pertinent to trucking include:

- Cargo Securement Regulation 37/2005
- Commercial Drivers Abstracts Regulation 109/2003
- Commercial Vehicle Trip Inspection Regulation 95/2008
- Drivers Hours of Service Regulation 72/2007
- Periodic Mandatory Vehicle Inspection Regulation 76/94
- Vehicle Equipment, Safety and Inspection Regulation 31/2019
- Tolerances in Gross Weight of Certain Vehicles Regulation 422/87 R
- Vehicle Weights and Dimensions on Classes of Highways Regulation 155/2018

The first six regulations listed above are based on National Safety Code (NSC) standards. The Vehicle Inspection Section of the Winnipeg Policy Department works closely with the commercial vehicle community, MPI, and the provincial government to ensure commercial vehicles traveling on Winnipeg roads do so in compliance with these standards.

The last regulation listed, Manitoba Regulation 155/2018, is a key regulation for the City of Winnipeg as it legally defines vehicle weights and dimensions, highway classes, and maximum weights (by axle type and gross vehicle weight) and dimensions by highway class. It is important to note that the province classifies each of the highways under its jurisdiction into RTAC, A1, A, B1, B, and C routes meaning that the maximum weights allowed on a specific highway depend on the highway classification. The City of Winnipeg currently takes a different approach to weight regulation than the Province. The City does not currently classify its

streets into routes and instead defines weight allowances based on the vehicle characteristics and not the street. In the City's Traffic By-law 1573/77, the City indicates that any vehicle that meets the requirements of an RTAC vehicle can carry RTAC route weights on any street in the City of Winnipeg. Any vehicle that does not meet RTAC vehicle requirements (i.e., a non-RTAC vehicle), can carry A1 route weights on any street in the city of Winnipeg. In other words, all streets in Winnipeg are simultaneously RTAC and A1 routes as defined in Manitoba Regulation 155/2018.

The City of Winnipeg regulates trucking through the City of Winnipeg Traffic Bylaw 1573/77, Parking By-law 86/2016, and Neighbourhood Livability By-law 1/2008. The sections of these three by-laws that relate to trucking are provided on the City's Truck Route map and links to the Traffic and Parking by-laws are provided on the City's Truck Regulation webpage.

2.2.2 Traffic By-law 1573/77

The Traffic By-law is the key document and it provides the following:

- Definition of a truck (vehicle adapted to carry goods that has more than four tires) and truck tractor (Section 2(2)).
- The authority for the Director of Public Works to impose spring weight restrictions (Section 17).
- Listing of full time and part time truck routes (Schedules 1 and 2 in the by-law) and a definition of the legal route of truck travel (Sections 39-44). Generally, legal route of truck travel is via truck routes exclusively if origin/destination is on a truck route and via the shortest distance from a truck route if origin/destination is not located on a truck route. The intent is to maximize truck travel on truck routes which are generally located on a one mile grid spacing.
- Definition of the legal weights and dimensions for vehicles on City streets (Section 45).
- Listing of weight restricted streets and structures (Section 47 and Schedules 6 and 7 in the by-law).
- The authority for the Director of Public Works to issue permits for oversized and overdimension vehicles (Section 48.1).

It is important to note that the Traffic By-law, except for Arlington Bridge, allows trucks to travel on any street in the City of Winnipeg. The distinction is that travel on designated truck routes is unlimited while travel on non-truck routes is limited to the shortest distance between truck route and origin/destination. This is not always understood by the public and elected officials, resulting in requests to post 'Not a Truck Route' signs with the belief that the signs will restrict all truck movements on the streets where they are placed. Similarly, there are past examples where truck routes have been removed (example Plessis Road north of Regent Avenue and Grassie Boulevard) from the City network by City Council due to public complaints with the unintended consequence of making some local residential streets into the legal route of truck travel (i.e., shortest distance) to some origins and destinations. Public complaints about truck noise and vibration are sometimes a result of insufficient setback allowances to structures from streets that are defined truck routes.

Review of the Traffic By-law indicated that a by-law amendment is needed to the current by-law to reflect that the old Manitoba Regulation for vehicle weights and dimensions 575/88, which is currently referenced in the Traffic By-law, has been rescinded and replaced by the introduction of Manitoba Regulation 155/2018. The meaningful effect of the change in regulation is that the new regulation (155/2018) no longer defines an RTAC vehicle. Consequently, when amending the Traffic By-law, the City will no longer be able to define weight allowances based on the vehicle characteristics and will instead have to adopt the Provincial practice of defining maximum weight allowance by street classification. The most likely outcome is that an amendment will define all streets in the City as RTAC routes with legal weight and dimensions as identified for RTAC routes in Manitoba Regulation 155/2018.

Parking By-law 86/2016

Another relevant City By-law relative to trucking is the Parking By-law 86/2016. This by-law defines a large vehicle (any vehicle longer than 6.7 m), special purpose vehicle (special mobile machine or unregistered vehicle), and a trailer (towed vehicle) for the purposes of restricting on-street parking for these vehicle types to no longer than one hour unless in use by a tradesperson or enabled by permit. The Parking By-law also imposes limitations on parking large vehicles on residential properties.

Neighbourhood Liveability By-law 1/2008

The Neighbourhood Liveability By-law 1/2008 contains one section relevant to truck regulation (Section 68). This section restricts the use of engine retarder brakes by any vehicle driven within the City of Winnipeg.

Truck Route Map

The primary interface between the City, industry, and the public with respect to truck regulation is the City of Winnipeg's Truck Route Map. This 11x17 double sided map is available on the City's Truck Regulation webpage and contains the following information:

- A full City map identifying full time and part time truck routes, structures with 36,500 kg weight limits, limited vertical clearances on truck routes, and weigh scale locations.
- Maximum allowable truck height and width.
- Traffic, Parking, and Neighbourhood Liveability by-law excerpts.
- Reference to the Manitoba Regulation on Vehicle Weights and Dimensions
- A listing of limited vertical clearances.
- Images of truck route signing.

The Truck Route map was developed over 40 years ago and needs a complete review. The truck route network was developed based on years of operation, knowledge of Winnipeg's unique transportation system, political/citizen pressures, and the following principles:

> Arterial Streets (Regional Streets) are generally designated as a Truck Route, since they are streets that are constructed to a higher standard such as thicker and stronger pavement and wider roadways that are required to carry large trucks on a regular basis. In the planning of an urban area, to the extent feasible, a grid of arterial streets and Truck Routes are made available that are typically separated by no more than 1.6 kilometres to:

- minimize the need to construct streets to a higher standard such as thicker pavement and wider roadways that are required to carry large trucks on a regular basis;
- ensure that there are a reasonable number of Truck Routes available for "through" truck traffic, thereby minimizing the need for trucks to be driven through the more concentrated residentially developed segments of the City (in accordance with the Truck Route provisions of the City of Winnipeg Traffic Bylaw No. 1573/77, trucks are limited to using the shortest route between their point of destination/origin and a designated Truck Route); and to
- ensure that trucks destined to/from a commercial or residential development do not have to travel more than approximately 0.8 kilometres on a residential street.

Such a practice of establishing a grid of reasonably spaced designated truck routes minimizes truck traffic on local streets that would otherwise seek the shortest routing to an origin/destination if truck routes were not made available.

Spring Weight Restrictions

Spring weight restrictions are an important component of the City's regulation of trucking and are administered by the Transportation Division and Streets Maintenance Division in Public Works. These restrictions are coordinated with the Province's Manitoba Spring Road Restrictions Program. Spring weight restrictions are imposed on specific asphalt and granular streets that are vulnerable to excessive damage due to substructure thaw and heavy vehicle loading during a period that generally spans from mid-March to the end of May. On identified asphalt streets, weight is restricted to 90% of normal loading on axle groups and on granular streets weight is restricted to 65% of normal loading on axle groups. These restrictions are identified with signs on each street. Exceptions are granted to specific essential commodities and there are further exemptions from the 65% restrictions for school buses, transit and city maintenance vehicles. Permits are also available to prevent undue hardship or for economic necessity. Information regarding Spring Weight Restrictions is concisely summarized on a Spring Weight Restrictions webpage on the City's website.

Truck Permits

The ability for traffic authorities to issue permits for vehicles that exceed legal weight and dimensions is provided in Section 87 of the Highway Traffic Act. In Winnipeg, this authority to issue permits has been delegated down from the Standing Policy Committee on Infrastructure Renewal and Public Works to the Director of Public Works via Section 48.1 of the Traffic By-law. The delegation allows the Director to issue permits so long as they are satisfied that operation of the vehicle will not:

a. damage the streets over which it passes;
b. disrupt traffic or pose a threat to vehicular traffic or pedestrians;
c. damage properties adjacent to the right of way.

Since 2012, the Province of Manitoba, through the Manitoba Motor Carrier Division has issued overweight and over dimension vehicle permits on behalf of the City of Winnipeg based on a signed agreement and a reference document that outlines all the City's permit requirements. For industry, this arrangement has

provided one-stop-shop for City and Provincial permits and greater consistency in permit requirements between the City and Province. For the City, provincial issuance provides numerous benefits including:

- Access to experienced permit staff at the province. When permits were issued by the City there was only one permit clerk with no experience in trucking dedicating half their time to truck permits and the other half to Use of Street permits. Manitoba Infrastructure has a full staff dedicated to permit issuance.
- Dedication of fewer City resources to permit issuance (human resources and technology).
- Opportunities to share or maximize alignment of City and Provincial permit policy to the benefit of both industry and enforcement.
- Greater compliance with permit requirements and increased permit revenue to reinvest in the permit process and policy development.
- A place on the Province's weights and dimensions committee which sets out the government's province-wide approach to trucking issues and interacts with the trucking industry.

Further to the Weights and Dimensions committee, it is noted that the City's representative has historically been from the Public Works Department's Transportation Division. However, in recent years the representative has shifted to the Engineering Division. Involvement of both the Transportation and Engineering Divisions is critical to vehicle permitting with the Engineering Division managing all the structure considerations and the Transportation Division handling policy, practice, and regulations (by-law). At this time, the Department should consider increasing the involvement of the Transportation Division in the Weights and Dimensions committee to re-establish connections with the Province on the policy, practice, and regulatory front.

The downside of the current Provincial permit arrangement for the City is a certain lack of independence and control around permits and a dependence on the Province for continued issuance of permits and the implications of Provincial legacy permitting systems (IT) and Provincial priorities. That said, the benefits of Provincial permit issuance are greater than the disbenefits at this time and the Goods Movement study provides an opportunity to identify any strategic directions in the area of permitting that could be pursued with the Province.

2.2.3 Rail Transport

Rail operation in Winnipeg is regulated by Transport Canada and, to a lesser extent, the Province of Manitoba (for Provincially regulated railways). For rail operation, responsibilities for regulatory compliance are specifically divided between the railways and the road authority (as outlined in Section 3 of the Grade Crossings Regulations). The City of Winnipeg is currently in a multi-year project to comply with Transport Canada regulations that must be completed by November 2021. This project began in December of 2014, when Transport Canada released the new Canadian Grade Crossings Regulations (GCR) and new Grade Crossings Standards (GCS) under the Railway Safety Act (RSA). These regulations require road authorities across Canada to do the following:

- Information Sharing, which required all road authorities to provide Transport Canada and railway companies with the information concerning public grade crossings in each jurisdiction (completed prior to November 27, 2016).
- Safety Assessments, which ensured that all crossings in Canadian jurisdictions meet the new regulations within seven years of their enactment (a deadline of November 27, 2021 has been set by Transport Canada).

In addition to the mandatory requirements, there are published guidelines with additional safety or operational information on the overall elements of at-grade railway crossings. The following documents also form part of the best practices used to identify best practices for future consideration:

- Transport Canada Determining Minimum Sightlines at Grade Crossings
- Transport Canada Grade Crossings Handbook
- Transport Canada Train Whistling (for whistle cessation requests)
- Transport Canada Pedestrian Safety at Grade Crossings Guide
- Transportation Association of Canada Geometric Design Guide
- Manual of Uniform Traffic Control Devices for Canada

The GCR defines the responsibility of the railway company and the roadway authority with respect to grade crossings and outlines what needs to be done for compliance at existing crossings, new crossings, and crossings where changes are being made. For the road authority the elements for compliance are:

- The design, construction, and maintenance of a road approach.
- Traffic control devices, except for the maintenance of a Stop sign that is installed on the same post as a Railway Crossing sign.
- The design of a crossing surface.
- Sightlines within the land on which the road is situated and over land in the vicinity of the grade crossing, including the removal of trees and brush that obstruct the sightlines.

For the railway company the elements for compliance are:

- Railway Crossing sign, Number of Tracks sign, and Emergency Notification sign.
- The maintenance of a Stop sign that is installed on the same post as a Railway Crossing sign.
- A warning system.
- A crossing surface, other than its design.
- Sightlines within the railway right-of-way and over land adjoining the railway right-of-way, including the removal of trees and brush that obstruct the sightlines.

The GCS provides the detailed drawings, specification, and requirements for compliance with the responsibilities in the GCR.

For the City of Winnipeg, the timeframe to November 2021 is geared toward meeting the regulatory compliance requirements established by Transport Canada. Beyond November 2021, the City will need to ensure ongoing compliance with controls in place to ensure that any new crossings or changes to existing

crossings comply with the requirements in the GCR and GCS. It is important to note that this includes not only the crossing but the sightline areas approaching the crossing which are 100 metres in length or longer on higher speed approaches. This means that installation and maintenance of any elements that could potentially obstruct the visibility of the crossing or crossing controls near a railway crossing could generate compliance issues.

Provincial regulation of railways extends only to the five shortline railways in the province. There are two shortline rail lines in the city - the Central Manitoba Railway Inc. (CEMR) line through Transcona, which runs to East Selkirk, and the CEMR line in south Charleswood, which runs to Carman. The provincially regulated railways are governed by the Provincial Railways Act and overseen by a Railway Safety Officer and Superintendent of Railways. The Provincial Railways Act includes a Provincial Railways Fitness Criteria and Safety Regulation that ties regulatory compliance back to the federal GCR and GCS. As such, all at-grade crossings in the City of Winnipeg must comply with the GCR and GCS.

2.2.4 Air Transport

Air transportation is regulated by Transport Canada. The City's involvement in air transport regulation is related to zoning and land use regulation in the area around the Winnipeg James Armstrong Richardson International Airport (Winnipeg Richardson International Airport) which has 24/7 operation and regulating the movement of goods between the airport and industrial areas around the airport, including CentrePort, which is largely located outside the City of Winnipeg in the RM of Rosser.

Active City of Winnipeg By-laws related to the Winnipeg Richardson International Airport include:

- Airport Area West Secondary Plan 8097/2002 – This by-law adopts a Secondary Plan for airport related and airport compatible land uses and servicing west of the Winnipeg Richardson International Airport.
- Airport Vicinity Acoustic Insulation 6419/94 – This by-law establishes minimum acoustic insulation requirements for buildings within the airport vicinity protection area.
- Airport Vicinity Protection Area Secondary Plan 6378/94 – This by-law adopts a Secondary Plan to address economic development and noise and traffic issues around the Winnipeg Richardson International Airport. The Airport Vicinity Protection plan is based on noise exposure forecasts from the mid-1990s that may require updating to reflect current conditions. There is currently a land use application in the Polo Park area with a residential component that is under debate due to the concern over potential noise complains and alignment with the Winnipeg Richardson International Airport Vicinity Development Plan.
- Airport Vicinity Protection Area Regulation (passes August 2021): This regulation establishes two protection areas, which define where and what type of new residential development may take place. Area 1 comprises lands immediately adjacent to the airport, where no new residential development will be permitted, except for replacement of buildings and minor infilling. Area 2 is located further away from the airport, where new or replacement residential development may be constructed, subject to indoor noise level limits. New noise exposure forecasts were

developed and all new residential dwellings within the Airport Vicinity Protection Area must be designed and constructed to achieve indoor sound mitigation levels of 30 decibels in bedrooms, 40 decibels in living, dining, and recreation rooms, and 45 decibels in kitchens, bathrooms, hallways and utility rooms. The protection areas mirror noise exposure forecasts prepared by independent experts and correspond to an 'ultimate scenario' where the airport is fully built out, including the development of a third runway, and operating at its estimated maximum practical capacity.

The other major consideration relative to the Winnipeg Richardson International Airport is the ongoing development of CentrePort. As illustrated in Figure 9, CentrePort is Canada's largest tri-modal inland port (20,000 acres) and Foreign Trade Zone with direct access to national and international rail, truck and air cargo operations. The CentrePort South area is located within the City of Winnipeg boundary and CentrePort North is in the RM of Rosser. Key City streets associated with CentrePort are Route 90, Sturgeon Road, and Saskatchewan Avenue and their connections with the Provincial highway network on PTH 190 CentrePort Canada Way and PTH 101 Perimeter Highway.

Additionally, St. Andrews Airport opened in 1962 to relieve the Winnipeg International Airport of increased flight training and air traffic. A general aviation airport, it covers approximately 473 hectares of land and is surrounded by flat farmland and rural housing.



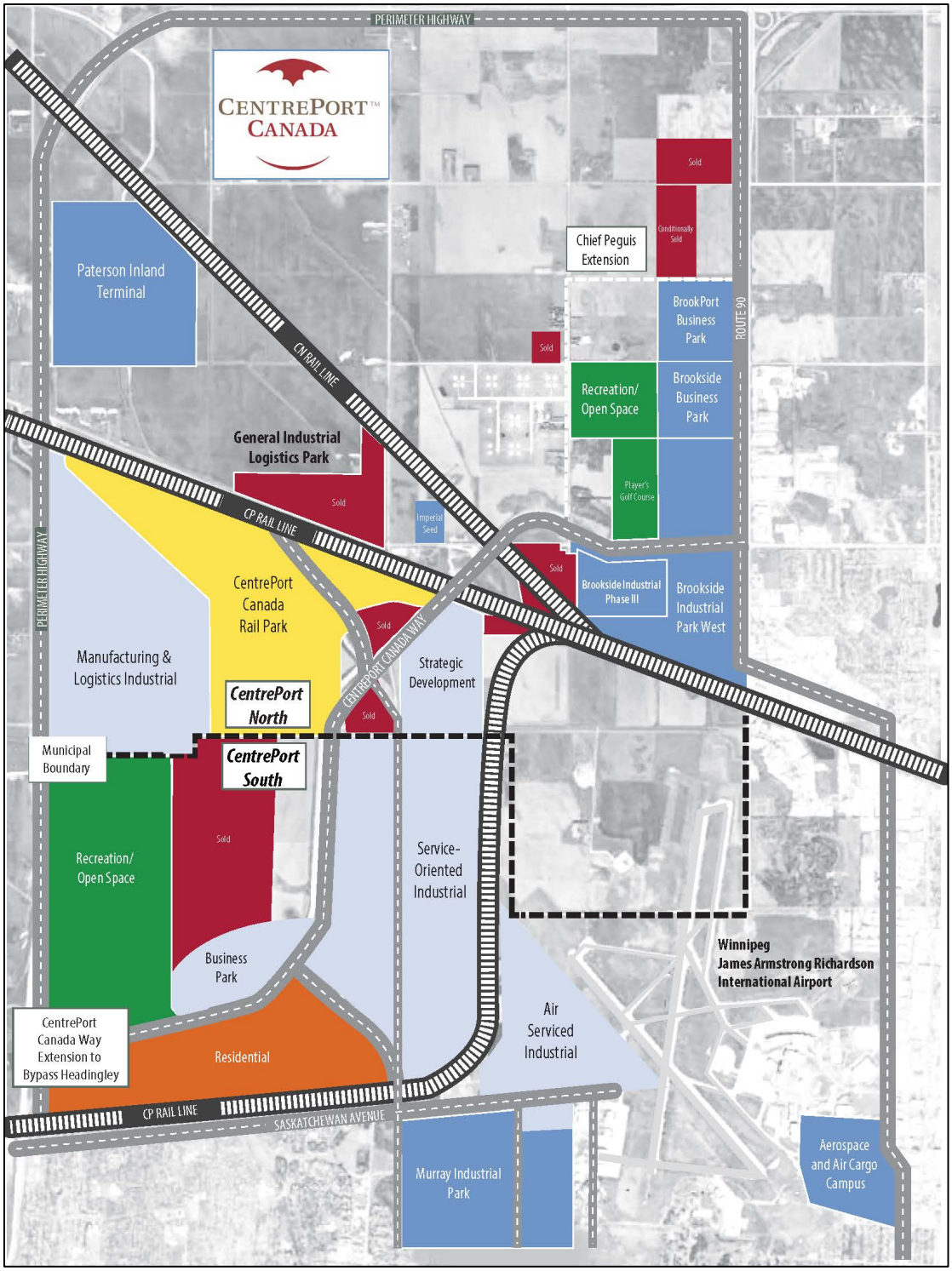


FIGURE 9: CENTREPORT LAND USE MAP

2.3 Summary Highlights

Though many of the current key documents relating to goods movement have been around for a decade, they are still relevant to the current study in most respects. Highlights from this policy review are:

- The importance of goods movement to the local economy and Winnipeg's role as a hub in continental and international trade. The development of this goods movement study must be explicit in recognizing this critical aspect of Winnipeg's economic engine.
- The airport area, 24-hour air operation, and continued development of CentrePort as focus areas for goods movement. This is a key freight generator and attractor of goods and as such, there should be specific actions that ensure the efficient and seamless movement of goods by the different modes to and from this location.
- Winnipeg's role as a rail and intermodal hub. A strong goods movement strategy can ensure that Winnipeg cements its current role and enhances it through collaboration with its Metropolitan Region.
- The importance of links within and into and out of downtown for goods. This is an important aspect that needs to happen within a context of complete streets and sustainable transportation. As a result, actions that are developed to accomplish this service to downtown, must recognize the dynamic interaction between various users of the transportation system in this area of the city.
- Success of the Winnipeg Metropolitan Region (Capital Region) is critical to the City of Winnipeg's success in goods movement. This requires increased collaboration and cooperation between the City of Winnipeg and the Region, hence recognizing that many goods movement issues and their solutions are regional in scope.
- Continued relevance of the strategic objective of safe, efficient, and equitable movement of people, goods, and services. Actions that address these issues must align with those identified in the Winnipeg Road Safety Strategy document.
- The Goods Movement Map from the 2011 TMP (Figure 3) can be a starting point for discussion recognizing that some elements have been constructed or planned and others such as William Clement Parkway extension may no longer be supported.
- Recognizing that the city is facing a shortfall in serviced employment (industrial) lands and has an excess of commercial land is important in the development of the goods movement study. Similarly, recognizing that the Metropolitan Region is competitive in bringing serviced employment lands to market is also important.
- Large scale multimodal logistics hubs are attractive land uses and demands related to e-commerce are growing. This results in increased need for connectivity between current and future industrial developments outside the city and the intermodal hubs and CentrePort inside the city, to ensure that the resultant traffic uses desired corridors.

- The airport has specific growth plans that involve additions to the Winnipeg's transportation network.

Highlights from the regulatory review are:

- There is an outstanding need to amend the City's Traffic By-law 1573/77 to reflect the new Manitoba Regulation for vehicle weights and dimensions. The critical element of this amendment will be to move the City to defining maximum weight allowance on its transportation network by street classification and, in doing so, align itself with the Province's long-time practice.
- After a Traffic By-law amendment there is a need to update the City's Truck Route Map and Truck Regulation webpage to ensure accurate and current information is being conveyed to industry.
- There is a need for the Transportation Division to re-engage with Manitoba Infrastructure with respect to policy, practice, and regulation around vehicle weights and dimensions. There is currently a gap in the City's understanding of industry challenges and needs due to a lack of communication and engagement with Manitoba Infrastructure. This gap in understanding extends to both legal truck movements and permit vehicle movements. The Province also represents a resource to increase the City's knowledge base relative to trucking and permits.
- The focus on rail to November 2021 will be on ensuring regulatory compliance with Transport Canada at-grade rail crossing requirements, after which the City will need to transition to a maintenance phase with controls in place to ensure ongoing regulatory compliance.
- In terms of regulation of goods movements by air, it may be beneficial for the City to update its noise exposure forecasts last completed in the mid-1990s.

3 EXISTING NETWORK

3.1 Condition and Capacity of Goods Movement Network

The condition and capacity of the goods movement network serving Winnipeg and its Metropolitan Region was evaluated through an examination of the following:

- The demand for freight movements
- Trucking activity generators
- Types of trucks that use the network
- Designated truck route network
- Pavement condition on the road network
- Rail network
- Railway corridors and yards
- Air cargo facilities & runways
- Major air cargo carriers serving Winnipeg

For the purposes of this report, the following definitions identify a truck:1F[2]

A truck is defined as a motor vehicle or semi-trailer truck, that is constructed or adapted to carry goods, wares and merchandise, freight or commodities, but not passengers or baggage, and that has more than four tires.

A truck tractor is a motor vehicle designed and used primarily for towing other vehicles, and not so constructed as to carry a load other than the driver thereof and part of the weight of any vehicle so towed including the load thereon, and that has more than four tires.

3.1.1 Demand for Freight Movement

This section examines the movement of freight to and from the Winnipeg Census Metropolitan Area (CMA) based on publicly available databases2F[3]. The CMA is defined by Statistics Canada as shown in Figure 10. The primary data source used to assess freight movement was the Canadian Freight Analysis Framework (CFAF), which is a data source that utilizes freight movement data from Statistics Canada representing Canadian Provinces and major CMAs. As Figure 10 shows, the Winnipeg CMA as defined by Statistics Canada relative to Winnipeg's municipal boundary and Winnipeg Metropolitan Region's boundary. The Winnipeg Metropolitan Region's boundary is missing the RM of Cartier, RM of Rockwood, RM of St. Andrews, City of Selkirk, Town of Niverville, Village of Dunnottar, and Town of Stonewall based on the Winnipeg defined CMA.

[2] City of Winnipeg Traffic By-law 1573/77

[3] Truck and rail freight tonnage is reported in the Canadian Freight Analysis Framework, Air freight tonnage is under the confidentiality act and is not accessible, Table 50-503-X, Published May 14, 2020

Air tonnage is reported in Air Cargo Traffic at Canadian Airports, Annual, Table 23-10-0254-01, Published July 26, 2019

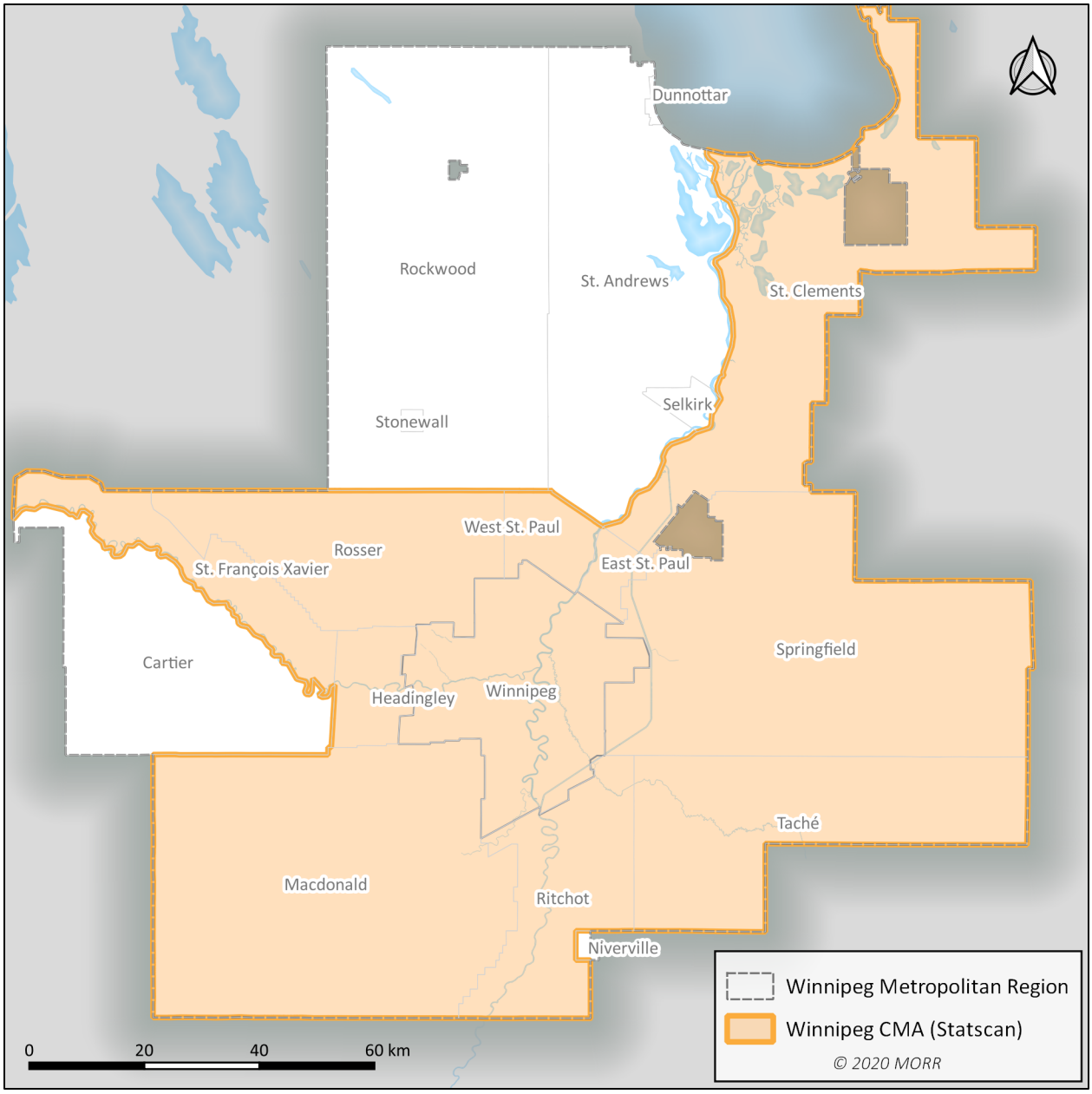


FIGURE 10: WINNIPEG CMA DEFINED BY STATISTICS CANADA

Employment size data for Winnipeg and for Winnipeg CMA was obtained from the Province of Manitoba's Economic Profiles to highlight the related freight movements by employment. The economic profile report 3F[4],4F[5] includes employment data as of June 2018. At that time, Winnipeg saw a total of 444,467 jobs while employment in the Metropolitan Region (which includes the City of Winnipeg employment) yielded 490,705

[4] Capital Region Economic Profile, https://www.gov.mb.ca/jec/ecprofiles/pdfs/ecprofiles/capital_region_ep.pdf

[5] Winnipeg Economic Profile, https://www.gov.mb.ca/jec/ecprofiles/pdfs/winnipeg/winnipeg_ep.pdf

jobs. To put this into perspective, Winnipeg's employment of 447,467 equates to approximately 91% of total jobs in the Metropolitan Region. Based on the employment ratios, it is likely that a corresponding majority of freight activity is also related to Winnipeg.

Freight movements were analyzed and characterized by mode (truck, rail, and air) in terms of quantities, commodities, and origin-destination patterns. Between 2015 and 2017, there was an average of 14.8 million tonnes of freight per year moving to Winnipeg CMA and 13.3 million tonnes per year leaving Winnipeg CMA by all modes combined. As Figure 11 shows, trucking accounted for the majority of these movements, being responsible for approximately 80% of all freight tonnage moved during this period.

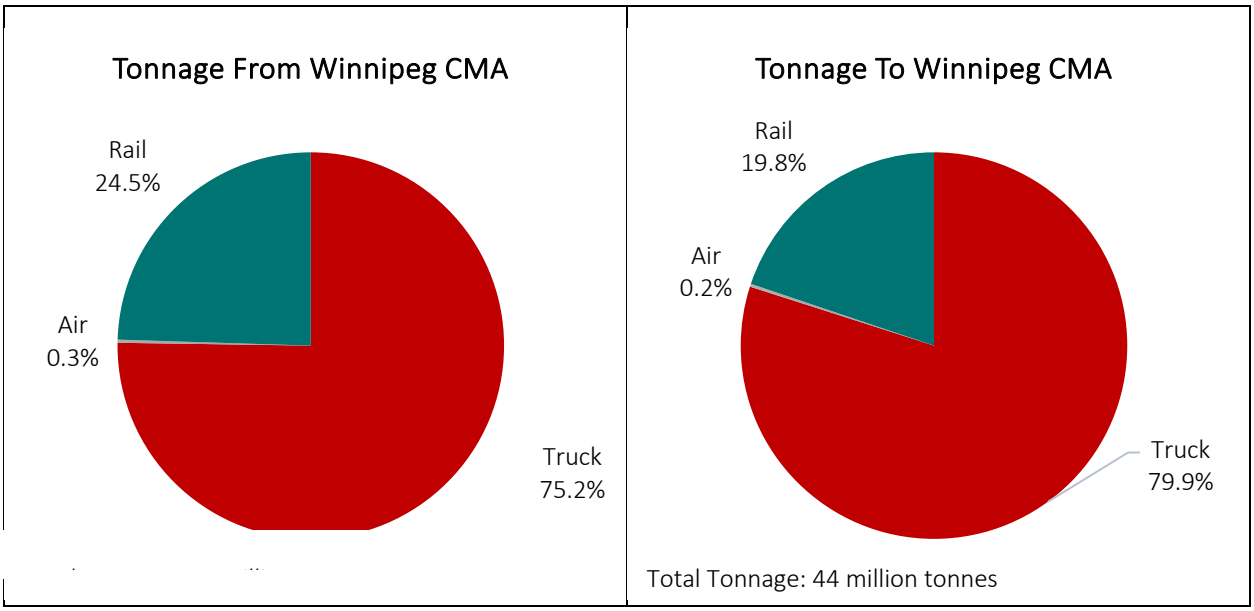


FIGURE 11: TONNAGE DISTRIBUTION BY MODE BETWEEN 2015 AND 2017

With respect to value of freight movements, a total of $36.1 billion of freight travelled to Winnipeg CMA and $34.8 billion of freight left Winnipeg CMA by all modes combined in 2015. As Figure 12 shows, trucking accounted for the majority these movements, being responsible for approximately 80% to 90% of all value-related freight movements during this period.5F[6]

The following sections discuss the characteristics of weight-related freight movement to and from Winnipeg CMA for each mode.

[6] Truck and rail freight value is reported in the Canadian Freight Analysis Framework, Air freight value is under the confidentiality act and is not accessible, Table 50-503-X, Published May 14, 2020

Air freight value is reported in the Winnipeg James Armstrong Richardson International Airport 2016 Economic Impact Study and convert to Canadian currency, published in April 19, 2017

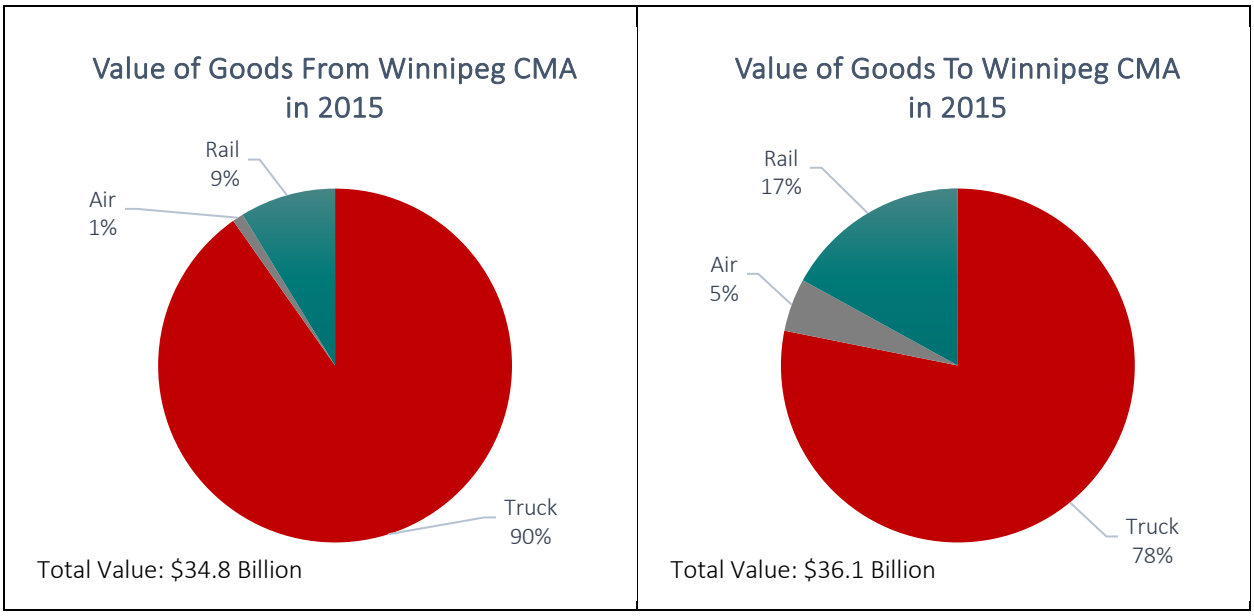


FIGURE 12: VALUE DISTRIBUTION BY MODE IN 2015

Freight Movements by Truck

Freight movements by truck related to the Winnipeg CMA were obtained from the Canadian Freight Analysis Framework (CFAF) database for the three-year period between 2015 and 2017. There was a total of 65.5 million tonnes of freight moved by truck to and from the Winnipeg CMA during the three-year period. Of these, 26.8 million tonnes were moved in 2017. The origin-destination patterns and commodities transported in 2017 are further discussed in this section.

Origin Destination Patterns

Figure 13 and Figure 14 show origin-destination patterns of interprovincial and international truck movements to and from Winnipeg CMA by direction of travel. The values listed are annual tonnes for all commodities in 2017 (the most recent year for which data is available).

Figure 13 illustrates the origin-destination patterns of the 11.3 million tonnes of freight moving by truck from Winnipeg CMA in 2017:

- 73% of goods were destined for Manitoba (58% destined for places in Winnipeg).
- 12% of goods were destined for western Canada (British Columbia, Alberta, and Saskatchewan).
- 8% of goods were destined for eastern Canada (Ontario, Quebec, and Maritime Provinces).
- 7% of goods were destined for the south (U.S. and Mexico).
- < 1% of goods were destined for the north (the Yukon, Northwest Territories, and Nunavut).

Figure 14 shows the origin-destination patterns of the 15.5 million tonnes of freight moving by truck to Winnipeg CMA in 2017:

- 70% of goods originated in Manitoba (40% originates in Winnipeg).
- 17% of goods originated from western Canada (British Columbia, Alberta, and Saskatchewan).

- 8% of goods originated from eastern Canada (Ontario, Quebec, and Maritime Provinces).
- 5% of goods originated from the south (U.S. and Mexico).
- < 1% of goods originated from the north (Yukon, Northwest Territories, and Nunavut).

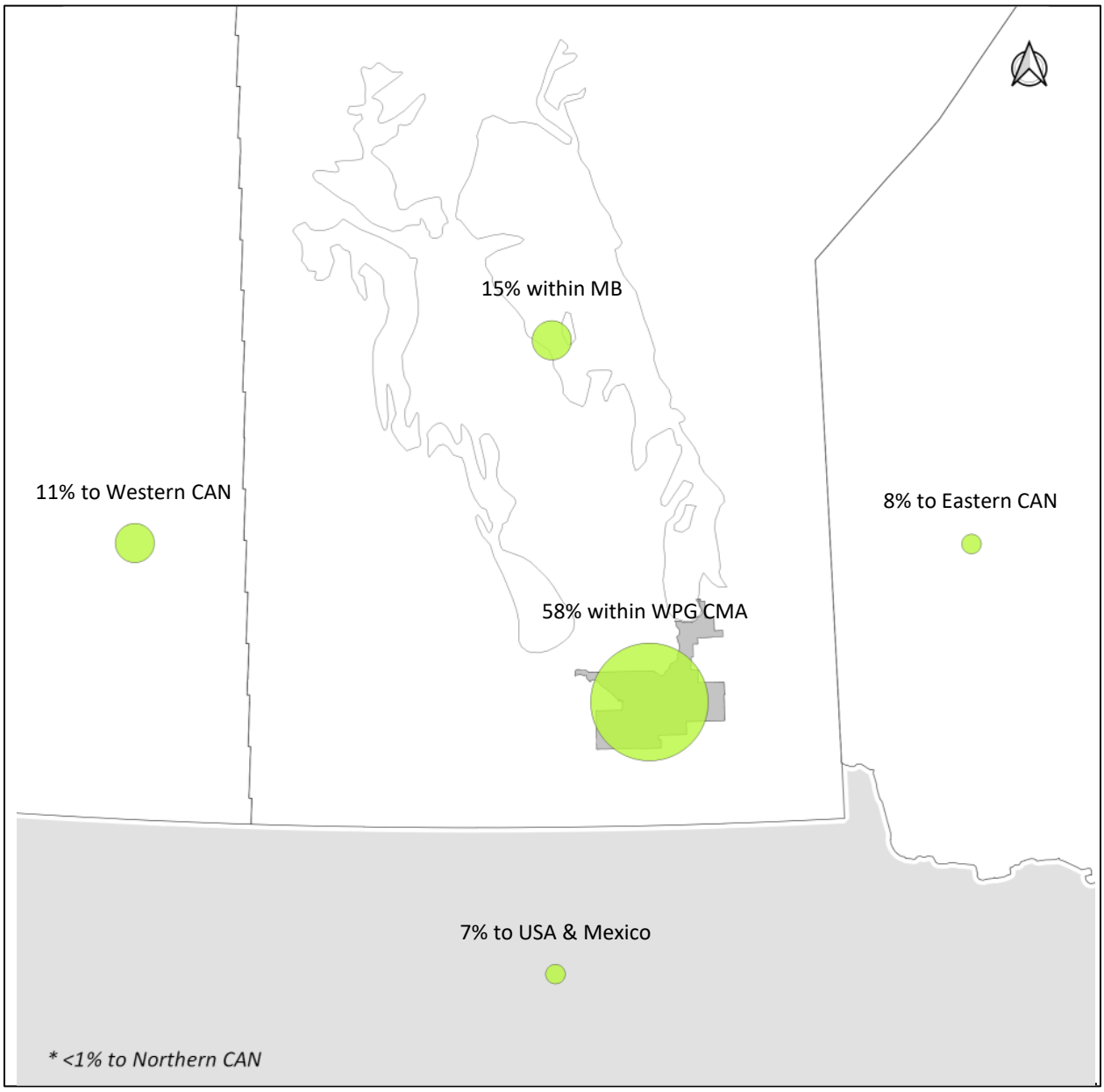


FIGURE 13: PROPORTION OF TRUCK FREIGHT TONNAGE (11.3 MILLION) TRANSPORTED FROM WINNIPEG CMA IN 2017

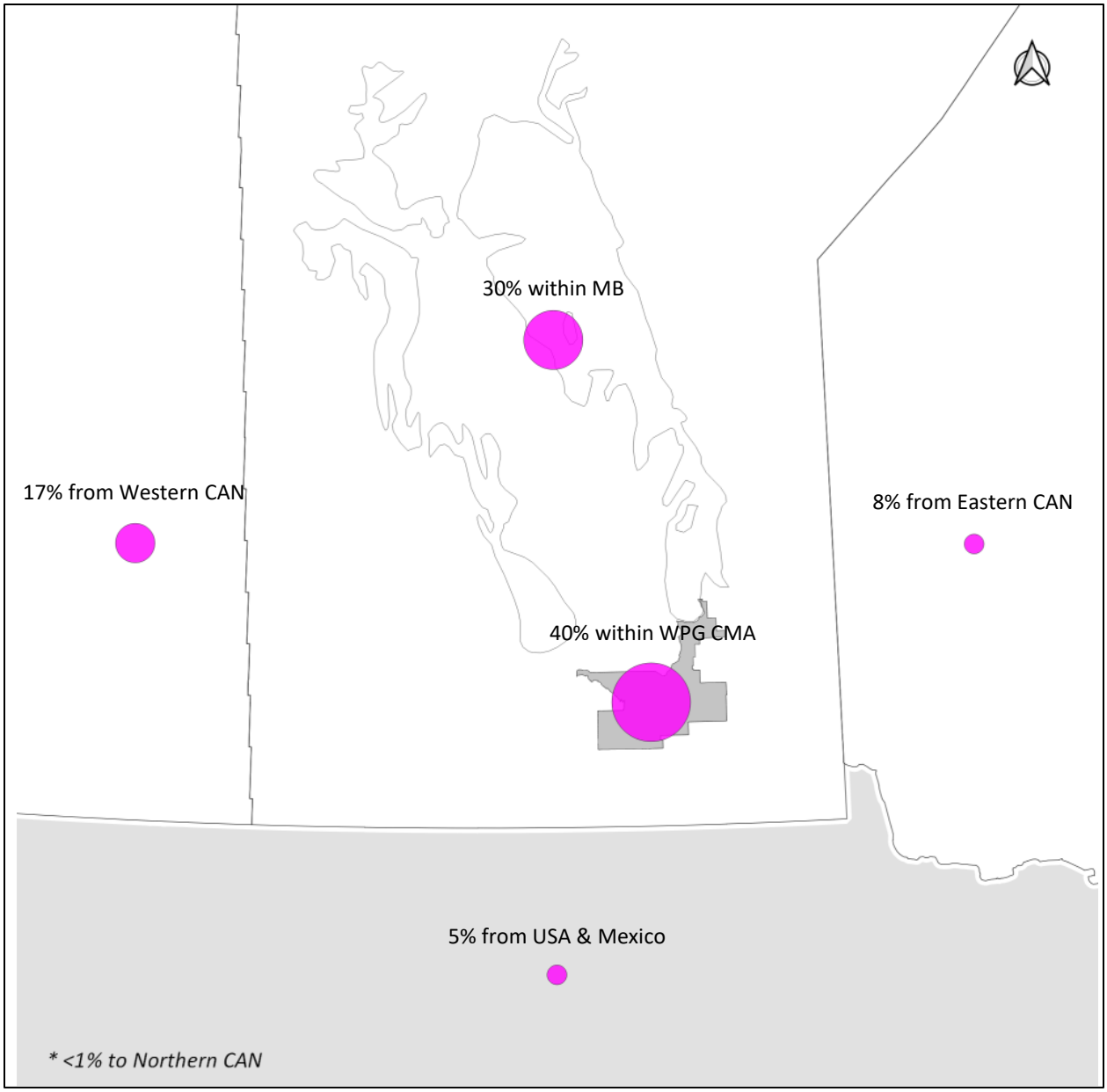


FIGURE 14: PROPORTION OF TRUCK FREIGHT TONNAGE (15.5 MILLION) TRANSPORTED TO WINNIPEG CMA IN 2017

Commodities

The top 10 commodity groups moved to and from Winnipeg CMA by truck in 2017 are shown in Table 4. These accounted for 98% of the total tonnage moved. CFAF utilizes all 42 Standard Classification of Transported Goods (SCTG) groups6F[7] and condenses them into 12 commodity groups7F[8] for its database.

TABLE 4: TOP 10 COMMODITIES MOVED BY TRUCK TO AND FROM WINNIPEG CMA IN 2017

Commodities	Percentage of Truck Tonnage	Commodities	Percentage of Truck Tonnage
From Winnipeg CMA		*To Winnipeg CMA*	
Minerals	25.7%	Plastic & Chemical Products	36.8%
Waste	21.4%	Other Manufactured Products	30.0%
Fuels	17.5%	Transportation Equipment	17.0%
Miscellaneous	10.4%	Waste	8.7%
Metal	5.2%	Minerals	2.9%
Agricultural Products	4.6%	Fuels	2.8%
Plastic & Chemical Products	4.4%	Miscellaneous	0.6%
Other Manufactured Products	4.0%	Agricultural Products	0.5%
Food	3.1%	Food	0.3%
Forest Products	2.5%	Metal	0.2%

For movements from Winnipeg CMA to other jurisdictions, four commodity groups accounted for 75% of the 11.3 million tonnes of freight originating from the area in 2017. Minerals (building stone, natural sands, gravel and crushed stone, non-metallic materials, and metallic ores) accounted for 25.7% of exports by truck; waste and scrap accounted for 21.4%; fuel oils and crude petroleum (gasoline & aviation turbine fuel, fuel oils, crude petroleum, and products of petroleum refining and coal products) accounted for 17.5%; and miscellaneous products (mail & parcels, trailers on flat cars, container on flat cars) accounted for 10.4%.

For movements into Winnipeg CMA from other jurisdictions, three commodity groups accounted for 75% of the 15.5 million tonnes of freight destined for the area. Plastic and chemical products (basic chemicals, pharmaceutical products, fertilizers & fertilizer material, chemical products, and rubber and plastics) accounted for 37% of imports by truck, other manufactured products (textiles, leather, articles, machinery, electronic/electrical equipment, precision instrument & apparatus, furniture, mattress, toys, arms and ammunition) accounted for 30%, and automobiles and other transportation equipment accounted for 17%.

[7] SCTG categories are a structured list that is defined using the Harmonized Commodity Description and Coding System at less detailed levels, and defined using patterns and industrial activity at more detailed levels.

[8] CFAF database combines 42 SCTG categories into 12 SCTG commodity groups, however it does not further breakdown the 12 groups into its SCTG categories.

Freight Movements by Rail

Freight movements by rail were obtained from the Canadian Freight Analysis Framework database for the three-year period between 2015 and 2017. The database includes 18.5 million tonnes of rail freight moved to and from Winnipeg CMA during the three-year period, categorized into commodity of freight moved, vehicle distance travelled, value of goods, and revenue of goods. In 2017, 6.6 million tonnes of freight were moved to and from the Winnipeg CMA by rail. The origin-destination patterns and commodities transported in 2017 are further discussed in this section.

Origin Destination Patterns

Figure 15 and Figure 16 illustrate the origin-destination patterns of interprovincial and international rail movements to and from Winnipeg CMA by direction of travel. The data shown in this figure represents the annual tonnes for all commodities in 2017 (the most recent year for which data is available).

Figure 15 illustrates the origin-destination patterns of the 3.6 million tonnes of freight moved by rail from Winnipeg CMA in 2017:

- 52% of goods were destined for eastern Canada (Ontario, Quebec, and Maritime Provinces).
- 26% of goods were destined for the south (U.S. and Mexico).
- 21% of goods were destined for western Canada (British Columbia, Alberta, and Saskatchewan).
- 1% of goods were destined for places in Manitoba (<1% of goods destined for Winnipeg).
- < 1% of goods were destined for the north (Yukon, Northwest Territories, and Nunavut).

Figure 16 Illustrates the origin-destination patterns of the 3 million tonnes of freight moved by rail to Winnipeg CMA in 2017:

- 42% of goods originated from eastern Canada (Ontario, Quebec, and Maritime Provinces).
- 42% of goods originated from western Canada (British Columbia, Alberta, and Saskatchewan).
- 16% of goods originated from the south (U.S. and Mexico).
- < 1% of goods originated in Manitoba.
- No goods originated from the north (Yukon, Northwest Territories, Nunavut).

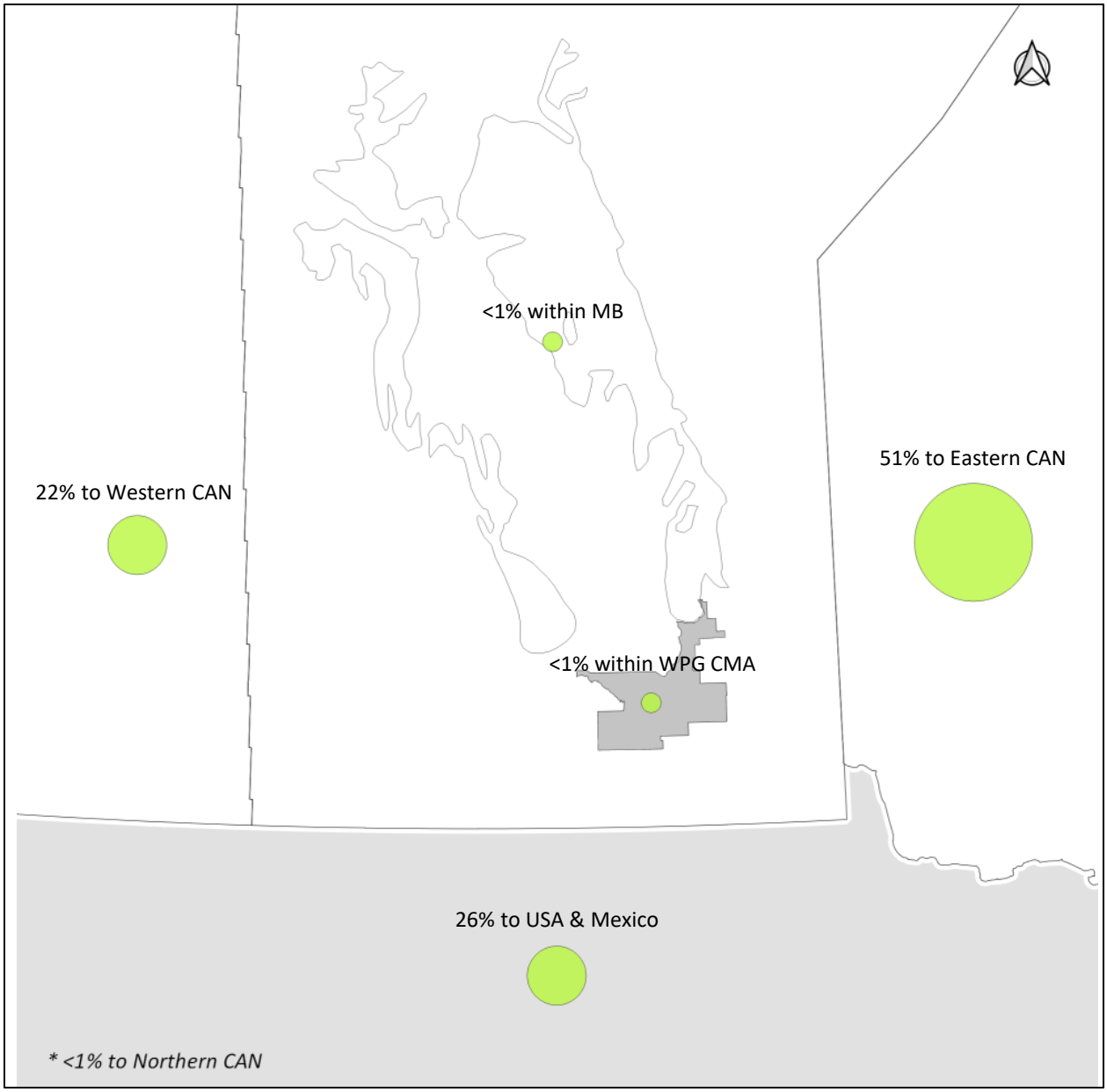


FIGURE 15: PROPORTION OF RAIL FREIGHT TONNAGE (3.6 MILLION) TRANSPORTED FROM WINNIPEG CMA IN 2017

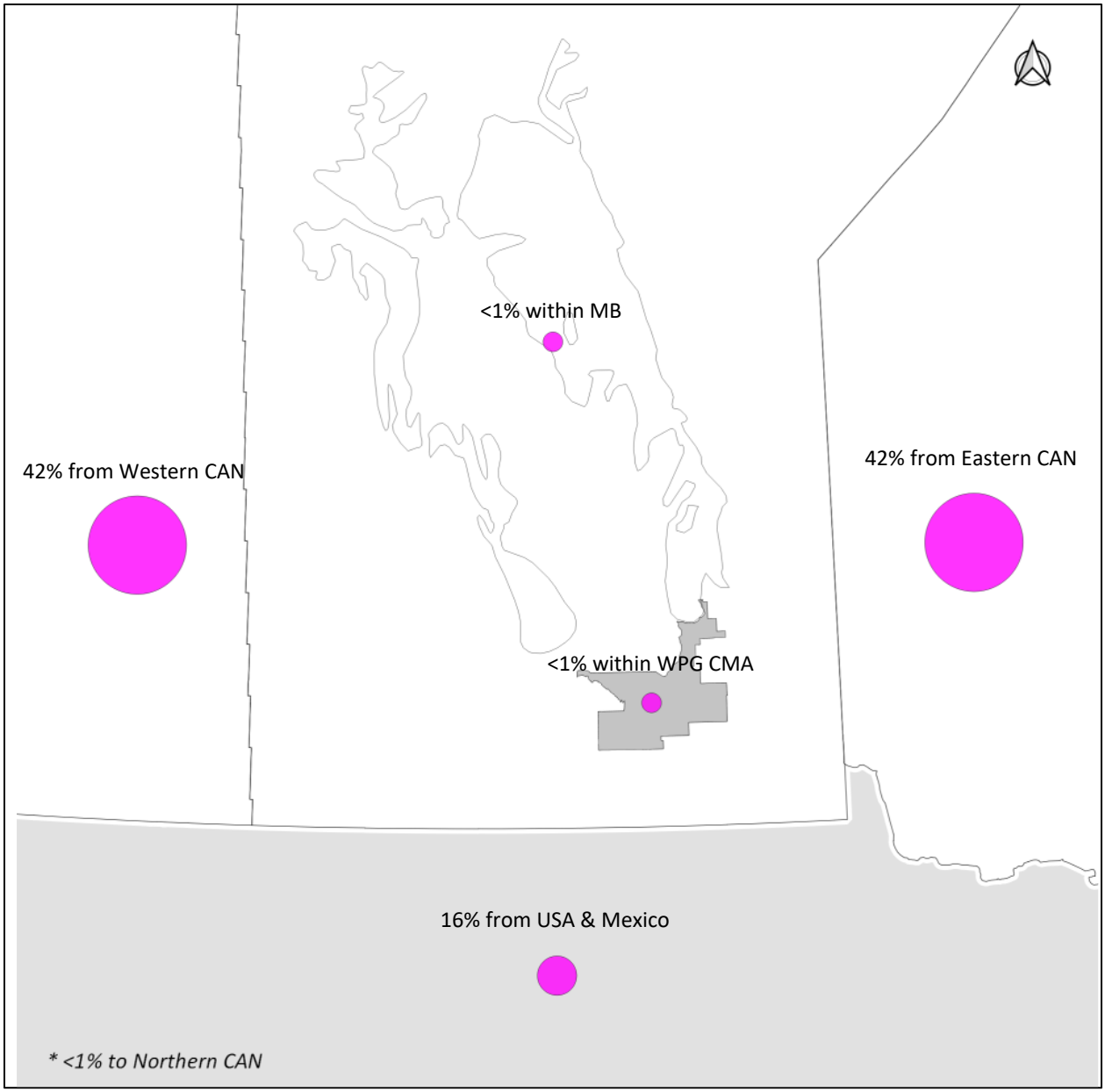


FIGURE 16: RAIL FREIGHT TONNAGE ENTERING WINNIPEG

Commodities

The top 10 commodity groups moved to and from Winnipeg CMA, accounting for 99% of the total tonnage moved by rail in 2017, are shown in Table 5. CFAF utilizes all 42 Standard Classification of Transported Goods (SCTG) groups8F[9] and condenses them into 12 commodity groups9F[10] for its database.

TABLE 5: TOP 10 RAIL COMMODITIES MOVED FROM AND TO WINNIPEG CMA IN 2017

Commodities	Percentage of Rail Tonnage	Commodities	Percentage of Rail Tonnage
From Winnipeg CMA		*Into Winnipeg CMA*	
Agricultural Products	47.9%	Metal	25.7%
Miscellaneous	12.7%	Plastic & Chemical Products	24.6%
Plastic & Chemical Products	11.0%	Miscellaneous	19.8%
Food	8.8%	Forest Products	7.5%
Fuels	8.3%	Transportation Equipment	5.8%
Waste	3.5%	Fuels	4.8%
Metal	2.3%	Food	4.2%
Minerals	1.7%	Minerals	2.8%
Other Manufactured Products	1.5%	Waste	1.7%
Forest Products	1.3%	Agricultural Products	1.6%

For movements from Winnipeg CMA into other jurisdictions, three commodity groups accounted for over 70% of the 3.6 million tonnes of freight originating from the area in 2017. Agricultural products (live animals and fish, cereal grains, animal feed, feed ingredients, vegetables, fruits, seeds) accounted for 48% of exports by rail; miscellaneous products (mail and parcels, trailers on flat cars, containers on flat cars) accounted for 12.7%; and plastic and chemical products (basic chemicals, pharmaceutical products, fertilizers and fertilizer material, chemical products, and rubber and plastics) accounted for 11%.

For movements into Winnipeg CMA from other jurisdictions, three commodity groups accounted for 70% of the 3 million tonnes of freight destined for the area in 2017. Metal (non-metallic mineral products, finished base metal, articles of base metal) accounted for 25.7% of imports by rail; plastic and chemical (basic chemicals, pharmaceutical products, fertilizers and fertilizer material, chemical products, and rubber and plastics) products accounted for 24.6%; and miscellaneous products (mail and parcels, trailers on flat cars, containers on flat cars) accounted for 20%.

[9] SCTG categories are a structured list that is defined using the Harmonized Commodity Description and Coding System at less detailed levels, and defined using patterns and industrial activity at more detailed levels.

[10] CFAF database combines 42 SCTG categories into 12 SCTG commodity groups, however it does not further breakdown the 12 groups into its SCTG categories.

Freight Movements by Air

Freight movement by air can be categorized into three main groups:

- Major Combination Carriers consists of major passenger airlines that offer air cargo services as a by-product of passenger services. Carriers in this group must provide Statistics Canada with data on their air cargo activity.
- Regional and Local Carriers provide services on primary routes in the Prairie region as well as to remote communities in the north. Air cargo activity from this group of carriers is not required to be provided to Statistics Canada.
- Integrated Carriers includes UPS, FedEx, Purolator, and other courier companies. Carriers in this group are required to report data on their U.S. operations, but there are no such requirements for Canadian operations.

Since Statistics Canada only captures one of the three main groups of air cargo activity, there is no complete and reliable database on air cargo shipments, origin-destination patterns, nor data on commodity mix. Additionally, there are no current reporting requirements on air tonnage origin-destination transport, nor any detailed reporting on commodities and value of goods for the Richardson International Airport. The tonnage of freight moved by air in 2017 is presented as data from/to Canadian airports categorized by sectors as domestic, transborder, and other international freight tonnage movements.

In 2017, a total of 1.3 million tonnes of cargo was loaded and unloaded in Canada. Winnipeg proper accounted for 4.6% of this activity, with Manitoba accounting for 5.0% of Canada's total air movement. Table 6 presents Canada's air cargo movements by province based on Statistics Canada data.

In addition, the Winnipeg Airports Authority (WAA) reported that in 2019, a total of 12 cargo carriers moved goods in and out of the region, accounting for over 4,000 cargo flights10F[11]. According to the WAA, cargo-related landings increased by 5.0% with most coming from domestic freighters.

[11] Winnipeg Airports Authority, 2019 Annual Report: Leading Transportation, Innovation, and Growth.

TABLE 6: AIR CARGO TRAFFIC AT CANADIAN AIRPORTS IN 2017[12]

Locations	Loaded Cargo (Tonnes)	Unloaded Cargo (Tonnes)	Total Cargo (Tonnes)	% of Total Cargo
Ontario	255,446	304,211	559,657	42.1%
British Columbia	140,546	148,200	288,746	21.7%
Quebec	78,873	105,441	184,314	13.9%
Alberta	44,768	69,775	114,543	8.6%
Manitoba	35,047	31,446	66,493	5.0%
Winnipeg/James Armstrong Richardson International Airport	**33,299**	**28,244**	**61,543**	**4.6%**
Nunavut	5,914	12,624	18,538	1.4%
Northwest Territories	7,175	4,649	11,825	0.9%
Newfoundland and Labrador	2,583	9,157	11,740	0.9%
Saskatchewan	4,914	5,517	10,432	0.8%
Prince Edward Island	No data available			
Nova Scotia	No data available			
New Brunswick	No data available			
Winnipeg/St Andrews, Manitoba	No data available			
Yukon	No data available			

3.1.2 Trucking Activity Generators

Winnipeg

Figure 17 shows the location of major generators of trucking activity in Winnipeg along with neighbourhoods characterized as industrial and land parcels zoned as corridor and regional commercial. Examples of major industrial and commercial areas in Winnipeg are:

Industrial Areas

- CenterPort Canada
- Winnipeg Richardson International Airport
- North Inkster Industrial
- Inkster Industrial Park
- St. Boniface Industrial Park

Commercial Areas

- Garden City Shopping Centre
- St. Vital
- Unicity Centre
- Polo Park
- Downtown

[12] Statistics Canada, Table: 23-10-0254-01, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2310025401

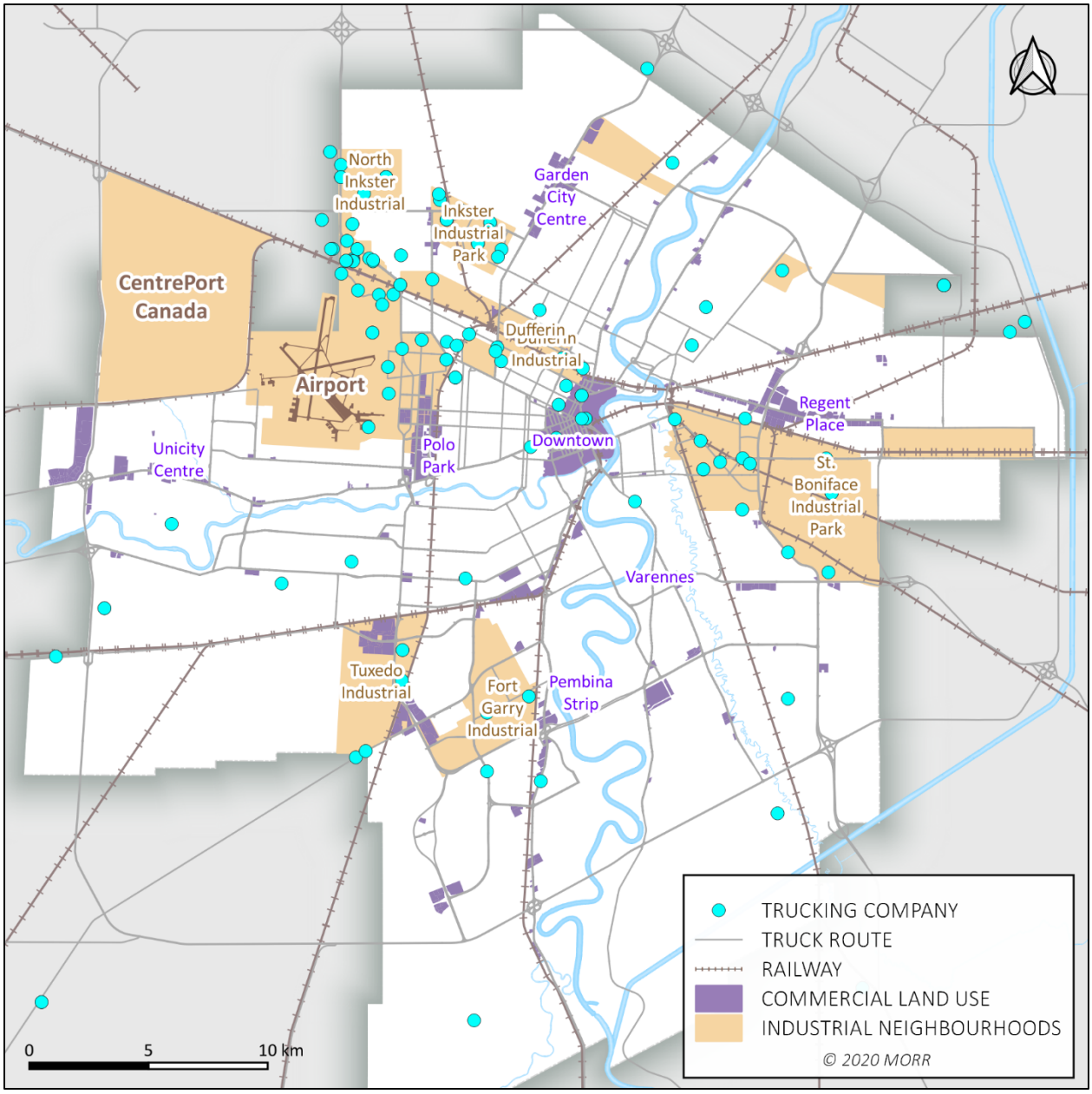


FIGURE 17: MAJOR GENERATORS OF TRUCKING ACTIVITY IN WINNIPEG.

Data Source

The following data was used for this analysis:

Data set of businesses in Manitoba or 2018 from InfoCanada provided to the City by ENVIRONICS Analytics. The data set provides detailed information on the location and type of business including range of employees, range of revenue, and SIC/NAICS industry codes. Businesses defined as truck activity generators were identified as the Motor Freight Transportation/Warehouse related industries as defined by the Standard Industrial Classification (SIC). Only major trucking related businesses with more than 19 employees and more than $10 million in estimated annual sales volume are considered in this report. Data: Businesses2018.xlsx

Winnipeg's 2020 land parcel shapefile which details the zoning district type of every parcel as per Winnipeg Zoning By-Law (NO. 200/2006). Truck activity generators were identified as all manufacturing district types which includes mixed use (MMU), light (M1), general (M2), and heavy (M3). Shapefile: PARCEL.shp

Winnipeg Metropolitan Region

Figure 18 shows the location of major businesses and land use types that are associated with trucking activity generation in the Metropolitan Region. Commercial activity is centred around the municipalities in the metropolitan region. The top five communities in the region by population are:

- City of Winnipeg (700,000 people)
- City of Selkirk (10,000 people)
- Town of Stonewall (4,800 people)
- Oakbank (4,600 people)
- Town of Niverville (4,000 people)

Data Source

The following data was used for this analysis:

The 2018 Manitoba businesses data set identified above was also used for the Metropolitan Region. However, trucking related businesses were defined as those with more than 4 employees. Data: Businesses2018.xlsx.

- The Metropolitan Region zoning bylaw shapefile which details the current zoning category of land parcels in the region. Truck activity generators were identified as the industrial zoning category. Shapefile: MG_ZONING_BYLAW_POLY_WMR.shp

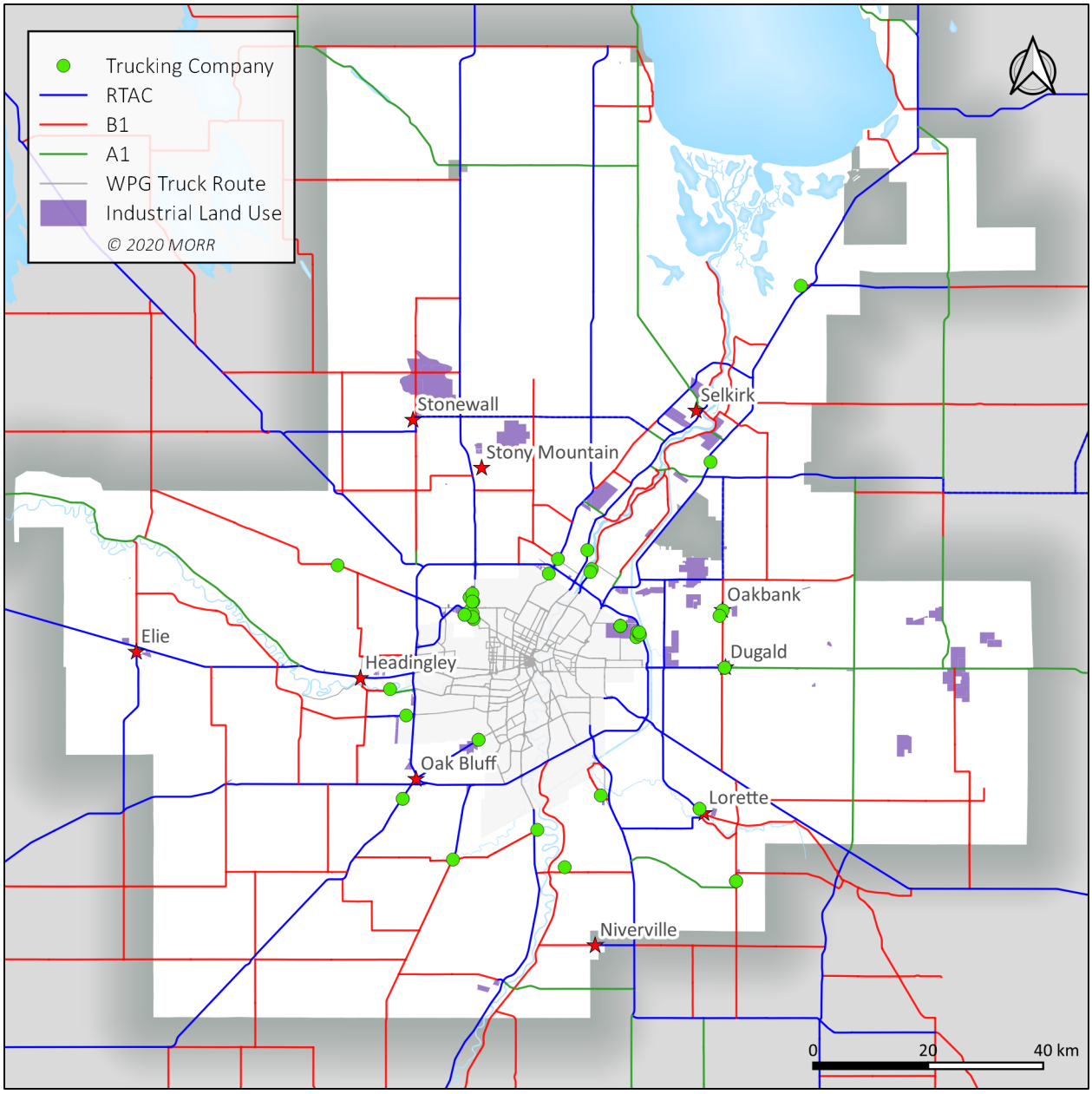


FIGURE 18: METROPOLITAN REGION TRUCK ACTIVITY GENERATORS.

3.1.3 Types of Trucks Operating in the Study Area

Table 7 shows common types of trucks that operate in Winnipeg and its Metropolitan Region under regular operation. For each truck type, the following information is provided: Maximum allowable gross vehicle weight (GVW) under regular operation (i.e., outside of winter weight premiums or spring weight restrictions) for the highest-class roads, maximum allowable axle loads, and maximum allowable length, width, and height. These truck types account for nearly 100% of the truck fleet operating on Winnipeg streets and Metropolitan Region roads.

Table 8 shows the different types of long combination vehicles (LCVs) that operate in Winnipeg and its Metropolitan Region under special permit. For each truck type, the following information is provided: Maximum allowable GVW, maximum allowable axle loads, and maximum allowable length, width, and height.

TABLE 7: COMMON TRUCK TYPES OPERATING IN WINNIPEG AND METROPOLITAN REGION

Truck Type	Maximum Allowable Size and Weight Under Regular Operations on Highest Class Roads	
 2-Axle Single Unit Truck (SUT)	GVW	16,400 kg
	Axle Loads	Steering: 7,300 kg Single: 9,100 kg
	Height	4.15 m
	Width	2.60 m
	Length	12.5 m
 3-Axle Single Unit Truck (SUT)	GVW	24,300 kg
	Axle Loads	Steering: 7,300 kg Tandem: 17,000 kg
	Height	4.15 m
	Width	2.60 m
	Length	12.5 m
 5-Axle Tractor Semitrailer (3-S2)	GVW	38,400 kg
	Axle Loads	Steering: 6,000 kg Tandem: 17,000 kg
	Height	4.15 m
	Width	2.60 m
	Length	23 m
 6-Axle Tractor Semitrailer (3-S3)	GVW	44,000 kg
	Axle Loads	Steering: 6,000 kg Tandem: 17,000 kg Tridem: 24,000 kg
	Height	4.15 m
	Width	2.60 m
	Length	23.5 m

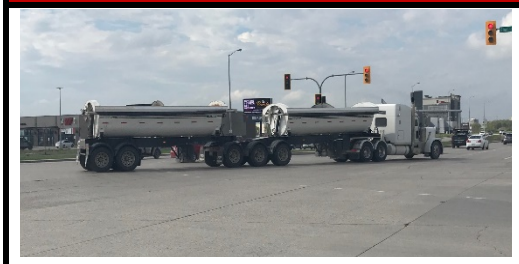
Truck Type	Maximum Allowable Size and Weight Under Regular Operations on Highest Class Roads	
 8-Axle Super B train (3-S3-S2)	GVW	63,500 kg
	Axle Loads	Steering: 6,000 kg Tandem: 17,000 kg Tridem: 24,000 kg
	Height	4.15 m
	Width	2.60 m
	Length	27.5 m
 Standard Double Trailer Combination (3-S1-2)	GVW	50,300 kg
	Axle Loads	Steering: 6,000 kg Single: 9,100 kg Tandem: 17,000 kg
	Height	4.15 m
	Width	2.60 m
	Length	25 m
 Truck Tractor		

TABLE 8: LONG COMBINATION VEHICLES (LCVS)

Long Combination Vehicle (LCV) Type	Maximum Allowable Size and Weight Under Permit	
 Rocky Mountain Double Trailer Combination	GVW	63,500 kg with B-converter dolly
	Axle Loads	Steering: 6,000 kg Single: 9,100 kg Tandem: 17,000 kg
	Height	4.15 m
	Width	2.60 m
	Length	41.0 m on 4-lane road 32.5 m on 2-lane road
 Turnpike Double Trailer Combination	GVW	63,500 kg all dolly types
	Axle Loads	Steering: 6,000 kg Tandem: 17,000 kg
	Height	4.15 m
	Width	2.60 m
	Length	41 m
 Triple Trailer Combination	GVW	53,500 kg
	Axle Loads	Steering: 6,000 kg Single: 9,100 kg
	Height	4.15 m
	Width	2.60 m
	Length	35 m

3.1.4 Truck Route Network

The operation of trucks within the city limits is regulated through Traffic By-law 1573/77. The by-law prescribes what constitutes a truck route and what routes trucks can use under what circumstances. In general, except for Arlington Bridge, the by-law allows trucks to travel on any street in the city. However, travel on designated truck routes is unlimited while travel on non-truck routes is limited to the shortest distance between truck route and origin/destination.

Winnipeg

Figure 19 illustrates Winnipeg's current truck route network and Figure 20 shows the long combination vehicle (LCV) network. In total, there are 715 centerline-kilometres of full-time truck routes and 20 centerline-kilometres of part-time truck routes. These include the 101 centerline-kilometres of road where LCV are permitted to operate.

Data Source

The following truck route network data was used for this analysis:

The City of Winnipeg truck route map was last produced in February 2017 and available in PDF format from the City's website. The City also provided a shapefile of the truck route network based on the divided network with separate line segments for divided roadways. The shapefile indicates the type of truck route (i.e., full time, full time restricted, and part time) and the BLOCK_ID which relates to the City's primary asset management road network shapefile (BLOCK_SEGMENTS_01_MAR_12.shp). Provincial roadways (e.g., Perimeter Highway) are also included as part of the truck route network in this file. Shapefile: TRUCK_ROUTE.shp

The City of Winnipeg LCV Routes map was scanned and provided as an image file. A shapefile was created from the scanned map for this analysis. Image: LCV_Routes.tiff

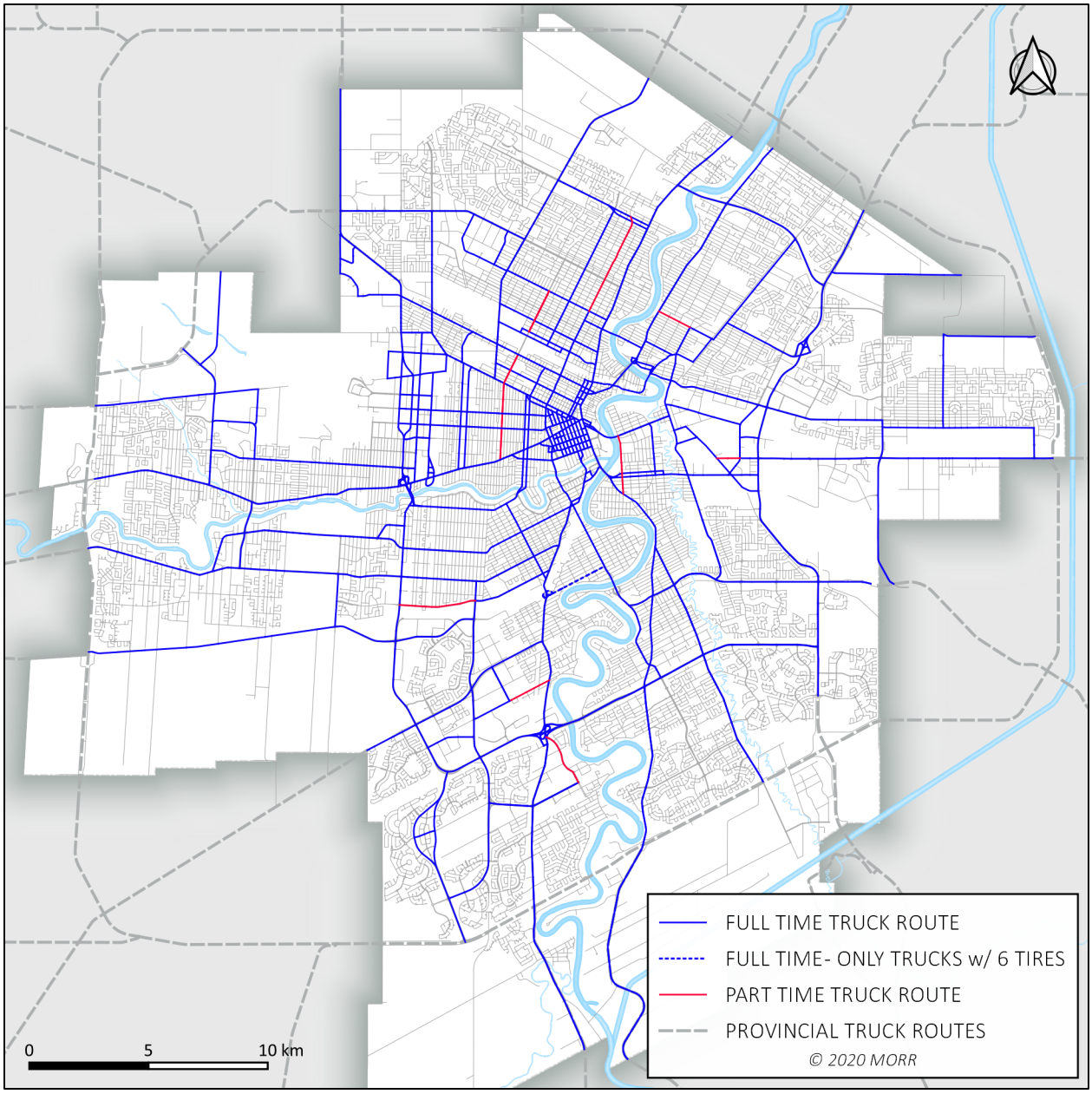


FIGURE 19: WINNIPEG DESIGNATED TRUCK ROUTE NETWORK.

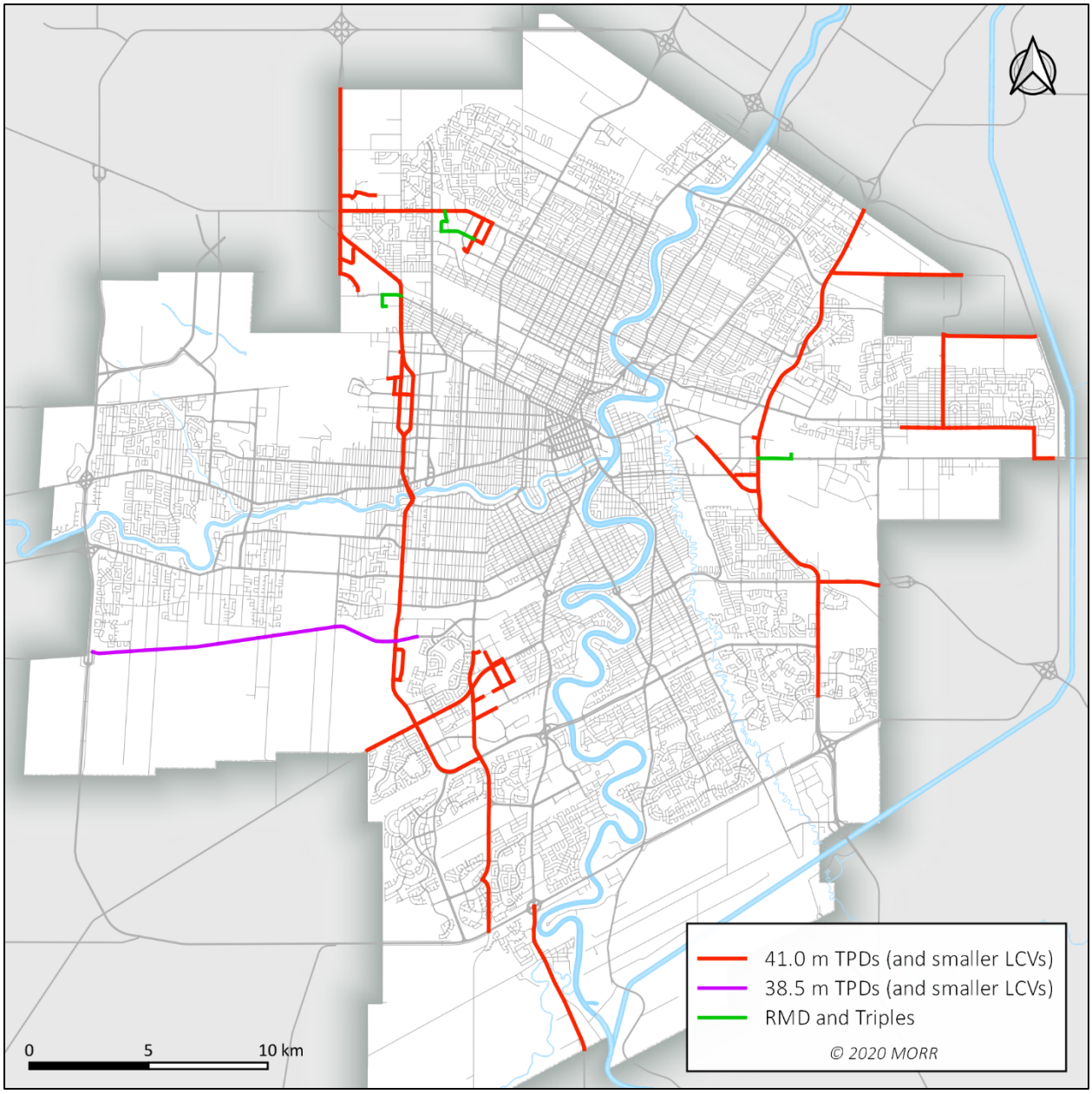


FIGURE 20: WINNIPEG LONG COMBINATION VEHICLE (LCV) NETWORK.

Winnipeg Metropolitan Region

As it pertains to the Metropolitan Region, there are three types of roads where trucks operate – RTAC, A1, and B1 roads. The maximum allowable GVW for trucks operating on these roads depends on the type of road and the type of truck, as shown in the previous section.

Figure 21 shows the truck routes by class for the Winnipeg Metropolitan Region. In total, there are 681 centerline-kilometres of RTAC roads, 267 centerline-kilometres of A1 roads, and 802 centerline-kilometres of B1 roads in Winnipeg's Metropolitan Region.

Data Source

The latest version of the truck route map was published on June 1, 2017 and is available in PDF format from MI's website. The 2018 Manitoba Highway Inventory shapefile does not include truck route designation, so the 2013 Truck Traffic Flow Map shapefile produced by the Manitoba Highway Traffic Information System (MHTIS) was used. The shapefile provides truck traffic volume information and truck route designation (i.e., RTAC, A1, B1) for all roadway control sections.

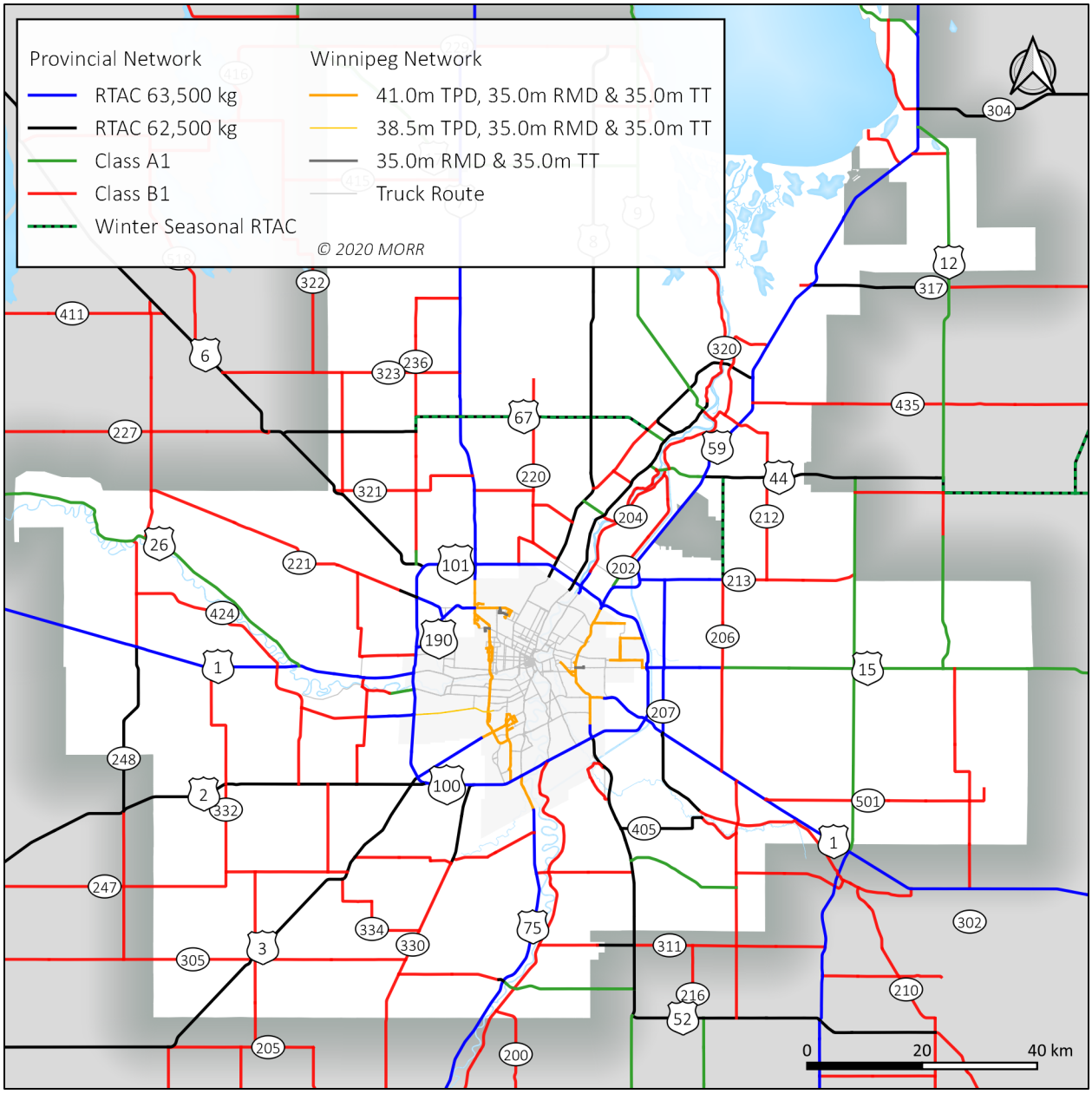


FIGURE 21: METROPOLITAN REGION TRUCK ROUTE NETWORK.

3.1.5 Pavement Condition

Winnipeg

Figure 22 shows the existing pavement condition on Winnipeg's truck route network. Of the 833 kilometres of truck routes, 61 kilometres are classified as having new pavement, 510 kilometres are classified as having good pavement, 160 kilometres have fair pavement, and 62 kilometres are classified as having poor pavement condition. The City uses the following definitions as it pertains to pavement condition:

A new pavement is that which has been recently renewed or constructed and displays little to no distresses. These streets may perform adequately without significant maintenance for ten years or more depending on the surface type and street classification.

Good pavement condition refers to a pavement structure which may display slight defects or deteriorated components but is functional. These streets may require minor maintenance (e.g., crack sealing, patching or thin overlay) depending on the surface type and street classification.

Fair pavement condition refers to a pavement structure which is deteriorated or defective but has not exceeded its useful life. Streets with this pavement condition may require minor or moderate maintenance (e.g., resurface or rehabilitation) depending on the surface type and street classification.

Poor pavement condition refers to a pavement structure which displays significant distresses, has critically damaged components, and has exceeded its useful life. Streets with this pavement condition require major maintenance (e.g., rehabilitation or reconstruction).

Data Source

Winnipeg's street rating shapefile that indicates the pavement condition on Winnipeg's regional streets as new, good, fair, or poor for 2018. Shapefile: Street_Rating.shp

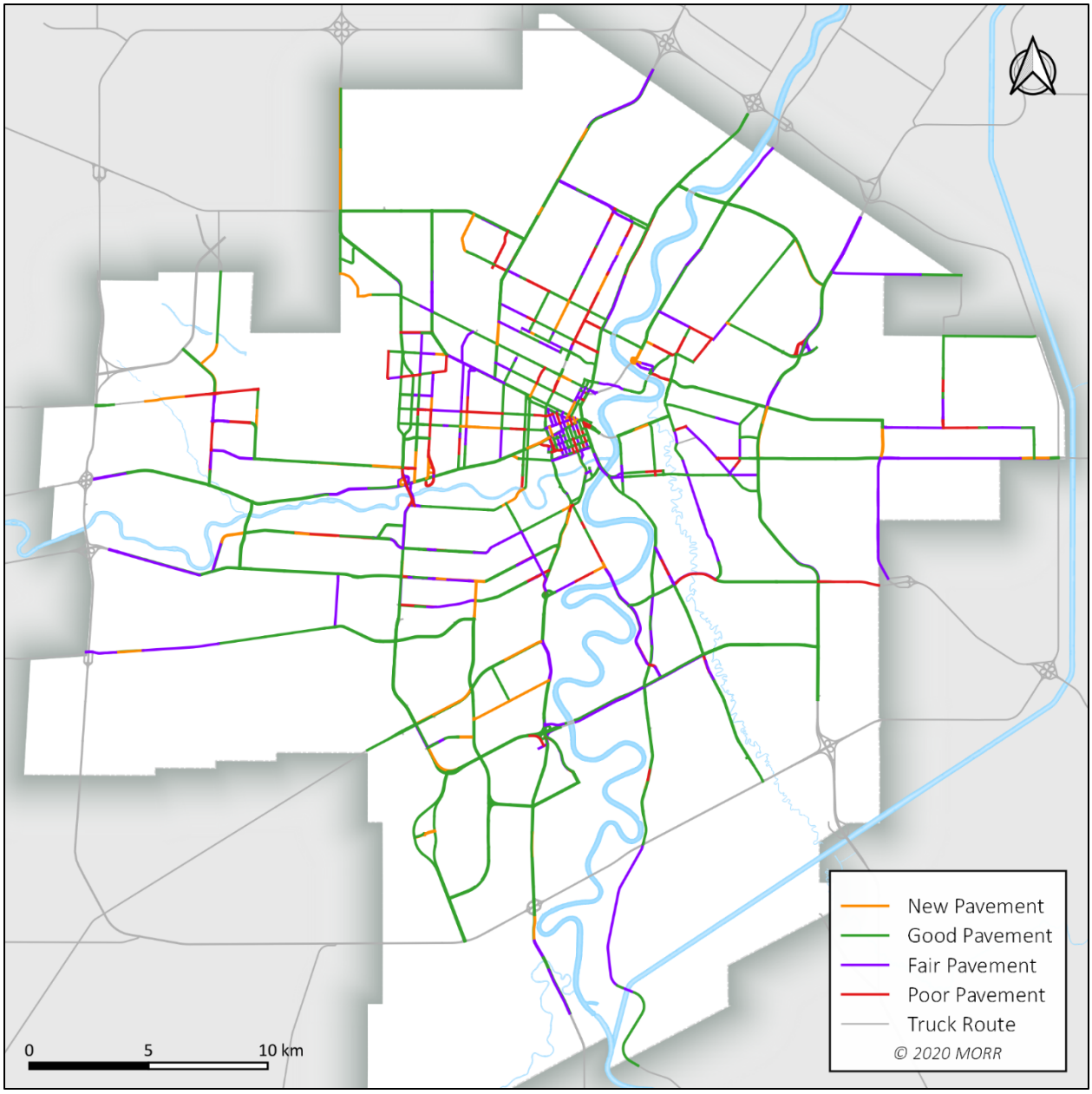


FIGURE 22: 2018 WINNIPEG PAVEMENT CONDITION ON TRUCK ROUTES.

Winnipeg Metropolitan Region

Figure 23 shows the pavement condition for roads in the Metropolitan Region. Of the 1,767 kilometres of RTAC, A1, and B1 roads in the Metropolitan Region, 404 roadway kilometres are classified as having good pavement, 880 roadway kilometres have fair pavement, and 594 roadway kilometres are classified as having poor pavement condition. As Table 9 shows, one half of the RTAC road pavements are in fair condition while nearly 30% are in good condition and nearly 20% are in poor condition. Comparatively, a larger proportion of pavements on A1 and B1 roads are in poor condition; however, the extent of the network with good pavement rating is greater for A1 roads than for B1 roads. Most trucking activity takes place on RTAC roads, followed by A1 roads.

Manitoba Infrastructure defines pavement condition based on International Roughness Index (IRI) as follows:

- Good pavement has an IRI ≤ 1.75
- Fair pavement has an IRI of 1.75 < IRI ≤ 2.80
- Poor pavement has an IRI > 2.80.

TABLE 9: ROADWAY KILOMETRE LENGTH OF PAVEMENT CONDITION RATING BY ROAD CLASS

	Good	Fair	Poor	No Data	Total
RTAC	305 km (29%)	525 km (49%)	180 km (17%)	50 km (5%)	1,060 km (100%)
A1	72 km (27%)	77 km (29%)	112 km (42%)	6 km (2%)	267 km (100%)
B1	28 km (3%)	265 km (33%)	295 km (37%)	214 km (27%)	802 km (100%)

Data Source

MI provided their 2019 pavement condition data set that includes International Roughness Index (IRI) measurements collected by a Laser Crack Measurement System (LCMS) in 2019. Data is provided in more detail than the roadway control section shapefile so the worst rating along a control section is used. *Data: Region 1 GFP for MORR.xlsx; Shapefile: Manitoba_Highway_Inventory_2018.shp.*

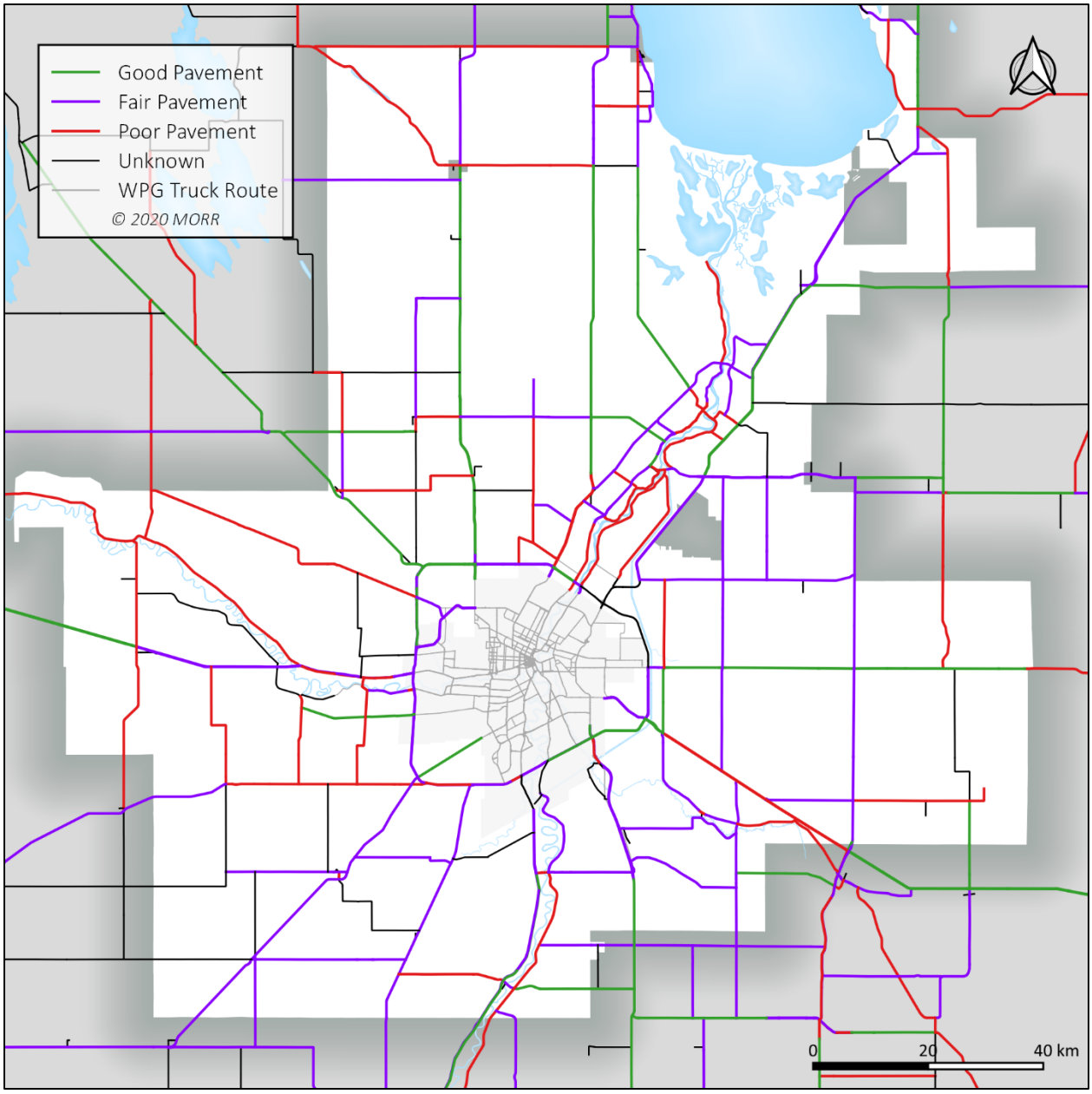


FIGURE 23: METROPOLITAN REGION PAVEMENT CONDITION

3.1.6 Rail Network

Figure 24 shows the extent of the railway network serving Winnipeg. In total, there are 162 kilometres of Class 1 railways (i.e., BNSF, CN, and CP), connecting to one of the two intermodal terminals (CN intermodal and CP intermodal).

Figure 25 shows the extent of the railway network serving Winnipeg's Metropolitan Region. There are 258 kilometres of CN track and 372 kilometres of CP track. Other rail lines (i.e., Central Manitoba Railway, Greater Winnipeg Water District, and Prairie Dog Central Railway) account for 191 kilometres of line serving the area.

The railcar gross capacity is 286,000 pounds for CN. An equivalent figure was not available from CP.

Data Source

The National Railway Network (NRWN) was acquired from the Government of Canada open data portal. The data set indicates the track class (main line, spur, and yard) and the operator (CN, CP, BNSR, and CEMR). *Shapefile: NRWN.shp*



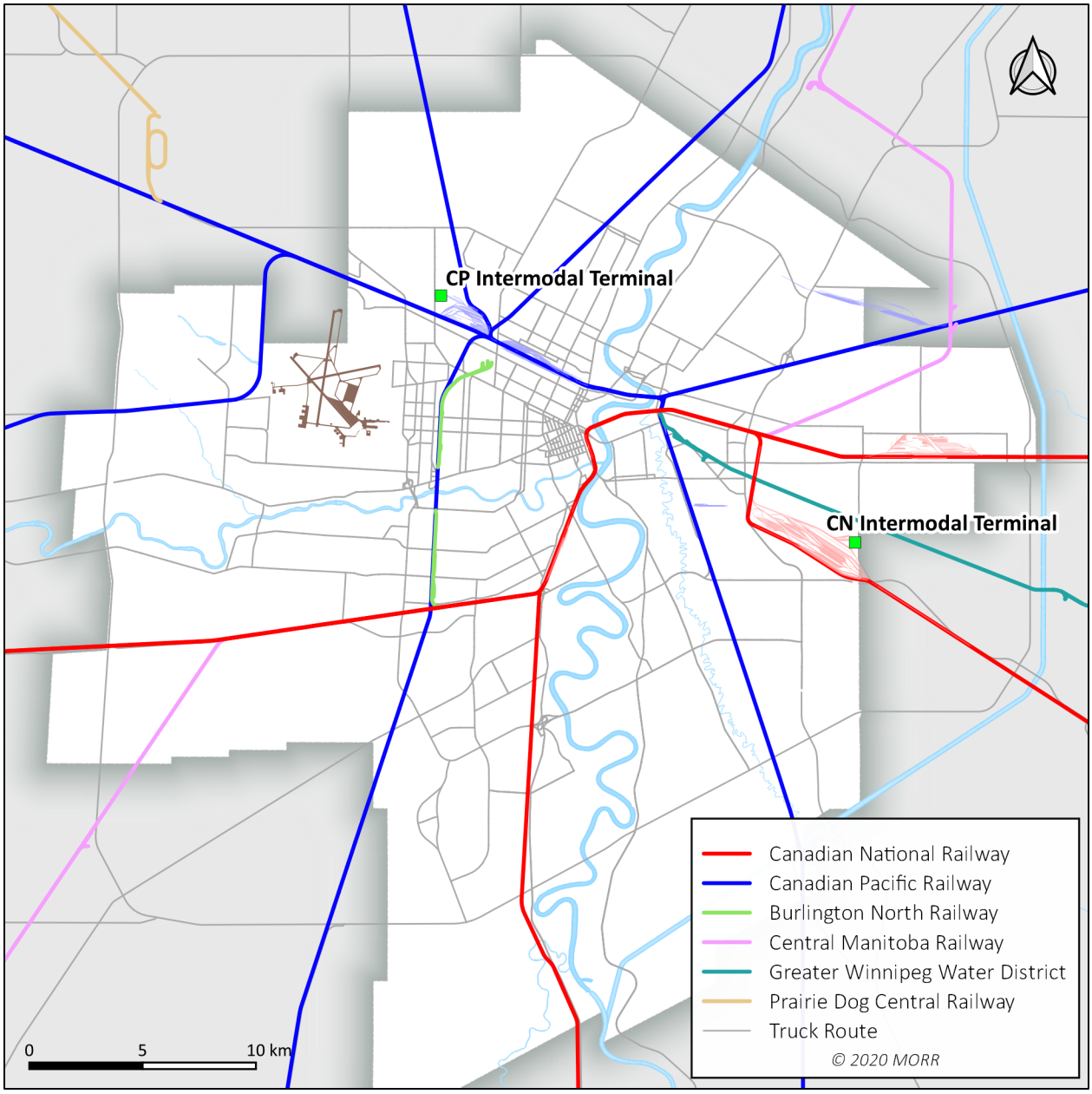


FIGURE 24: WINNIPEG RAILWAY NETWORK.

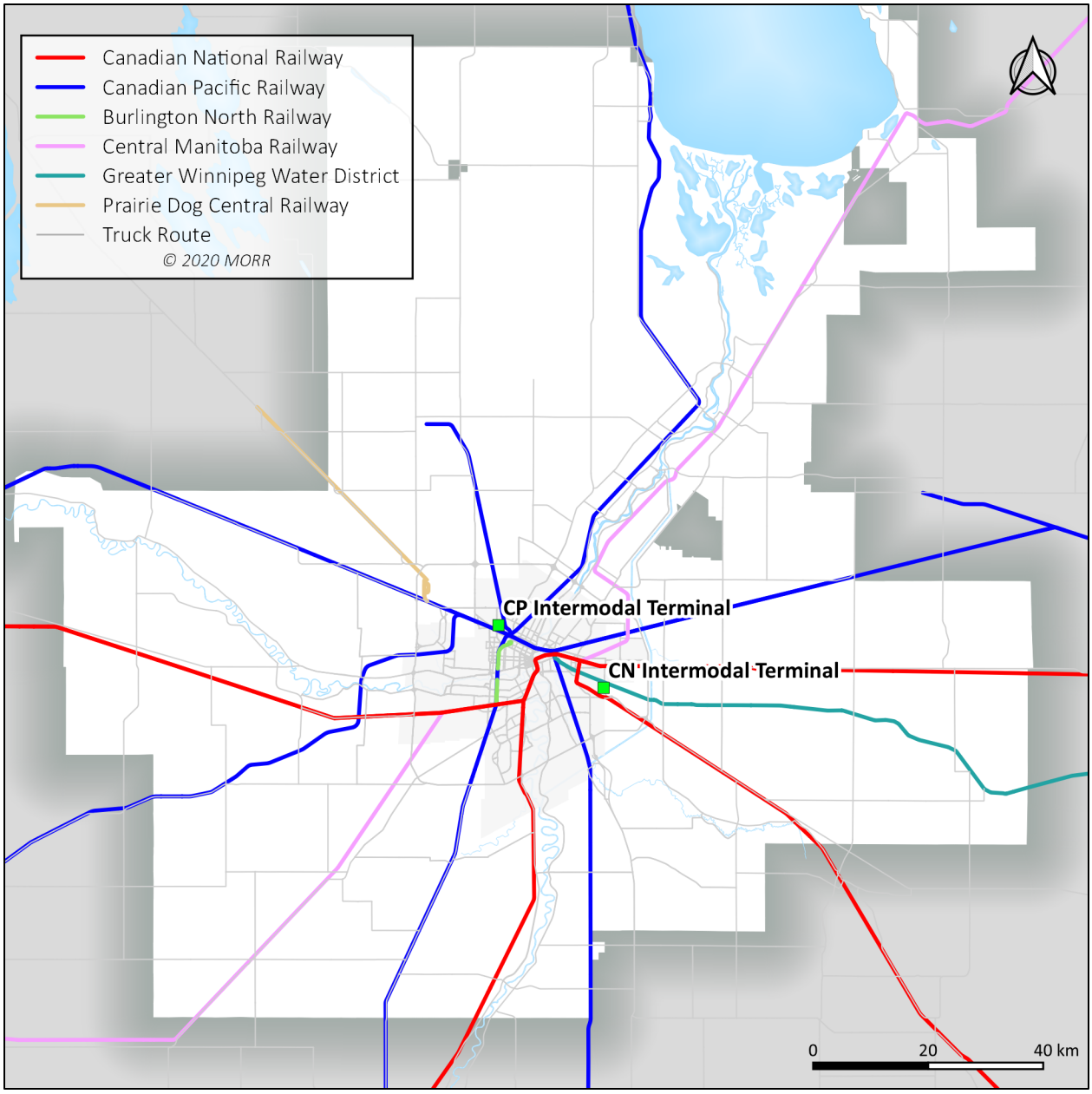


FIGURE 25: METROPOLITAN REGION RAILWAY NETWORK.

3.1.7 Airport Facilities

Figure 26 shows the location of international and local airports in Winnipeg and the Metropolitan Region.

The Richardson International airport operates 24 hours per day, 7 days per week. It has two key runways:

- Runway 18/36, which is the north-south runway, 11,000 ft (3,350 m) long and is equipped for CAT II operations. This runway was rehabilitated in 2014, including asphalt pavement resurfacing, removal and reinstallation of runway centerline and touchdown zone lights, and localized land drainage sewer repairs.
- Runway 13/31, which is the northwest-southeast runway and is 8,700 ft (2,650 m) long is equipped for CAT I operations.

The airport has 31,000 m^2 (333,681 ft^2) of warehouse space for cargo activities and there is a dedicated common use cargo apron with an area of 29,150 m^2 (313,768 ft^2).

Winnipeg has major sorting facilities for FedEx and Purolator, receives daily transborder service from UPS and FedEx and is a major hub for Cargojet Airlines and Purolator. Further, the airlines and freight forwarders shown in Table 10 operate from Winnipeg Richardson International Airport.

TABLE 10: CARGO AIRLINES AND FREIGHT FORWARDERS OPERATING IN WINNIPEG RICHARDSON AIRPORT

Airlines	Oversized Cargo	Freight Forwarders
Air Canada Cargo	Bearskin Airlines	A.D. Rutherford & Co. Ltd.
Cargojet Canada	Calm Air Cargo	Agility Logistics
FedEx	Delta Cargo	CEVA Logistics
Purolator	First Air	Cole International
UPS	Kivalliq Air Cargo	FedEx Trade Networks
Volga-Dnepr Airlines	Perimeter Airlines	Garroni International Logistics
	SkyLink Express	Kuehne & Nagel
	WestJet Cargo	Locher Evers International
		Panalpina
		Schenker of Canada Ltd.
		Tri-ad International Freight
		Whizdom International

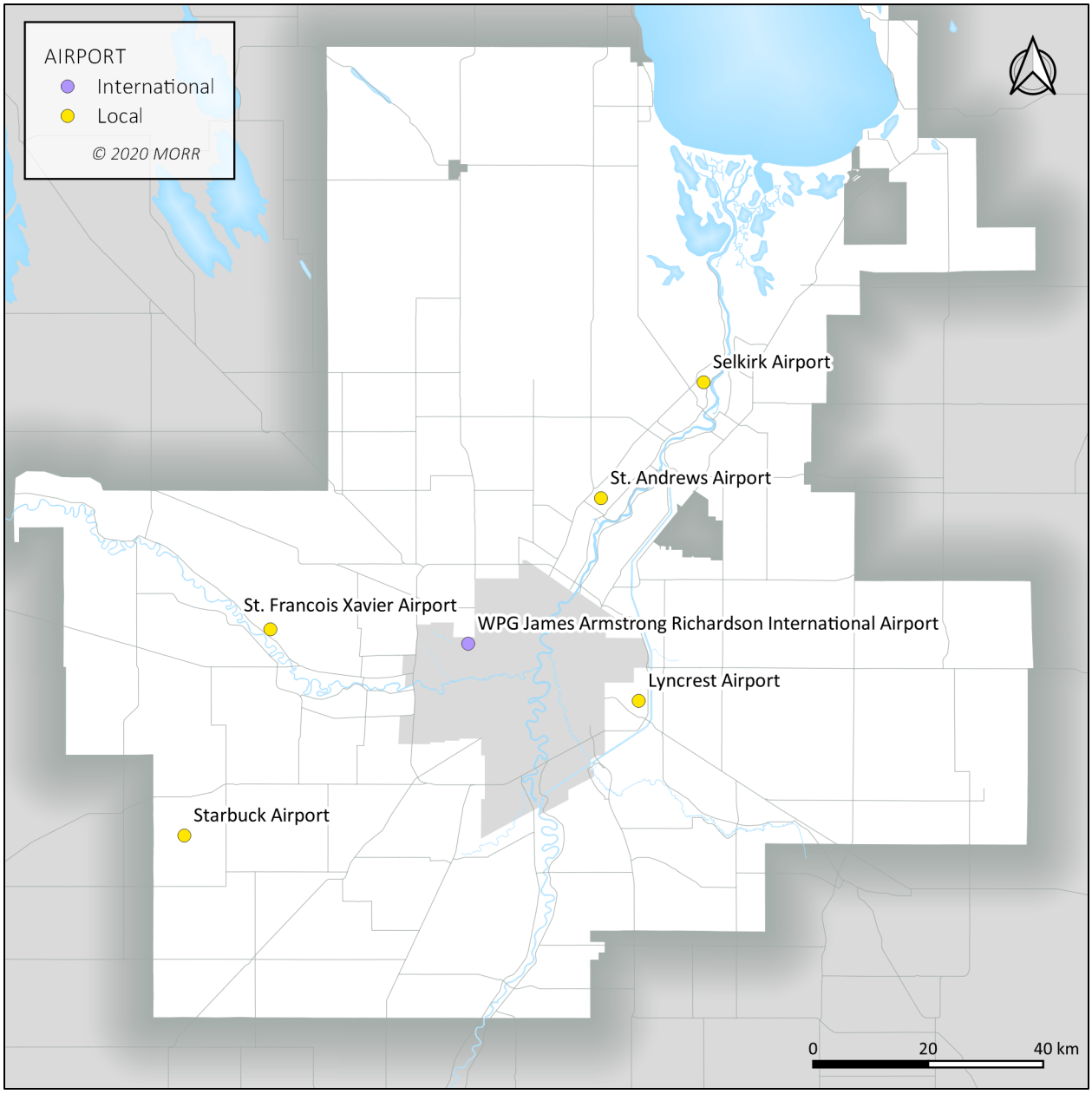


FIGURE 26: AIRPORTS IN WINNIPEG AND THE METROPOLITAN REGION.

Data Source

The following airport data was used for Winnipeg and Metropolitan Region:

- A list of airport locations in Manitoba was accessed from Wikipedia. The list indicates the International Civil Aviation Organization (ICAO) number or the Transport Canada Location Identifier (TCLID) depending on the type of flights the airport may serve. *Data: List of airports in Manitoba.*
- Winnipeg Airports Authority list of Airlines and Forwarders. https://www.waa.ca/uploads/ck/files/AirlinesForwardersSeptember2016.pdf

3.2 Performance of Goods Movement Network

The performance of the goods movement network serving Winnipeg and its Metropolitan Region was evaluated through the following perspectives:

- Analysis of truck traffic volumes.
- Evaluation of delay associated with railway crossings.
- Analysis of data on collisions involving trucks.
- Review of travel speed and travel time variability on Winnipeg's truck route network.

3.2.1 Truck Traffic Volume

Truck traffic volume data provides insight as to where trucks are travelling on the road network. For the purposes of this section, truck traffic refers to all single unit trucks and articulated trucks (tractor semitrailer or larger) as discussed in Section 3.1.3.

Winnipeg

Figure 27 shows the average daily truck traffic (ADTT) volumes. As the figure illustrates, in addition to the Perimeter Highway, which is provincial jurisdiction, the corridors with the largest total truck traffic volume in Winnipeg are Route 90, Lagimodire Boulevard, Inkster Boulevard, Logan Avenue, and Keewatin Street.

Figure 28 shows the ADTT for single unit trucks and Figure 29 shows the ADTT for articulated trucks based on 2012 data, which is the most recently available information on truck traffic, except for volumes on CentrePort Canada Way for which the data is for 2018. These figures show that single unit trucks operate mainly along Route 90, the southern portion of Lagimodiere Boulevard, Pembina Highway, Main Street, the downtown area, and the central west area of the City. Comparatively, articulated trucks operate mainly along CentrePort Canada Way, Lagimodiere Boulevard, Route 90, and the Perimeter Highway. This confirms the pickup and delivery nature of single unit trucks and the long-haul application of articulated vehicles.

Data Source

Truck traffic volume estimate data for the 2012 study: *Urban and Regional Transportation Emissions Modelling: Development of Spatial, Temporal, and Vehicle-Specific Factors for Manitoba: Part A: Inputs for Emissions Modelling in Winnipeg*. The study provides a shapefile of average daily traffic (ADT) volume estimates for single unit and articulated trucks. The data was supplemented with volume estimates for significant new links like CentrePort Canada Way and Chief Peguis Trail. *Shapefile: Truck Flows 2.shp*

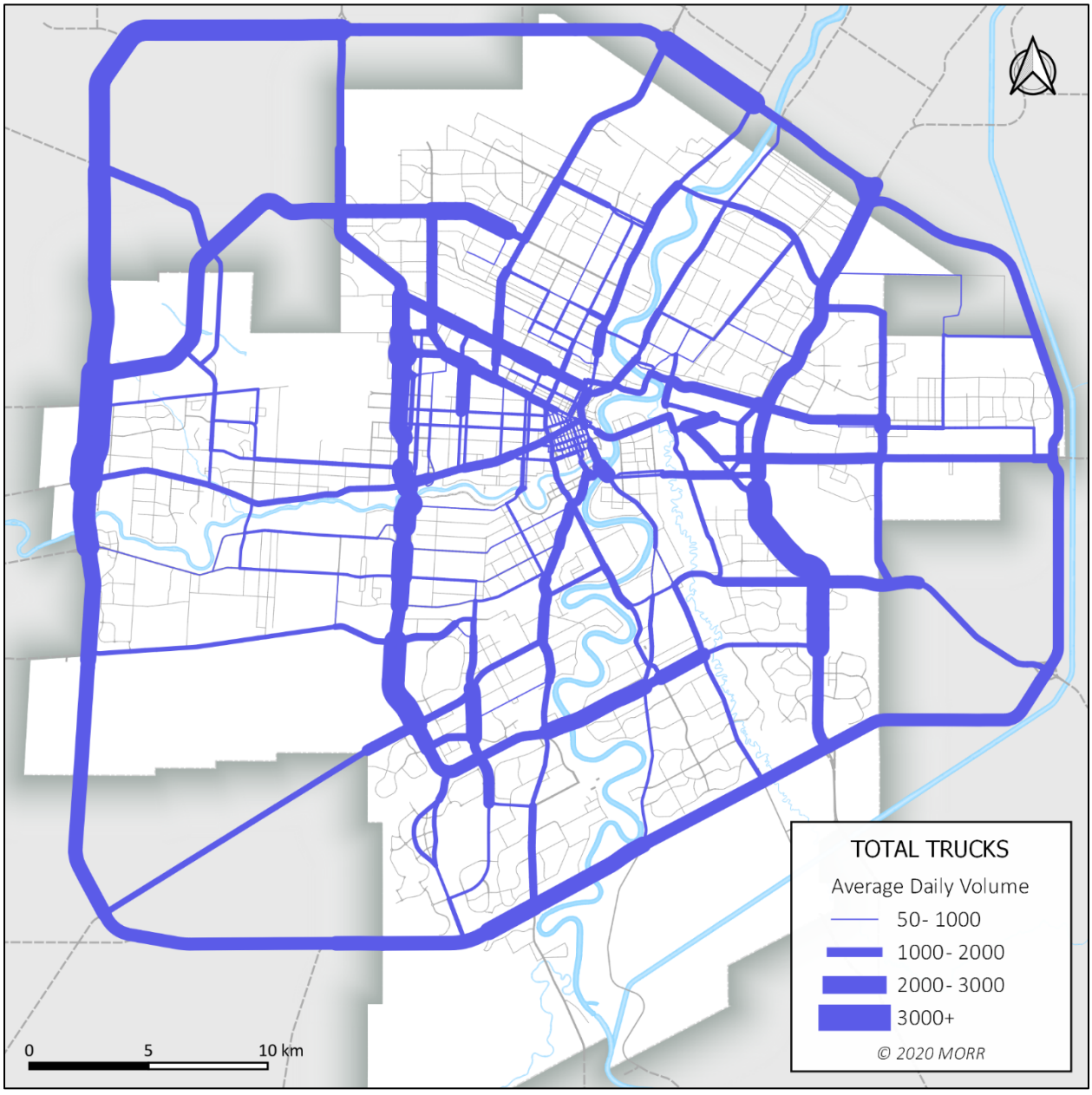


FIGURE 27: WINNIPEG AVERAGE DAILY TRUCK TRAFFIC VOLUME.

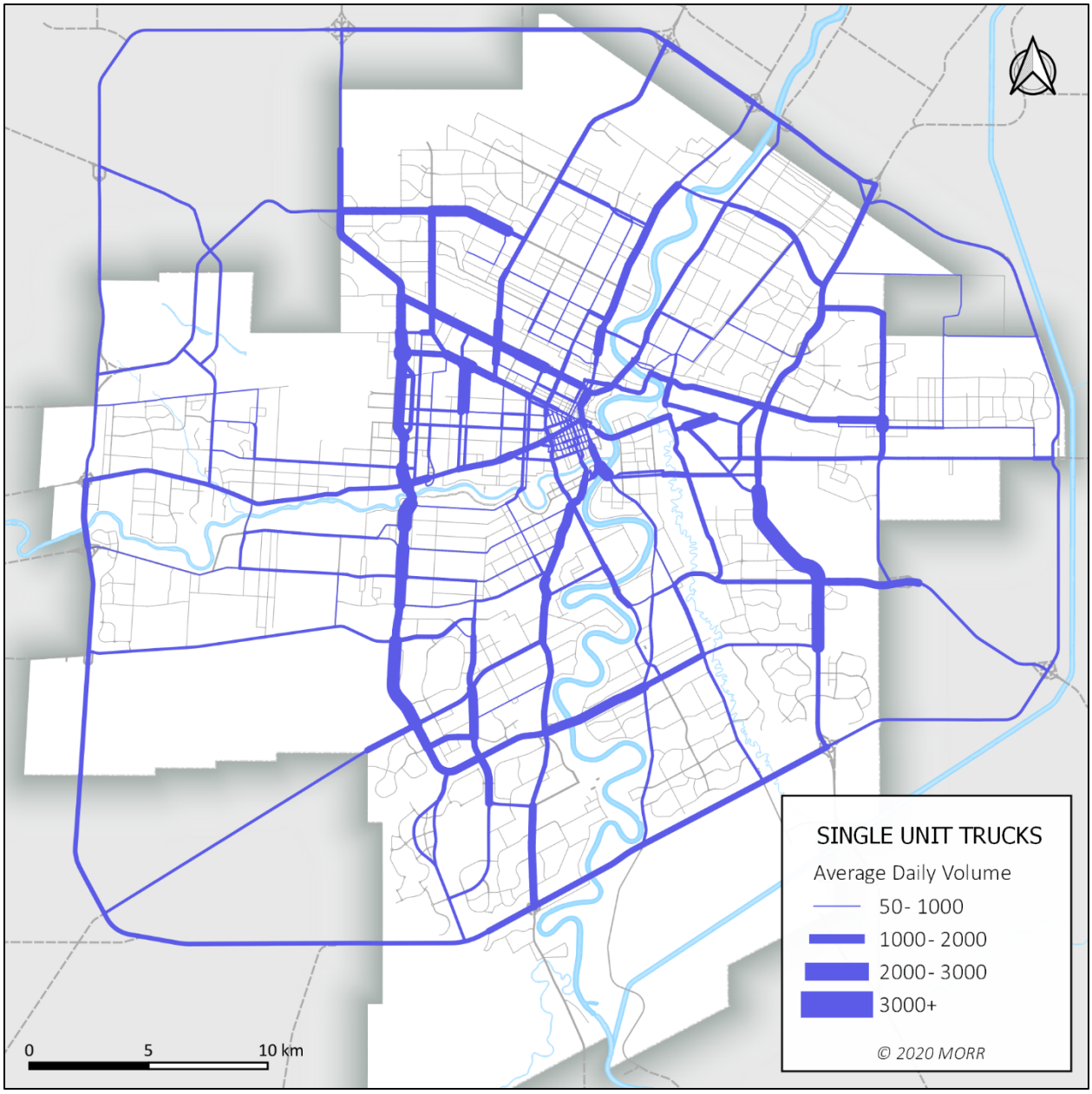


FIGURE 28: WINNIPEG SINGLE UNIT TRUCK AVERAGE DAILY VOLUME.

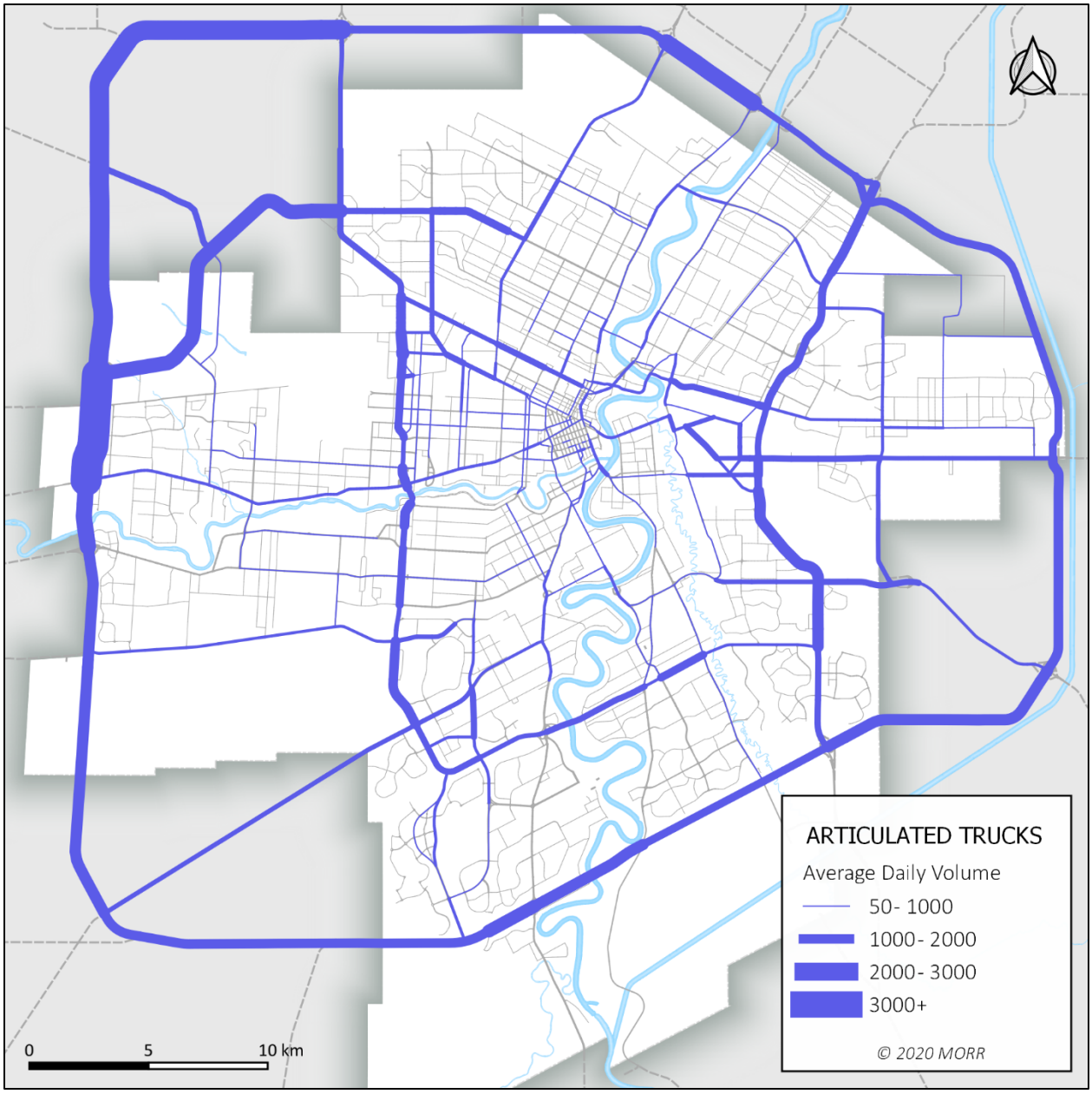


FIGURE 29: WINNIPEG ARTICULATED TRUCK AVERAGE DAILY VOLUME.

Winnipeg Metropolitan Region

Figure 30 shows the annual average daily truck traffic (AADTT) volumes on RTAC, A1, and B1 roads in the Metropolitan Region. As the figure shows, most of the truck traffic operates on the Perimeter Highway, the TransCanada Highway, Highway 75, and Highway 7 up to the limestone quarries.

Figure 31 shows the AADT for single unit trucks; Figure 32 shows the AADT for articulated trucks with a single trailer (tractor semitrailer); and Figure 33 shows the AADT for articulated trucks with multiple trailers (double and triple trailer combinations). The following observations are drawn from these figures:

- Minimal single unit truck traffic operates on Metropolitan Region roads.
- Tractor semitrailer combinations account for most of the truck traffic on Metropolitan Region roads.
- Most of the articulated trucks with more than one trailer operate in the west and south perimeter highways and the TransCanada Highway west.

Data Source

The 2013 Truck Traffic Flow Map shapefile produced by the Manitoba Highway Traffic Information System (MHTIS). The shapefile provides annual average daily truck traffic (AADTT) volumes for Federal Highway Administration (FHWA) vehicle classes 4 through 13 (single unit trucks and articulated trucks as per Section 2.1). *Shapefile: Truck_Traffic_Flow.shp.*

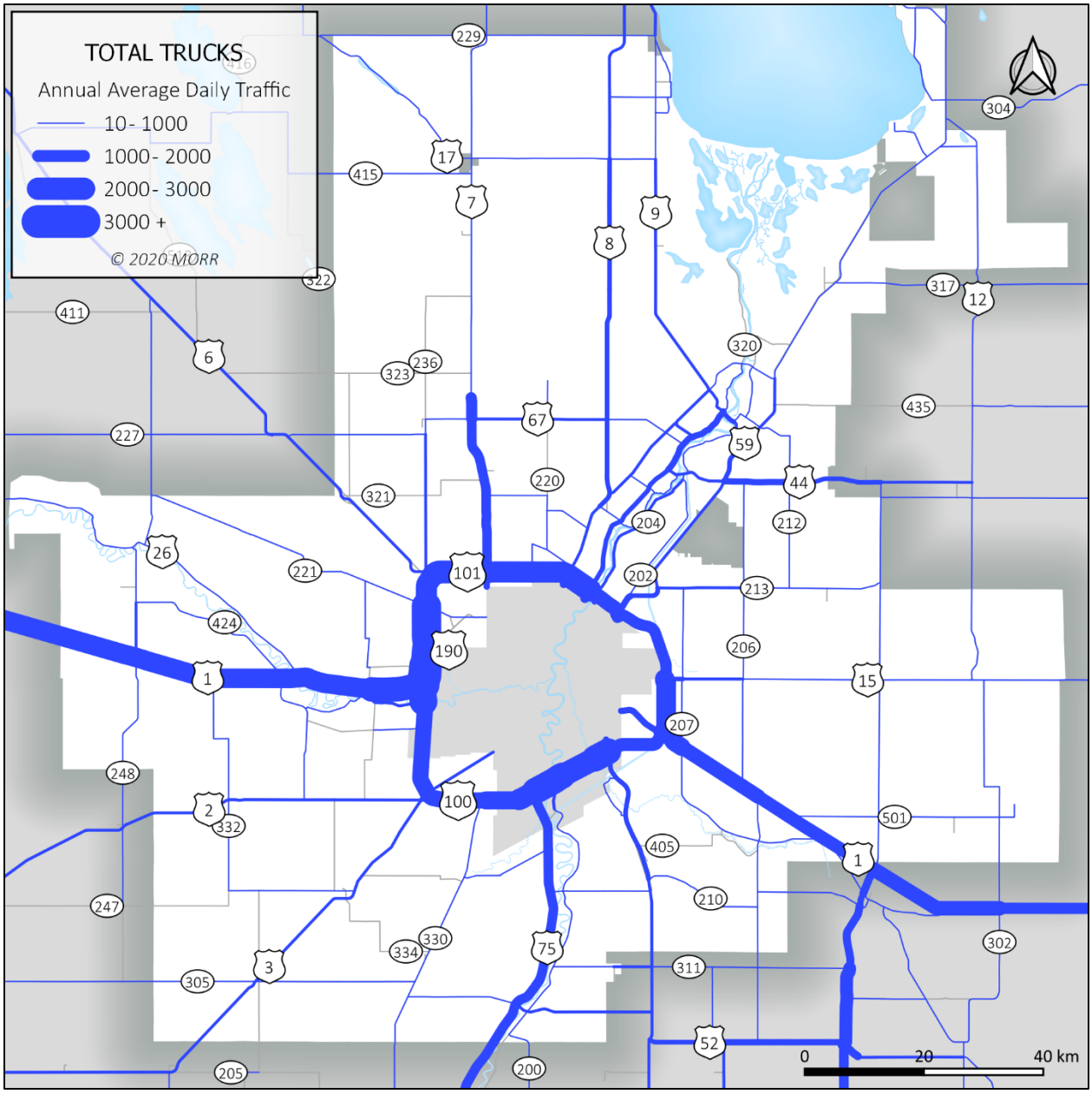


FIGURE 30: METROPOLITAN REGION ANNUAL AVERAGE DAILY TRUCK TRAFFIC VOLUME.

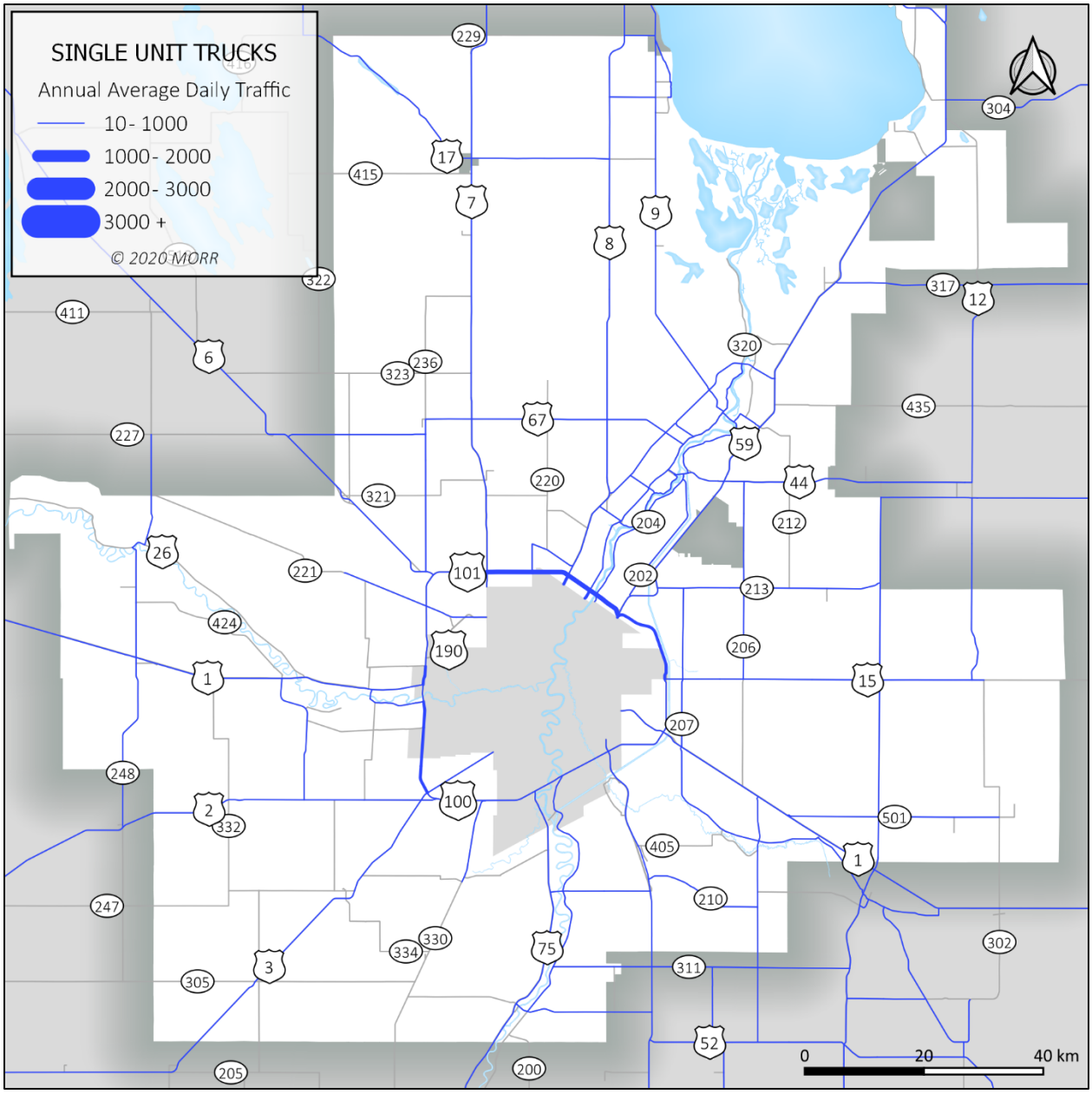


FIGURE 31: METROPOLITAN REGION SINGLE UNIT TRUCK ANNUAL AVERAGE DAILY TRAFFIC VOLUME.

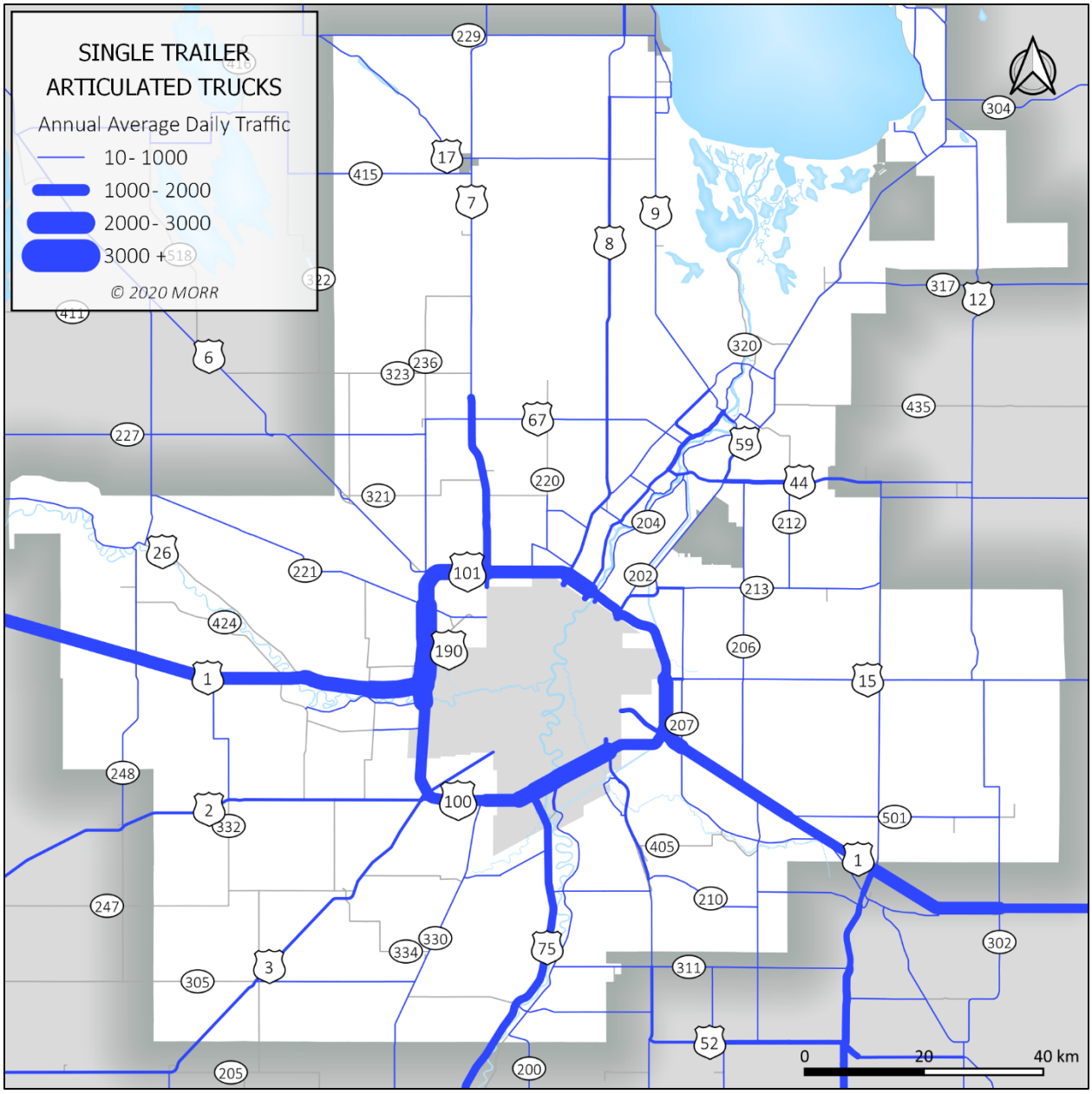


FIGURE 32: METROPOLITAN REGION ARTICULATED TRUCK (SINGLE TRAILER) ANNUAL AVERAGE DAILY TRAFFIC VOLUME.

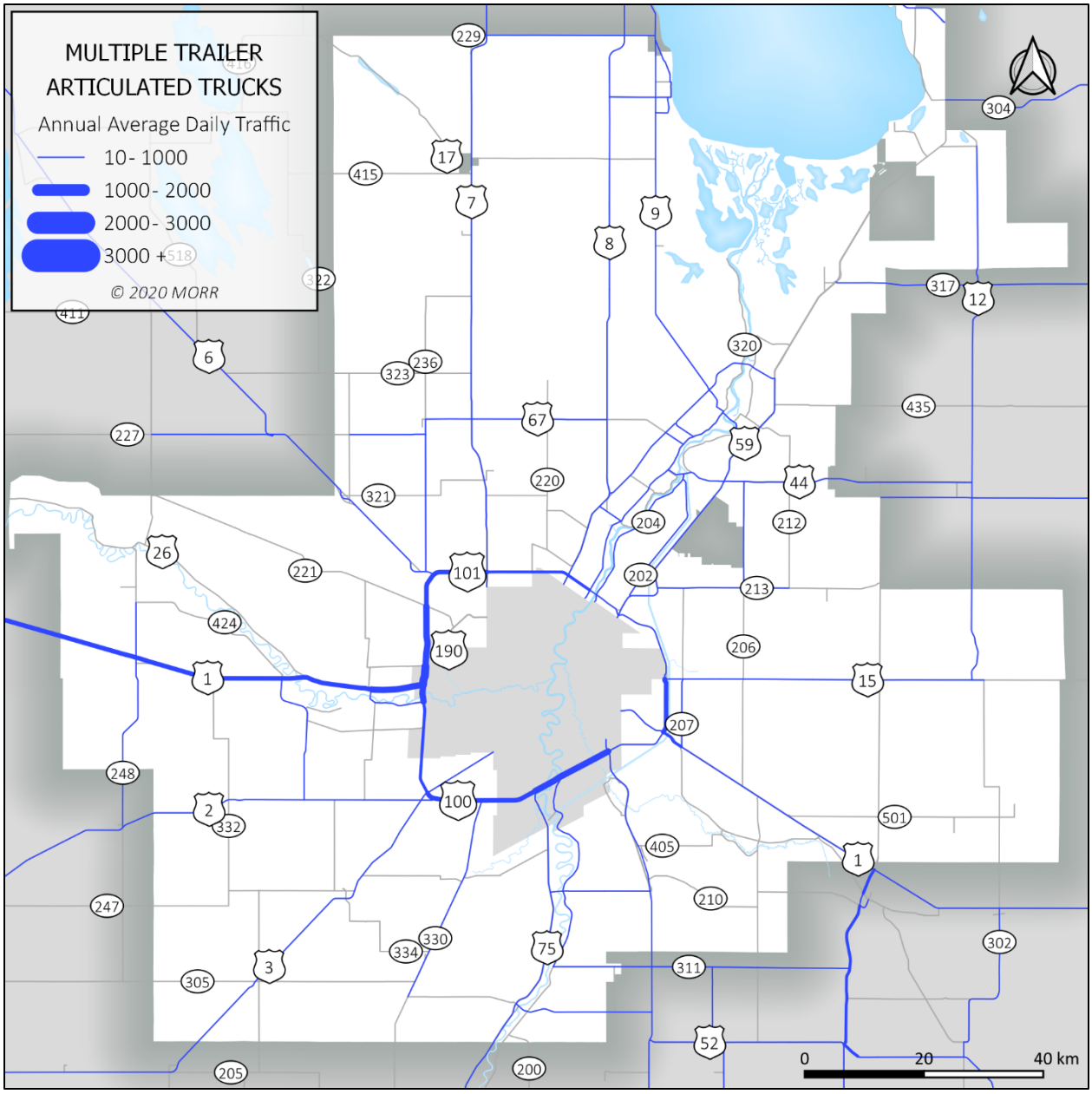


FIGURE 33: METROPOLITAN REGION ARTICULATED TRUCK (MULTIPLE TRAILER) ANNUAL AVERAGE DAILY TRAFFIC VOLUME.

3.2.2 Delay Associated with Railway Crossings

As Winnipeg is a city with extensive at-grade railway crossings, it is important to identify the locations of these crossings and the current impact that they may have on traffic flow. Figure 34 illustrates the current cross-product of average daily traffic and average daily number of trains at each at-grade crossing in Winnipeg. Cross-product is an important measure as it is one of several criteria that define warning system requirements at a crossing.

As the figure shows, most of the crossings with higher cross-product values are in the east side of the city, in Transcona, on the CP line, except for the Shaftesbury Boulevard crossing in the southeast area of the city. There is also high activity at four crossings on the CN line in Transcona near the intermodal terminal. In most cases, the cross-product at these crossings is over 200,000, which implies there is either high daily train volume or high vehicular volume, or both.

Figure 35 illustrates the average number of blockages per day for January 1 to December 31, 2019 at key crossings on truck routes. The figure also shows the average blockage duration. A blockage is defined as any event when a train is blocking the crossing and no vehicular traffic can move. As the figure shows, the two crossings with the greatest train activity per day in 2019 were Shaftesbury (36 trains per day) and Ravenhurst (27 trains per day). The average blockage duration at these two crossings was six to seven minutes, which translates into 216 minutes (3.6 hours) of blockages per day at Shaftesbury and 189 minutes (3.2 hours) per day at Ravenhurst, as shown in Figure 36 . The significance of this is that these figures do not include the traffic shockwave delay induced by the blockage itself. Depending on the amount of vehicular traffic queued at the crossing because of the blockage, this shockwave delay could double the blockage delay itself.

Data Source

Train activity data for at-grade rail crossings in Winnipeg were provided from TRAINFO as part of a pilot project completed in 2019 with the City of Winnipeg. The data set provides annual average values for rail crossing blockages and blockage duration. The cross-product of average daily traffic and average daily trains was determined with this data set and the City's 2018 traffic flow map.

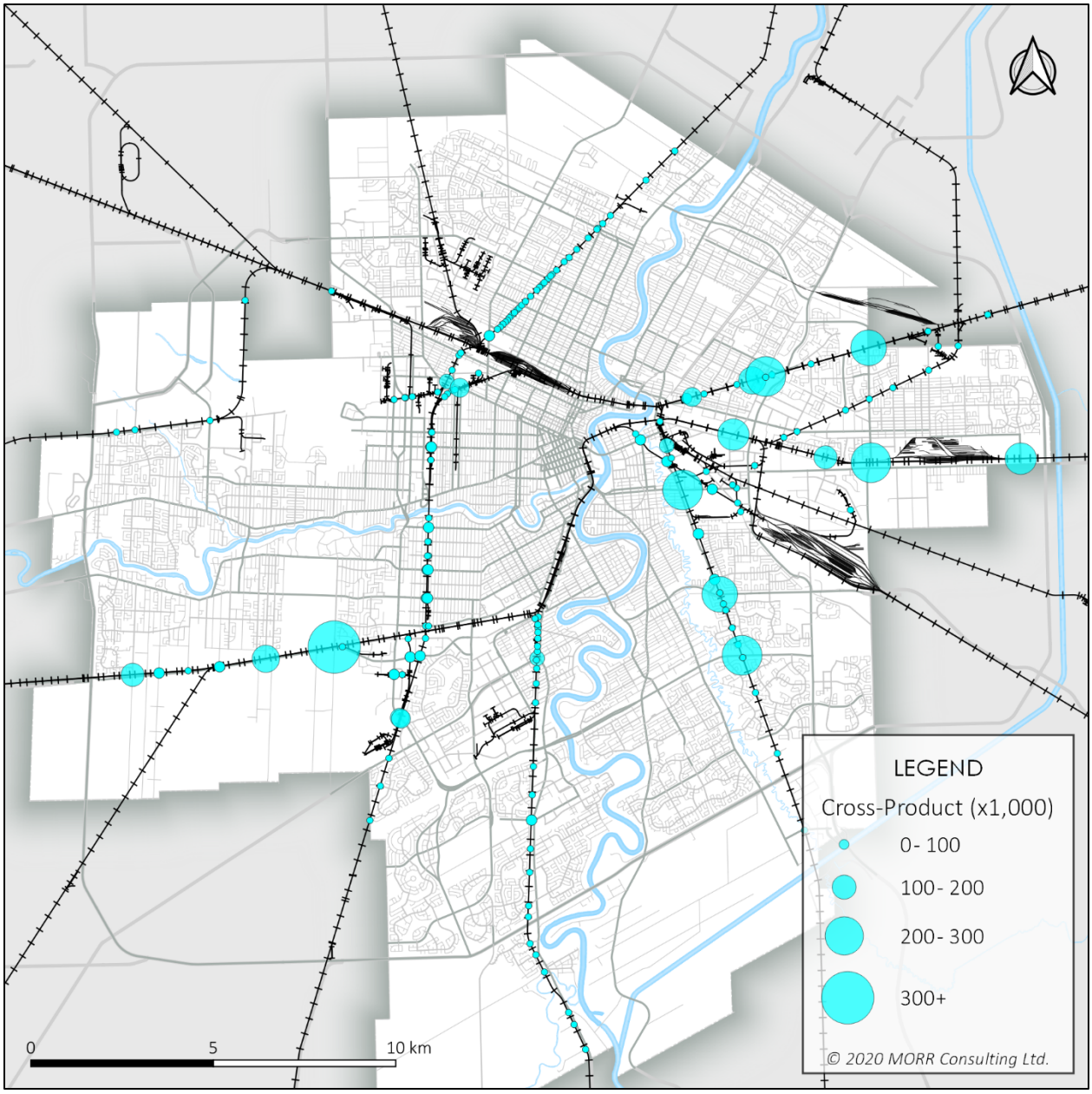


FIGURE 34: CROSS-PRODUCT (X1000) OF AVERAGE DAILY TRAFFIC AND AVERAGE DAILY TRAINS

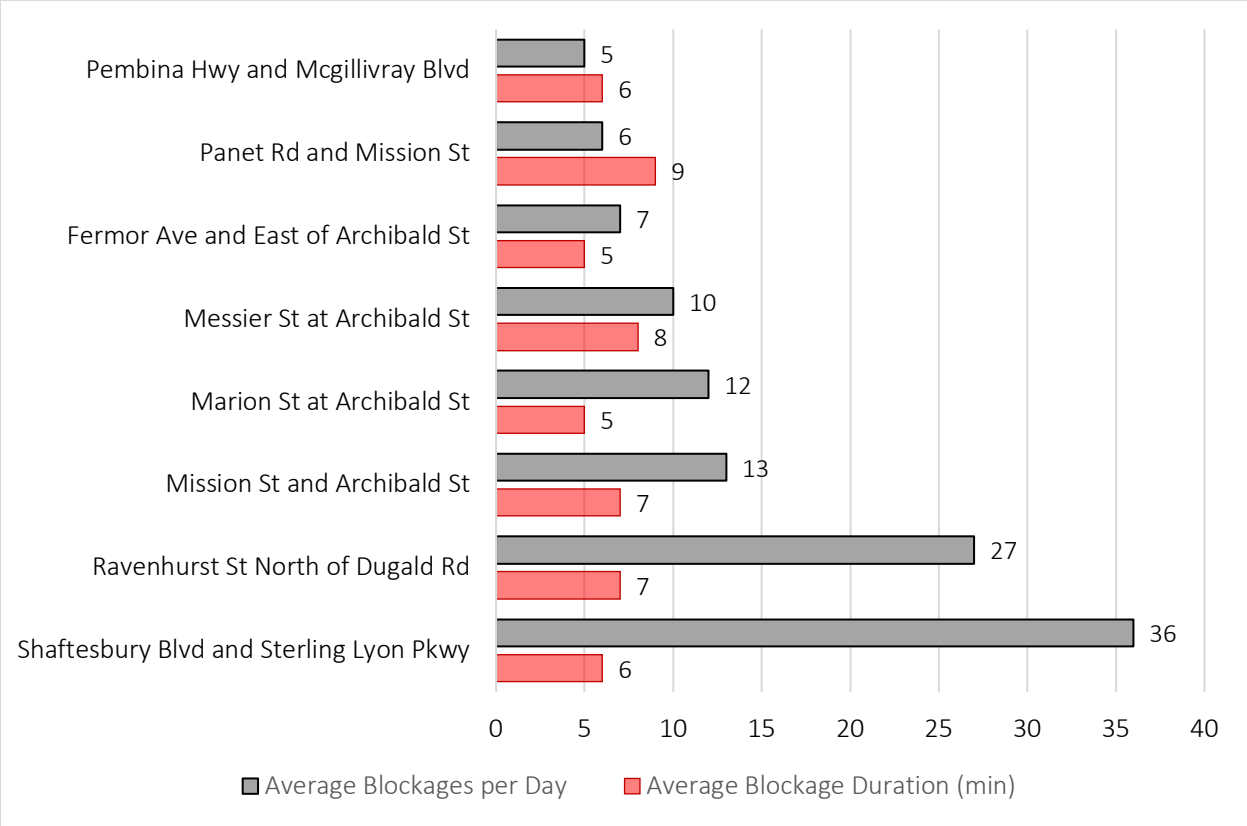


FIGURE 35: TRAIN ACTIVITY AT WINNIPEG TRUCK ROUTE CROSSINGS (2019)

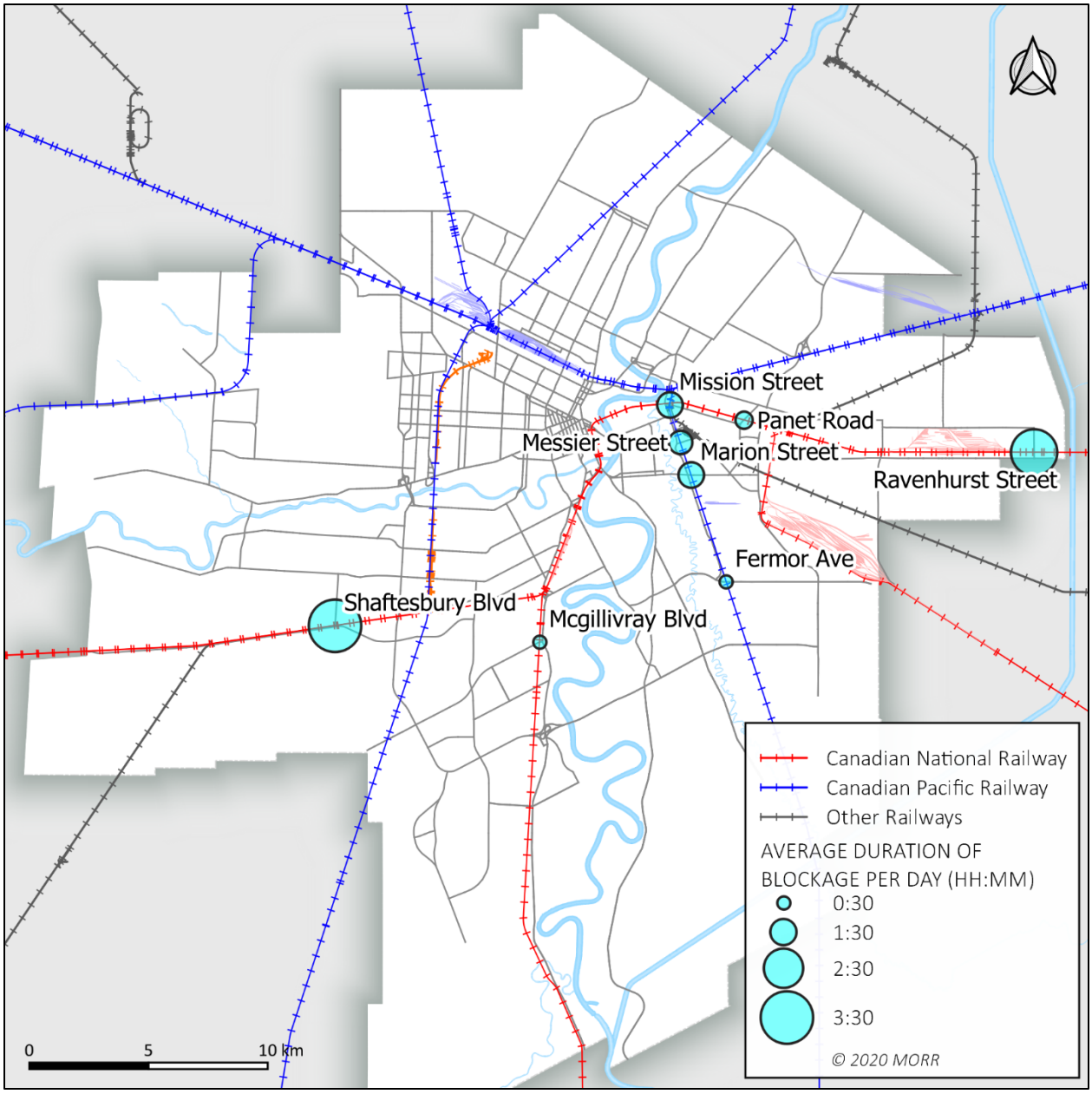


FIGURE 36: AVERAGE TOTAL DAILY BLOCKAGE DURATION AT WINNIPEG TRUCK ROUTE CROSSINGS (2019).

3.2.3 Collisions Involving Trucks

Winnipeg

There were over 195,000 total collisions in Winnipeg between 2012 and 2018 as detailed in Table 11. Over the same time period, there were 5,664 collisions involving trucks, which represents 3% of total collisions. Single unit trucks accounted for nearly 75% of all truck-related collisions and articulated trucks accounted for the remaining 25%.

While trucks accounted for a relatively low proportion of total collisions, the severity outcome associated with these collisions was significant. They accounted for 11% of all fatal collisions and 5% of all major injury collisions in Winnipeg over the seven-year period.

TABLE 11: TOTAL COLLISIONS AND TRUCK COLLISIONS BY COLLISION SEVERITY FROM 2012 TO 2018 (MPI DATA)

Year	Total Collisions	Collision Severity				Total Truck Collisions	Truck Collision Severity			
		Fatal	Major Injury	Other Injury	PDO		Fatal	Major Injury	Other Injury	PDO
2012	24,462	19	122	6,185	18,136	732	2	4	155	571
2013	27,088	10	106	6,535	20,437	886	0	5	182	699
2014	26,401	11	107	6,785	19,498	838	1	6	186	645
2015	26,321	13	149	6,875	19,284	745	2	7	158	578
2016	27,863	19	176	7,048	20,620	770	3	9	167	591
2017	31,946	9	167	7,245	24,525	843	0	8	173	662
2018	31,300	12	186	7,111	23,991	850	2	9	181	658
TOTAL	*195,381*	*93*	*1,013*	*47,784*	*146,491*	*5,664*	*10*	*48*	*1,202*	*4,404*

Other findings regarding fatal and major injury (FMI) collisions involving trucks are as follows:

Of the 58 FMI collisions involving trucks on Winnipeg streets between 2012 and 2018; 33 involved a single unit truck and 25 involved an articulated truck.

There were 11 fatalities resulting from the 10 fatal collisions and 49 victims with major injuries from the 48 major injury collisions. Of the 11 fatalities, 3 of them were pedestrians and 4 were bicyclists. These vulnerable road users make up over 60% of fatally injured victims involved in collisions with trucks. Pedestrian error/confusion was recorded as a contributing factor for all the pedestrian fatalities. A pedestrian corridor was in-use for one fatality. Of the 49 major injuries, 80% were from passenger vehicles, 14% were from trucks, 4% were pedestrians, and 2% were bicyclists.

The City of Winnipeg maintains a separate collision database that is geocoded for spatial analysis. It comprises all collisions from the MPI collision database that have location information. This dataset is also supplemented with fatal collision records provided by the Winnipeg Police Service. The City's collision database comprises 46 FMI collisions (37 major injury and 9 fatal collisions) involving trucks between 2012

and 2018; 35 involving a single unit truck and 11 involving articulated trucks. Figure 37 shows the location of FMI collisions involving single-unit and articulated trucks that occurred on Winnipeg roads between 2012 and 2018. The following can be observed from the figure:

Two of 46 (4%) FMI collisions involving trucks occurred on roads that are not truck routes; one major injury collision involving a single unit truck at the intersection of Plessis Road and Kildare Avenue and one major injury collision involving a single unit truck at the intersection of Thomas Avenue and Chester Street.

Two intersections had more than one FMI collision involving a truck; three major injury collisions involving a single unit truck at Wellington Avenue and King Edward Street and two major injury collisions involving a single unit truck at Bishop Grandin Boulevard and River Road.

Two of 46 (4%) FMI collisions involving trucks occurred at mid-block locations, both along Lagimodiere Boulevard; one was a fatal collision involving a single unit truck occurred between Marion Street and Dugald Road and the other was a major injury collision involving an articulated truck between Cottonwood Road and Tascona Road.

FMI collisions involving trucks were concentrated around the industrial area north of downtown between Princess Street and Main Street and around the Route 90 corridor near the airport.

Data Source

Collision data was obtained for 2012 to 2018 from the City of Winnipeg collision database. This data is based on insurance claims collected by Manitoba Public Insurance (MPI) and validated with collision location by the City of Winnipeg Public Works Department. Collisions coded as involving a 'Truck >4500 kgs Unit Chassis' are considered single unit truck collisions and those coded as involving a 'Power Unit (Semi-Trailer)' are considered articulated truck collisions. *Data: 2012-2018 Collision Data.xlsx*

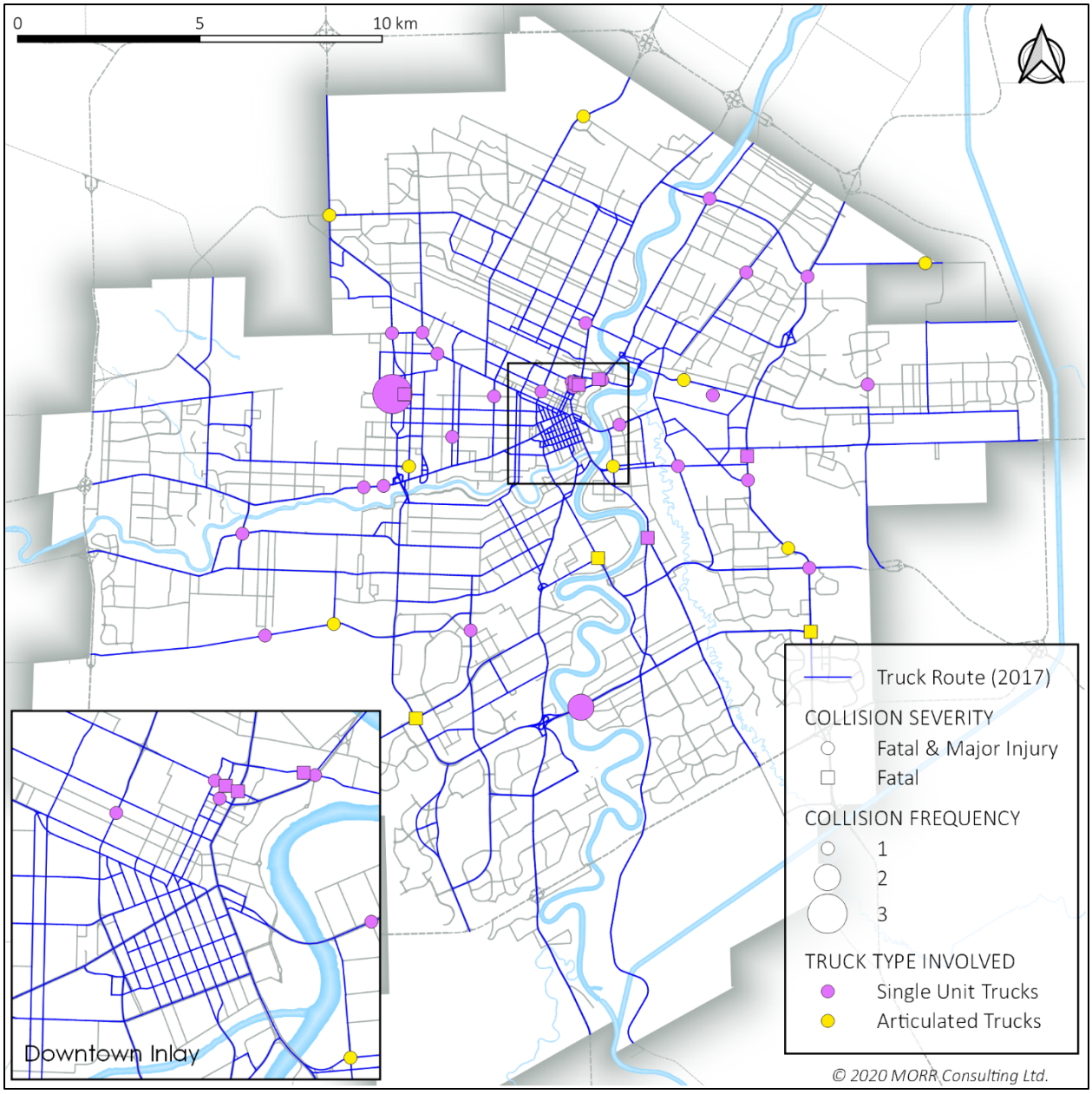


FIGURE 37: LOCATION OF FATAL AND MAJOR INJURY COLLISIONS INVOLVING TRUCKS (2012-2018).

Winnipeg Metropolitan Region

There were over 3,000 total fatal and injury collisions in the Metropolitan Region between 2012 and 2018; excluding an estimated 10% of collisions that could not be geo located. Over the same time period, there were 292 collisions involving trucks; Single unit trucks accounted for nearly 40% of all truck-related collisions and articulated trucks accounted for the remaining 60%. Figure 38 shows the location of fatal and injury collisions involving trucks in the Metropolitan Region. Figure 39 and Figure 40 show the location of collisions involving single unit trucks and articulated trucks, respectively. The following observations are drawn from these figures:

There were 22 fatal collisions and 170 injury collisions involving trucks on Metropolitan Region RTAC, A1, and B1 highways between 2012 and 2018.

Single unit trucks accounted for 36% of all fatal and 39% of all injury collisions involving trucks in the Region. Articulated trucks accounted for the remaining 64% of fatal collisions and 61% of injury collisions.

- The Perimeter highway accounted for 18% of all fatal and 50% of all injury collisions involving trucks on Metropolitan Region provincial roads. The locations where most of these collisions took place are:
    - 26 on PTH 100 between PR 241 (Roblin Boulevard) and PTH 3 (McGillivray Boulevard)
    - 23 on PTH 100 between PTH 2 and PTH 75 (Pembina Highway)
    - 17 on PTH 100 between PTH 7 (Brookside Boulevard) and PTH 8 (McPhillips Street)
    - 14 on PTH 100 between St Mary's Road and Lagimodiere Boulevard

Single unit trucks accounted for 38% of all fatal and injury collisions on the Perimeter Highway, and articulated trucks accounted for the remaining 62%

In addition to the information shown in the figures, between 2012 and 2018, trucks accounted for 9% of all collisions on RTAC, A1, and B1 highways in the Metropolitan Region. However, they also accounted for 23% of all fatal and 9% of all injury collisions on those roads.

Data Source

Collision data was obtained for 2012 to 2018 from the Manitoba Infrastructure collision database. This data is based on insurance claims collected by Manitoba Public Insurance and geocoded to include location information. Collision data that cannot be geocoded is not included. Further, about 10% of collisions could not be mapped because they were not assigned to a control section. Collisions coded as involving a 'Truck >4500 kgs Unit Chassis' were considered single unit truck collisions and those coded as involving a 'Power Unit (Semi-Trailer)' were considered as articulated truck collisions. *Data: 2012_2018 FI Collisions.xlsx*

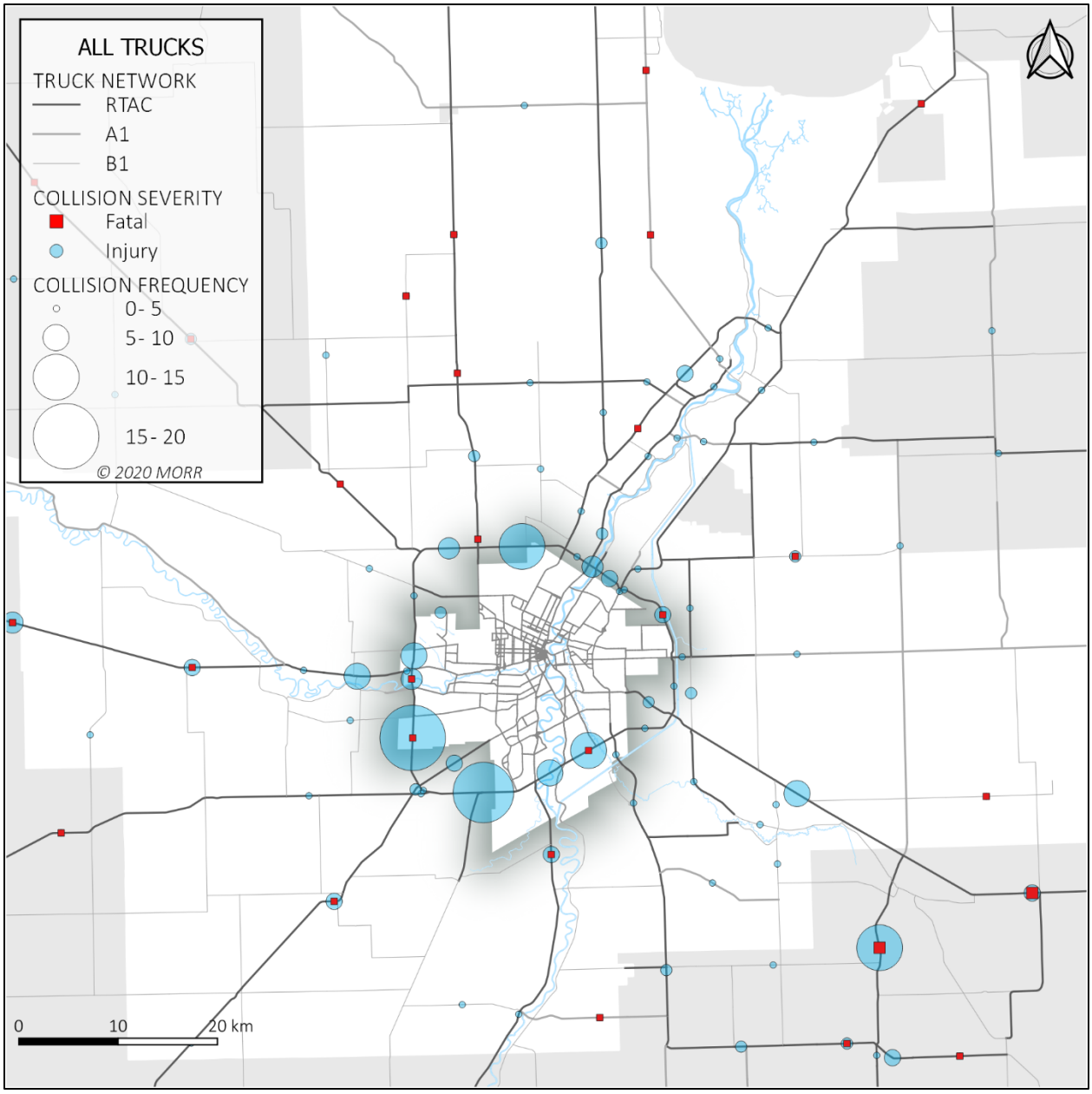


FIGURE 38: LOCATION OF INJURY COLLISIONS INVOLVING TRUCKS (2012-2018).

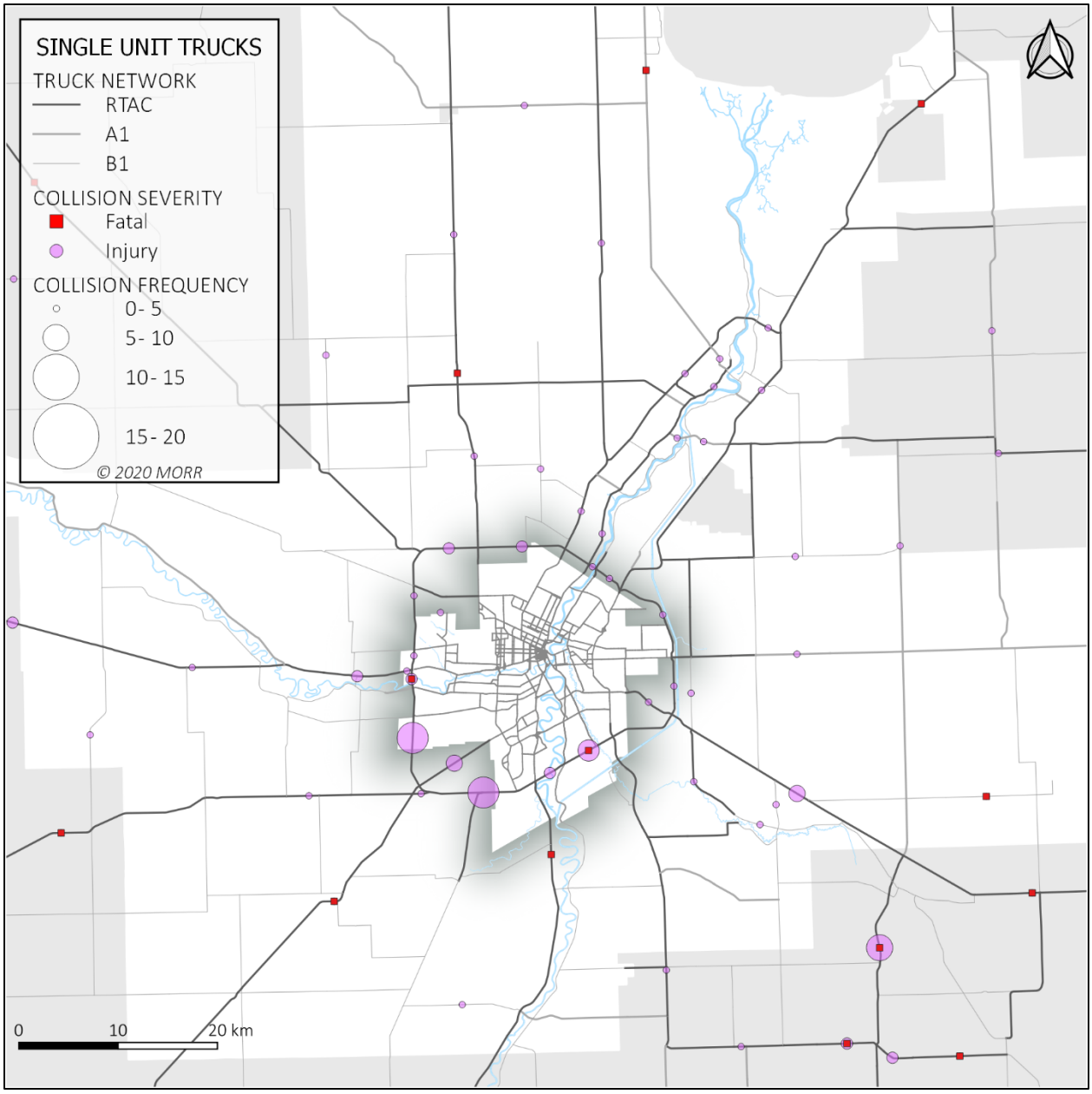


FIGURE 39: LOCATION OF INJURY COLLISIONS INVOLVING SINGLE UNIT TRUCKS (2012-2018).

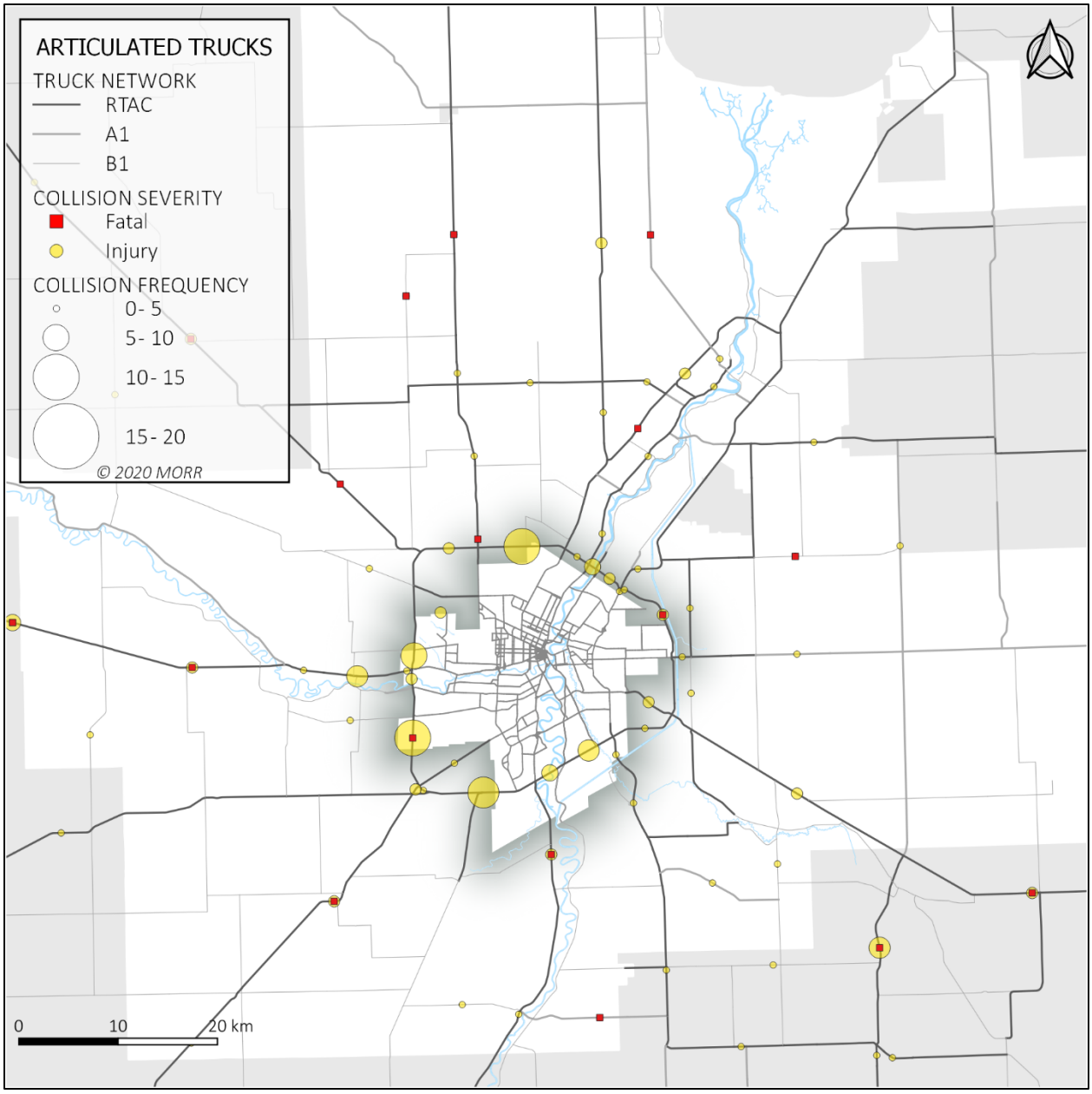


FIGURE 40: LOCATION OF INJURY COLLISIONS INVOLVING ARTICULATED TRUCKS (2012-2018).

3.2.4 Travel Speed and Travel Time Variability

Truck route network travel speed and travel time variability were assessed using data from the Waze App, as provided by the City of Winnipeg. Waze requires partners to submit analysis findings for review and approval before those findings are presented in public documents, so MORR completed an analysis detailing the methodology and findings, and submitted results in the form of a memorandum12F[13] to Waze for their approval, which was provided in October 2020.

The following points summarize the data and the analysis methodology, as detailed in the memo.

- The Waze data represented travel times on 374 routes through the truck route network. Routes included the Perimeter Highway and other Provincial Highways near Winnipeg.
- For each route, the data included vehicle travel times aggregated into one-hour bins.
- To allow for consideration of seasonal trends, the data included one week in summer conditions (from July 2019), one week in fall conditions (from November 2019), one week in winter conditions (from January 2020) and one week in spring conditions (from March 2020, prior to the start of restrictions related to the COVID-19 pandemic).
- While data was provided for all hours of the day, the analysis focused on the weekday AM peak period (7:00 AM – 9:00 AM) and the weekday PM peak period (4:00 PM – 6:00 PM). “Weekdays” included Mondays, Tuesdays, Wednesdays, Thursdays, and Fridays.
- For each route, average travel speeds were calculated for each one-hour interval using the average travel time and the length of the route. Average travel speeds were calculated for weekday AM and PM peak periods considering all data, and separately for each season.
- Travel time variability was calculated for each route as the standard deviation in travel time divided by the average travel time. This yielded a “variability index”, which was calculated for each route considering all data, and separately for each season.
- The study team mapped the average travel speeds and variability indices.

Figure 41, Figure 42, Figure 43, and Figure 44 show average travel speeds and travel time variability indices aggregated from all data, as presented in the memo.

[13] MORR Transportation Consulting (2020), TMP 50 Goods Movement Strategy Findings from Waze Data, Technical Memorandum.

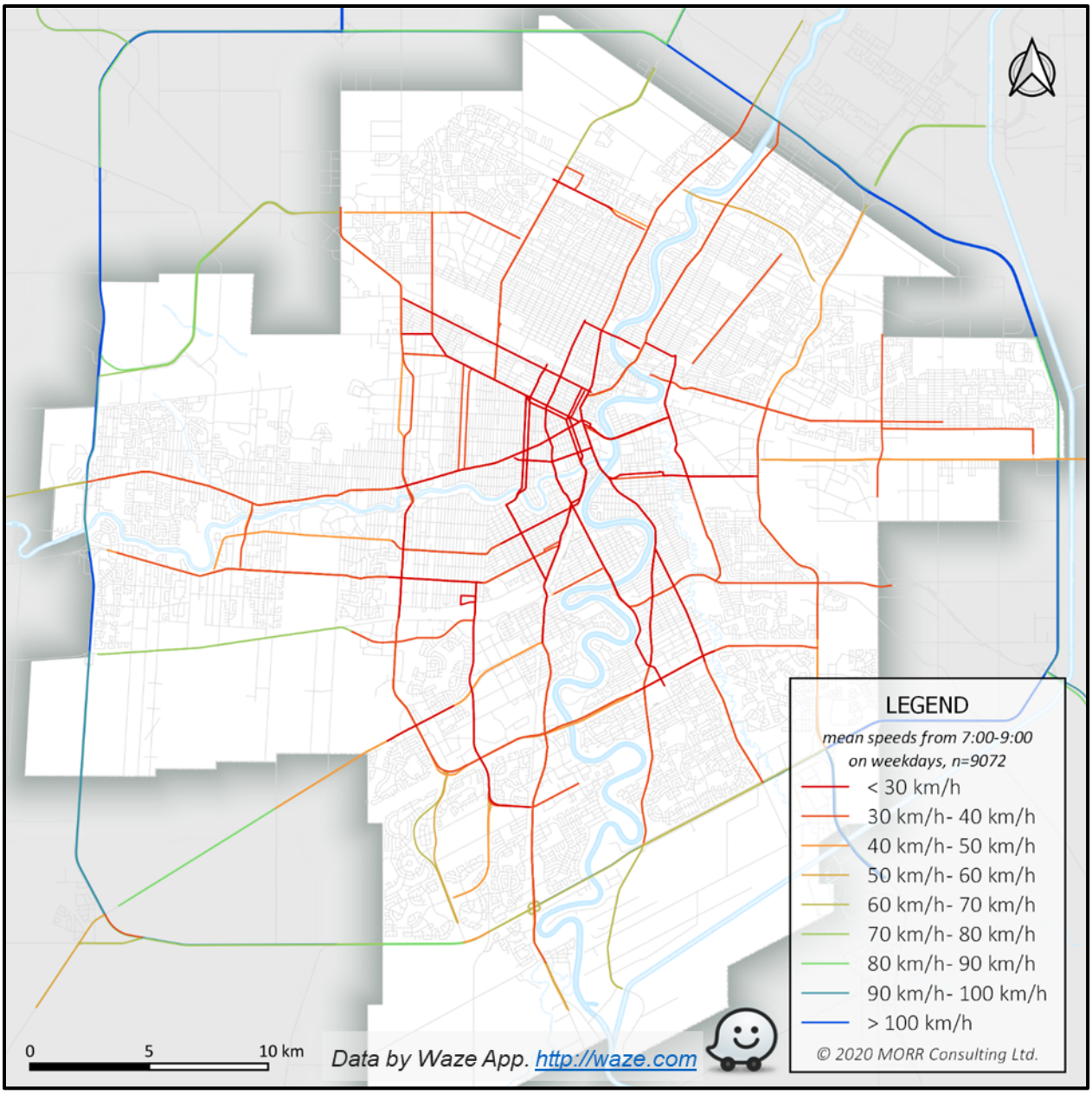


FIGURE 41: WEEKDAY AM PEAK PERIOD AVERAGE TRAVEL SPEEDS

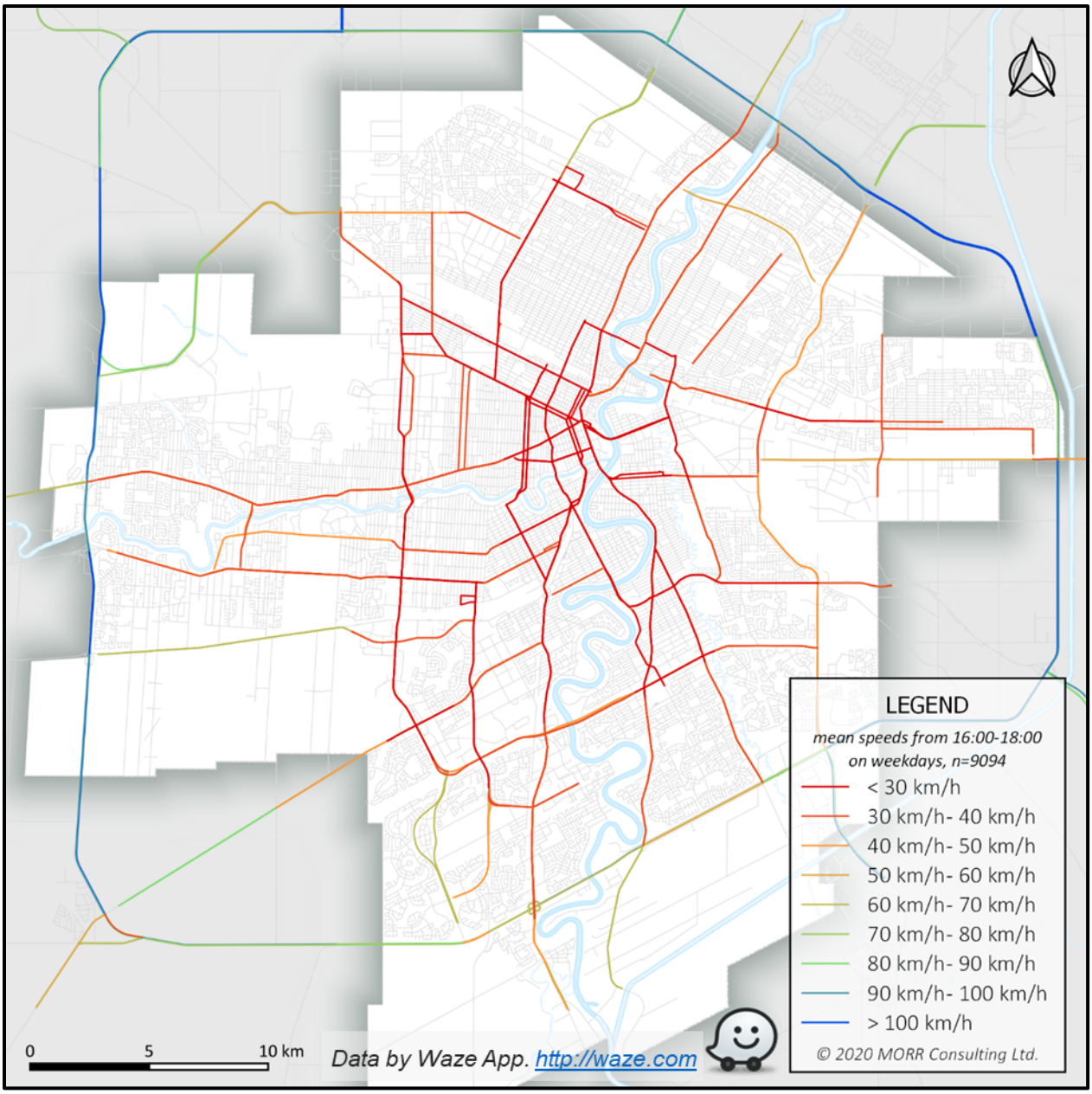


FIGURE 42: WEEKDAY PM PEAK PERIOD AVERAGE TRAVEL SPEEDS

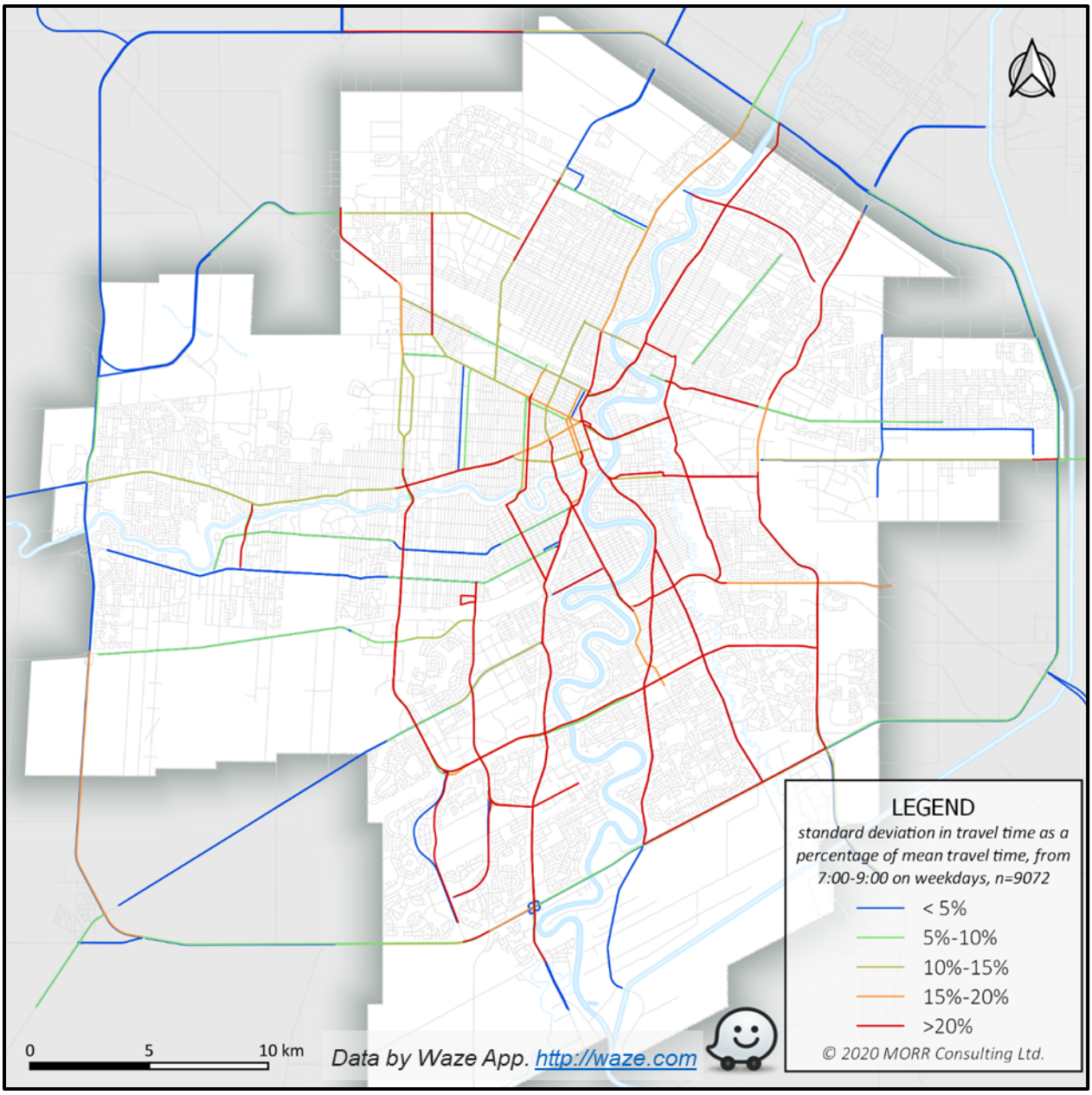


FIGURE 43: WEEKDAY AM PEAK PERIOD TRAVEL TIME VARIABILITY

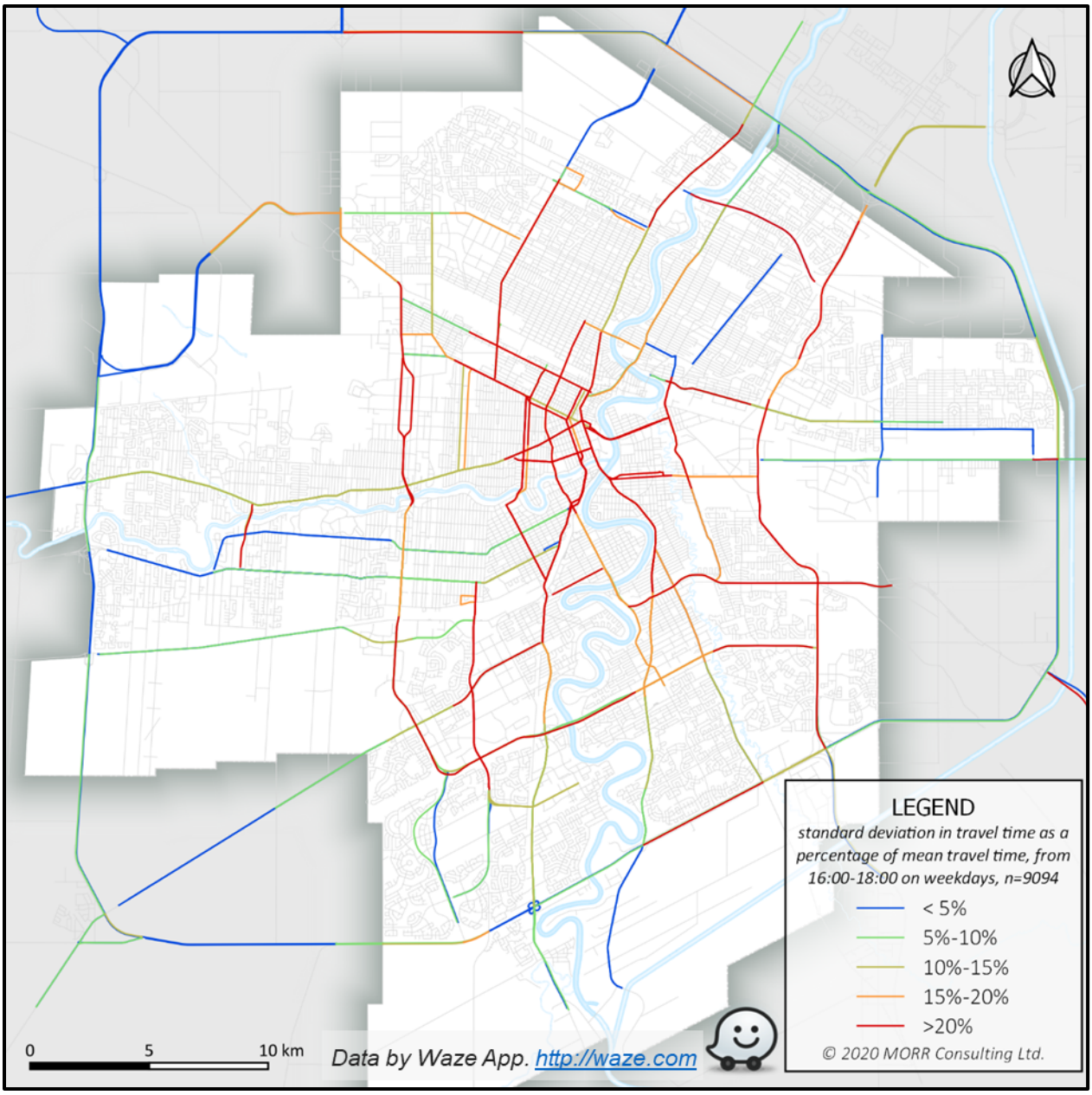


FIGURE 44: WEEKDAY PM PEAK PERIOD TRAVEL TIME VARIABILITY

The following observations result from Figure 41, Figure 42, Figure 43, and Figure 44:

- Travel speeds are lowest in the downtown area and on radial arterial routes leading into downtown. Speeds are greatest on the Perimeter Highway (PTH 100 and PTH 101), particularly the sections without signalized intersections (PTH 101 from PTH 8 to PTH 1E, PTH 100 from Portage Avenue to PTH 3). Speeds on the Perimeter Highway between Pembina Highway and St. Anne's Road were markedly lower, although still greater than speeds on the radial arterial routes.
- Speeds in the weekday PM peak period were very similar to speeds in the weekday AM peak period. Experience suggests that the speed pattern from the AM should be reversed in the PM (for

example, low speeds on routes heading into downtown in the AM would suggest that low speeds should be found on routes leaving the downtown in the PM) but the scale of the maps precludes identification of differences in speed by direction.

- Weekday AM travel time variability was found most often in the south and east areas of the city, with most routes in those areas having the standard deviation in travel time equal to more than 20% of the average travel time. Some routes in the west and north parts of the city showed little travel time variability (10% or less) even in central areas (for example, Corydon Avenue and Grant Avenue near Pembina Highway, Notre Dame Avenue near McPhillips Street, and Cumberland Avenue near Sherbrook Street). In general, weekday AM travel time variability was concentrated in areas of the city with widely spaced arterial streets, and variability was more concentrated on major arterial streets than on minor arterial streets.
- Travel time variability was more geographically distributed in the weekday PM peak period, with routes showing high travel time variability in all areas of the city, including most of downtown. Like in the weekday AM peak period, weekday PM peak period travel time variability was greater on major arterial routes than on minor arterial routes.
- Weekday AM and PM travel speeds had little variation between seasons.
- Travel time variability in January and November was like the variability derived from all seasons combined. March and July had considerably less travel time variability, although some major routes in the south and east areas of the city (Lagimodiere Boulevard, Kenaston Boulevard, Bishop Grandin Boulevard) still had significant travel time variability in those months.

3.3 Considerations for the Goods Movement Plan

The results discussed in the previous sections yield the following considerations for the development of strategies for the safe and efficient movement of goods in Winnipeg and its Metropolitan Region:

- There is significant demand for freight transportation in Winnipeg and its Metropolitan Region, with over 28 million tonnes of freight moved on an annual basis, representing over $70 billion per year. Approximately 80% of the tonnage and 90% of the value of freight is moved by truck.
- Over one half of the tonnage leaving Winnipeg and its Metropolitan Region by truck is comprised of minerals, waste, and fuels (these are commodities that typically weigh out). Over 60% of the tonnage entering Winnipeg and its Metropolitan Region by truck is comprised on plastic and chemical products, and manufactured products (these are commodities that may cube out or weigh out, depending on the product). The movement of freight by rail includes mainly agricultural products (nearly one half of all tonnage moved from Winnipeg and it its Metropolitan Region by rail); and metal, plastic, and chemicals (accounting for one-half of all tonnage moved into Winnipeg and its Metropolitan Region by rail).
- Most of Winnipeg's trucking companies are in the north west and east areas of the city, close to key freight generators such as the Winnipeg Richardson International Airport, CentrePort, north Inkster

industrial park, and St. Boniface industrial park. These are also near or on Route 90 or Lagimodiere Boulevard, with easy access to the Perimeter Highway.

- Winnipeg has an extensive truck route network, with 715 kilometres of road providing full time access to Winnipeg's commercial, industrial, and other destinations. Nearly 15% of this network is also accessible to LCVs for important access to the provincial road network and some key destinations within the city.
- While the RTAC road network in the Metropolitan Region is extensive, at 681 kilometres in length, about half is limited to 62,500 kg versus 63,500 kg. In particular, there are GVW discontinuities at the transition from Highway 2, Highway 3, Highway 6 and Highway 59 South to the Perimeter Highway, where the incoming roads are classified at lower maximum GVWs than the Perimeter Highway. These discontinuities may result in either lower productivity for those trucks that need to travel on the Perimeter Highway or increased number of weight-related violations.
- Pavement condition in Winnipeg, for the most part, is classified as good; however, this is not the case in the Metropolitan Region. Of the 833 kilometres of truck routes in Winnipeg, nearly 70% are classified as having either new or good pavement, 20% have fair pavement, and nearly 10% have poor pavement condition. In the Metropolitan Region, of the 1,767 kilometres of RTAC, A1, and B1 roads, 23% are classified as having good pavement condition rating, 50% have fair pavement, and 34% have poor pavement condition rating. This is an important consideration given that in Winnipeg, the greatest truck volumes are attributed to CentrePort Canada Way, Route 90, Lagimodiere Boulevard, Inkster Boulevard, Logan Avenue, and Keewatin Street. These streets, for the most part, have good pavement condition ratings, with some portions with fair or poor pavement condition. In the Metropolitan Region, the greatest truck volumes are attributed to the Perimeter Highway, Highway 1, Highway 75, and Highway 7. Except for Highway 7, which has a good pavement condition rating, all other high-volume roads have fair pavement conditions, which has important implications for truck operating costs.
- Single unit trucks operate mainly along Route 90, the southern portion of Lagimodiere Boulevard, Pembina Highway, Main Street, the downtown area, and the central west area of Winnipeg. Comparatively, articulated trucks operate mainly along CentrePort Canada Way, Lagimodiere Boulevard, Route 90, the Perimeter Highway and other provincial roads in the Metropolitan Region. This confirms the pickup and delivery nature of single unit trucks and the long-haul application of articulated vehicles. In addition, as it pertains to the Metropolitan Region, most articulated trucks with more than one trailer operate in the west and south perimeter highways and the TransCanada Highway west. This highlights the critical importance of the Perimeter Highway both as a gateway into the west and south of the province, and as the pain portal for trucking into and out of Winnipeg.
- Being located at the junction of the CN and CP lines, Winnipeg has an extensive railway network, with nearly 1,000 kilometres of Class 1 railways serving the region (Winnipeg and its Metropolitan Region). In Winnipeg, most of the crossings with cross-product over 200,000 are in the east side of the city, in Transcona, on the CP line, except for the Shaftesbury Boulevard crossing in the southeast area of the city. There is also high activity at four crossings on the CN line in Transcona

near the intermodal terminal. In addition, there is extensive train-induced delay on key truck routes such as Marion Street, Mission Street, Messier Street, Fermor Avenue, Panet Road, and McGillivray Boulevard. In some instances, this delay can exceed three hours per day. This is important due to the associated greenhouse gas emissions and decreased productivity associated with this daily delay on the movement of goods.

- With respect to collisions involving trucks, while trucks account for a relatively low proportion of total collisions, the severity outcome associated with these collisions is significant. In Winnipeg, trucks accounted for 11% of all fatal collisions and 5% of all major injury collisions over the seven-year period between 2012 and 2018. Pedestrians and cyclists accounted for more than 60% of fatally injured victims involved in collisions with trucks. However, it appears that the victim was at fault in these collisions as the major contributing factor was identified as pedestrian error/confusion. With respect to major injury truck-related collisions, 6% involve VRU.
- In the Metropolitan Region, trucks accounted for 9% of all collisions on RTAC, A1, and B1 highways; however, they also accounted for 23% of all fatal and 9% of all injury collisions on those roads. The Perimeter highway is of particular importance as it accounted for 18% of all fatal and 50% of all injury collisions involving trucks on Metropolitan Region provincial roads. Locations of particular importance are:
    - The segment between Roblin Boulevard and PTH 3 (McGillivray Boulevard)
    - The segment between PTH 2 and PTH 75 (Pembina Highway)
    - The segment between PTH 7 (Brookside Boulevard) and PTH 8 (McPhillips Street)
    - The segment between St Mary's Road and Lagimodiere Boulevard
- With respect to travel speeds, they are lowest in the downtown area and on radial arterial routes leading into downtown for both the morning and afternoon peak periods. Further, travel time variability is more geographically distributed in the weekday afternoon peak period, with routes showing high travel time variability in all areas of the city, including most of downtown. Like in the weekday morning peak period, weekday afternoon peak period travel time variability is greater on major arterial routes than on minor arterial routes. This has significant implications for truck travel time, reliability, safety, and reduce emissions.

4 ISSUES AND OPPORTUNITIES

This chapter summarizes urban goods movement issues that impact Winnipeg and the surrounding Metropolitan Region, as well as opportunities to address those issues. Several sources were used to define the challenges, as follows:

- Stakeholder engagement session notes, October 22, 2020 (Manitoba Trucking Association meeting) and November 3, 2020.
- *Submission to the City of Winnipeg 2020 Consultation Process for the Road Safety Strategic Action Plan*, Manitoba Trucking Association, file dated September 30, 2020.
- *Submission to the City of Winnipeg 2020 Consultation Process for the Transportation Master Plan Review*, Manitoba Trucking Association, file dated October 5, 2020.
- *Planning for Long Combination Vehicles (LCVs)*, Manitoba Trucking Association, file dated November 6, 2020.
- The City of Winnipeg's *Request for Proposal* for the *Goods Movement Study*. This document describes various issues that the TMP and related studies are to address.

These sources were complemented by the data analysis from Chapter 2 and Chapter 3 of this project as well as by the consultant team's experience with other goods movement studies.

For the identification of opportunities, a comprehensive literature review of practical solutions and treatments on various topics was conducted. The review identified 36 potential opportunities.

4.1 Issues Involving Goods Movement

Issues were classified according to the following four themes:

- Land use and network planning, encompassing the land use theme and broadening its definition to include the related planning of the transportation network.
- Managing the use of the network, encompassing the congestion theme and providing a broader context to account for operations and related topics.
- Sustainable urban goods movement, encompassing the environmental impact theme and broadening it to account directly for the TMP's sustainability orientation.
- Disruptors and new technologies.

Within these themes, 17 specific categories were identified. These are listed in Table 12. It should be noted that some of these categories could apply to more than one theme – for example, consultation and communications is listed under the network management theme but could also apply to the land use and network planning theme. For manageability they are listed only under a single theme.

Table 13 to Table 17 elaborate on each of the themes and categories by providing specifics about associated challenges and issues (e.g., as stated by stakeholders or based on the data analysis).

TABLE 12: ISSUE THEMES AND CATEGORIES

Theme	Challenge and Issue Categories
Land use and network planning	• Land use and goods movement • Network planning • CentrePort • Regional coordination • Importance of goods movement
Managing the use of the network	• Network operations • Safety • Parking, loading, and curbside management • Regulations on the use of the network • Congestion • Delays due to trains • Construction • Wayfinding • Consultation and communications
Sustainable goods movement	• Environmental impacts • Shared use of streets
Disruptors and new technologies	• Disruptors and new technologies

TABLE 13: LAND USE AND NETWORK PLANNING

Challenge and Issue Category	Specifics
Land use and goods movement. This reflects the need to maintain the viability of the goods movement function in land use planning and development, at several levels: • Siting of freight-generating (industrial) uses close to highways and other freight infrastructure, to avoid cutting through residential and other sensitive areas and to provide proximity to the major freight network. • Lack or inadequate consideration of freight access needs in site and corridor plans. • Loss of truck routes as corridors redevelop. • Ensuring the viability of key freight hubs (the airport, CentrePort, intermodal rail terminals) by maintaining space for ancillary uses and avoiding conflicting uses (e.g., Calgary's 2018 *Goods Movement Strategy* notes a specific concern about a planned residential development beneath the airport's flight paths that might eventually preclude overnight cargo and courier flights).	• Access/egress to sites not adequately considered in planning decisions. • Inadequate truck route access to all types of land uses (e.g., multi-dwelling development, mixed use, and commercial corridors), not just industrial areas. • Truck routes not considered in planning decisions (e.g., Plessis Road – Grassie Boulevard was removed as a truck route after new residential uses were developed). • Need to maintain viability of the airport as a 24/7 operation and continued development of CentrePort as focus areas for goods movement. • Need to situate industrial lands (i.e., lands that are likely to be used for freight-generating activities) close to highways, ensure adequate space on-site to accommodate heavy vehicle and LCV circulation, and ensure access roads are designed to support heavy vehicles and LCVs. • Lack of freight-supportive planning guidelines – other jurisdictions have these. • Freight movement is not considered in land use

TABLE 13: LAND USE AND NETWORK PLANNING

Challenge and Issue Category	Specifics
• Shortfall of industrial lands and lack of servicing • Lack of coordination in planning approvals between jurisdictions. • The 2019 Ottawa *Goods Movement Backgrounder* noted the need to accommodate LCVs in the designation of freight-generating land uses and in planning appropriate accesses.	plans (master plans, secondary plans). • Ever-changing zoning as land uses transition along industrial corridors (e.g., Inkster Boulevard). • Residential development is allowed to be too close to freight corridors or heavy industrial development. • Approval of new residential developments (outside Winnipeg) have safety and access impacts on highways and routes that connect with Winnipeg. • More servicing needed for employment lands. • City has a shortfall in serviced employment (industrial) lands but has an excess of commercial land, and is competing with surrounding Metropolitan Region in bringing serviced employment lands to market.
Network planning. This challenge concerns a lack of connections in the road and highway network, especially a delay-free east-west connection through the City (rather than the Perimeter Highway bypass); discontinuities in the quality and capability of the network that require some trucks to take indirect routes to their destinations; gaps in accommodating LCVs; and a lack of a systematic process for designating truck routes.	• Connectivity (lack of east-west connector for vehicles that require RTAC routing results in routing via Perimeter Highway). • Perimeter Highway not as efficient as it could be (connectivity). • Lack of connectivity between Chief Peguis Trail and other corridors. • Lack of policies on identification, protecting, and managing truck routes. • Lack of systematic, formal process for planning and designating truck routes, including ensuring that all parts of the city are connected and that industrial areas and freight generators are included in the truck route network. • Too many traffic signals/inadequate interchanges slow down long-distance trucks in Winnipeg and the surrounding areas. • Roads connecting industrial areas and highways do not always adequately support LCV movement due to existing infrastructure design. • Lack of quality strategic infrastructure for freight movement. Expectation that trucks use corridors like Provencher Boulevard putting freight movement in conflict with community corridors. • Competing needs for Provencher Boulevard (e.g., political desire to make it more for pedestrians but it is the only route for freight travelling east-west). • Gross vehicle weight discontinuities at some transitions to the Perimeter Highway, which can result in lower productivity for trucks that must access the Perimeter Highway or an increased

TABLE 13: LAND USE AND NETWORK PLANNING

Challenge and Issue Category	Specifics
	number of weight-related violations.
CentrePort. The lack of coordination between the Rural Municipality of Rosser and the City of Winnipeg, whose jurisdiction CentrePort straddles, to enable servicing infrastructure is seen as the biggest inhibitor of CentrePort's development. Planning, zoning and development issues must also be resolved. LCV access is also an issue.	• Biggest issue holding back development of CentrePort rail park is the lack of servicing infrastructure, whose lands straddle Rosser and the City (significant need for coordination). • Land use, zoning, development issues impede the development of CentrePort. • Interjurisdictional transportation and land use planning are issues with respect to connections. • Problems with LCV permitting and temporary conditions coordination.
Regional coordination. Plans and decisions that impact goods movement must be coordinated between the City and the surrounding Metropolitan Region. In particular, decisions made in the surrounding regions can have upstream impacts on the City's road network and vice-versa. Adequacy of connections to industrial developments outside the city is also fostering the city and region's overall economic viability to managing truck traffic.	• Need to recognize goods movement as a regional issue, requiring coordination between the City and the surrounding Metropolitan Region. • Need coordination among plans impacting goods movement between City of Winnipeg and the surrounding RMs (e.g., Tim Hortons development on Route 90 across from Manitoulin cited as example of fragmented jurisdictions - Rosser, Province, City of Winnipeg - resulting in safety concerns). • Lack of coordination for development approvals results in problems for goods movement when multiple municipalities are involved (e.g., CentrePort and Route 90, uncontrolled intersections on Portage Avenue west of Perimeter Highway (lack of left turn lane results in delays to LCVs), McGillivray accesses west of Brady Road). • Separation of planning decisions in adjacent municipalities impacts access routes into the city (e.g., approval of Tim Hortons in Rosser near Brookside Boulevard). • Need better traffic management at controlled intersections on major routes in the municipalities outside Winnipeg (extending the City's own traffic management system). • Lack of coordination delays/impedes LCV permitting between jurisdictions and responsiveness to changes in LCV routing. • Lack of planning coordination and problems with jurisdictional authority over decisions that impact adjacent municipalities. • Lack of connections between current and future industrial developments outside the city and the intermodal hubs and CentrePort inside the city to

TABLE 13: LAND USE AND NETWORK PLANNING

Challenge and Issue Category	Specifics
	ensure traffic uses desired corridors.
Importance of goods movement. Inherent in land use and network planning decisions is the need to recognize the importance of goods movement in the city and region's economy (and broadly, the provincial and national economy), as well as the role an efficient multi-modal goods movement network has in ensuring the development and competitiveness of the local and regional economy. There is a perception, however, that goods movement is secondary to passenger movement when plans and priorities are established. The challenge implicitly reflects a lack of understanding of freight's role in the urban economy and in maintaining residents' quality of life, consumer choices and the like – a challenge common to goods movement strategies elsewhere.	• Need to recognize role of Winnipeg as a major rail and intermodal hub (more than a focus on urban goods movement), to solidify and enhance this role through collaboration with the surrounding Metropolitan Region. • Goods movement is secondary to moving people (e.g., minimal wording in *OurWinnipeg 2045* about goods movement). • Lack of City staff who are dedicated to goods movement planning but dedicated staff to active transportation and road safety. • Lack of consideration of trucking needs in capital projects in high demand areas, whether or not there is a trucking business on the street in question. • Economic development is key to a healthy city. If people don't have jobs the city is not very healthy and goods movement is always associated with economic development. • Linkage between economic development and goods movement not fully recognized / appreciated / understood. • Politics can be a problem in understanding the importance of goods movement. Lack of forward thinking when it comes to corridor development and planning. Need fundamental shift in thinking to support economic activity, of which part is to support freight. Need certain corridors defined for freight movement. • Lack of understanding of what 'freight' means – planning must account for the movement of all types of commodities by all types of vehicles and modes. • Route 90 expansion project – no contact with Stakeholder Advisory Committee for a year.

TABLE 14: MANAGING THE USE OF THE NETWORK

Challenge and Issue Category	Specifics
Network operations. This challenge concerns turn restrictions that impede circulation in the downtown; inadequate left turn capability to/from some Regional highways; lack of controlled signals near the CN Intermodal Terminal; state-of-repair of roads; and snow clearance practices outside Winnipeg. Overall, these challenges suggest the need to consider network operations from the perspective of truck movements: for example, even if traffic engineering warrants do not indicate the need for a traffic signal when total traffic is considered, at certain locations this might merit a reconsideration where the movement of trucks alone is considered for an improvement (cost, delay, etc.). The cited challenges also directly impact goods movement efficiency (e.g., poorly-maintained roads were cited as causing increased truck maintenance costs in Edmonton's 2014 *Goods Movement Strategy*).	• Restricted turns in downtown. • Left turn access/egress to/from some highways (in the RMs outside Winnipeg) are problematic. • Is there a possibility for trucks to access diamond lanes, BRT during off-peak periods? • Need to continue maintenance and rehabilitation of city streets and road structures. • Turnaround time for application approvals for LCV permits is a problem. • Need better snow clearance on Provincial highways. • Lack of traffic signal on Plessis Road to serve CN Intermodal Terminal is a problem. • Lack of controlled intersections where there needs to be (e.g., at Symington Yard so trucks can safely turn; some uncontrolled intersections on west side of city). • Inadequate maintenance and poor pavement conditions on commercial and industrial streets (e.g., Sherwin Road, Inkster industrial park streets).
Safety. Two challenges are noted: The first relates to the severity of collisions that involve trucks, and to visibility concerns at pedestrian crossings. These topics are noted and presumably are being addressed in the ongoing *Road Safety Strategic Action Plan*. The second challenge concerns insufficient vehicle safety enforcement in Winnipeg, which can result in poor vehicle maintenance and truck trips that exceed road weight limits or have inadequate mechanical fitness. A possibly related issue, voiced in Calgary's *Goods Movement Strategy*, is the avoidance of safety maintenance by some independent owner/operators who, in a highly competitive industry operating in a tight economy, do not have the resources available to fleets in maintaining their vehicles.	• Although trucks account for a relatively low proportion of total collisions, the severity outcomes are significant. • Inadequate visibility for pedestrian-actuated crosswalk warnings due to inadequate sight distance, road geometry, and trees blocking view. • Lack of vehicle safety enforcement within the city – most enforcement is done by Province but that misses vehicles that operate only within Winnipeg. • Insufficient commercial inspection resources at the City. • Lack of enforcement within the city results in poor vehicle maintenance (compared with vehicles that use provincial highways) and overweight load movements – Winnipeg is a 'Go Free Zone' (i.e., transporters do not purchase permits). • Inadequate visibility at roundabouts and interchange exits - ability to see traffic at merges is compromised. • Uncoordinated planning between City and surrounding municipalities impacts safety. • Retail developments with drive-through services are a particular challenge … entry and egress points and the limited capacity of on-site driveways can easily affect the safety and flow of traffic. • Need to ensure coordination in treatment / accommodation of goods movement with

TABLE 14: MANAGING THE USE OF THE NETWORK

Challenge and Issue Category	Specifics
	Winnipeg's Road Safety Strategy, which is now in development.
Parking, loading, and curbside management. Development growth coupled with growth in e-commerce deliveries (and further exacerbated by the pandemic) mean that the space available for on-site parking and loading can be insufficient and the supply might not be keeping up with demand.	• Increased competition for on-street parking and loading space due to rapid growth in e-commerce; not enough consideration of that in planning for on-street spaces. • Mixed use developments have major implications on demand for on-street parking and loading. • Lack of policy establishing and protecting on-street loading zones, especially in areas with increasing residential density and mixed land uses.
Regulations on the use of the network. This challenge recognizes that much of the truck fleet that serves (and may be based in) Winnipeg also is involved in long-haul transportation. However, permissible weights and dimensions between the City and Province are not harmonized, which adds to truck fleet costs. Upcoming needs concern emerging regulatory compliance regarding at-grade rail crossing requirements and an update to the airport's noise exposure forecasts.	• Need to amend the City's Traffic By-law 1573/77 to reflect the new Manitoba Regulation for vehicle weights and dimensions and move the City to defining a maximum weight allowance on its transportation network by street classification. • Need to update the City's Truck Route Map and Truck Regulation webpage. • Need to re-engage with Manitoba Infrastructure with respect to policy, practice and regulation around vehicle weights and dimensions. • Ensure regulatory compliance with Transport Canada's at-grade rail crossing requirements to November 2021, after which the City must transition to a maintenance phase with controls in place to ensure ongoing regulatory compliance (this is currently under implementation). • Need to update the City's noise exposure forecasts with respect to air traffic.
Congestion. This is a general challenge, varying by time of day and location, with the downtown, its accesses, and Kenaston Boulevard cited as being particularly problematic. Congestion adds to trucking costs (associated with delay and reliability) as well as to fuel consumption, GHGs and pollutants – hence there is an impact on industry competitiveness because these costs cannot always be passed onto the customer.	• General congestion throughout the city was cited by stakeholders. • Congestion especially on Kenaston Boulevard – a key "economic" corridor. • Trucking costs and fuel efficiency impacted adversely by congestion. • Travel speeds are lowest in the downtown area and radial arterial routes to/from the downtown for both commuter peak periods. • Travel time variability is geographically distributed throughout the city, especially during the afternoon peak period and more so on major arterials than on minor arterials.
Delays due to trains. The pervasiveness of at-grade crossings throughout the city and the region mean	• 209 at-grade crossings.

TABLE 14: MANAGING THE USE OF THE NETWORK

Challenge and Issue Category	Specifics
that delays to traffic can be common, especially at certain sections of the CN and CP mainlines.	• Delays waiting for trains were cited as a problem generally by stakeholders. • Railway crossing-related congestion impacts taxi movements significantly (e.g., St. Boniface). • High activity on the CP and CN lines, especially in but not limited to the east side of the city, generates significant delays especially on Marion Street, Mission Street, Messier Street, Fermor Avenue, Panet Road and McGillivray Boulevard – in some cases exceeding 3 hours of delay/day.
Construction. Construction-related delays were cited as problematic, as were advanced notification of construction locations and delays in gaining LCV permits on detours around construction. Stakeholders were not aware of online information.	• Delays due to summer construction. • Inadequate communications around construction and short-term changes on LCV routes. • Delays for LCV permits on detours around construction.
Wayfinding. Improvements to signage and road markings were noted, as was the lack of real-time information on directions, clearances, and other information that are important to route choice.	• Need improved wayfinding (signage, road markings). • Lack of familiarity with City's truck route network and truck regulations. • Understanding of routing for multi-stop itineraries is generally good but it depends on sophistication of the trucking company and it varies across the industry. • Needs for accessing paper or electronic truck route map vary by company size and sophistication. It would be good if City can integrate digital mapping to Google Maps or similar. • Challenges for new drivers: streets are named, not numbered; many rivers and railways that must be negotiated. GIS truck route map would make it easier to avoid mistakes. In addition, there is some information missing that would be useful (e.g., low clearance locations). These are perceived as examples of the limitations of paper/PDF approach. • Need an electronic map that can be easily integrated by a range of platforms.
Consultation/communications. Stakeholders cited inadequate consultation on planning and design projects. Communication was also cited as a gap in several of the preceding network operations challenges, as described above.	• Trucking community does not feel it is well consulted on planning and design initiatives including new active transportation infrastructure, clearance reductions for overhead structures due to repaving, pedestrian-friendly changes in intersection turning radii.

TABLE 15: SUSTAINABLE URBAN GOODS MOVEMENT

Challenge and Issue Category	Specifics
Environmental impacts. Freight-related GHGs and air pollutants are a general concern. However, these impacts are exacerbated by congestion and by customer demands (for delivery 'when and where I want it'), and remedies such as GHG-reduction equipment and alternative fuel technologies are problematic for vehicle owners, cost-wise and in terms of winter performance. More broadly, this topic considers the challenges of transitioning to a more sustainable future for urban freight, to complement the move towards sustainable passenger transportation, as well as the need to support climate resiliency.	• Impact of freight related GHG and air pollutants (particulate matter, ozone cited specifically). • Need to promote electric vehicles. • Very expensive to make technology changes to reduce GHGs in vehicle fleets. • Will take time before new technologies are cost-competitive with internal combustion engines. • Limited range of electric propulsion systems in cold weather climates. • Congestion and idling generate GHGs and pollutants. • Customer demands for immediate delivery of items increases GHGs.
Shared use of streets. Complete Streets and other planning initiatives to protect vulnerable road users can be problematic for truckers to navigate safely. Stakeholders are also concerned that trucking needs for circulation and loading are not well incorporated into Complete Streets schemes – a point noted in a recent *ITE Journal* article on Complete Streets and goods movement in Canadian cities. (DS Kriger and M Seera, *Complete Streets and Goods Movement: The Canadian Experience*, ITE Journal, November 2020.)	• Lack of compatibility of Complete Streets plans with truck routes (e.g., Marion-Goulet as a key truck route). • Can active transportation corridors be put on streets other than truck routes? • Perceived safety problems when bicycle routes and truck routes are on same street. • Some roads are not wide enough to share road safely with cyclists. • Lack of pedestrian and cyclist education on safe use of streets and following traffic regulations. • Pedestrian-friendly (Complete Streets) treatments, like bulbs at intersections, are difficult for trucks to turn safely. • Complete Streets not considering goods movement. This is significant problem as there is a assumption that industry can revert to small delivery trucks and this is not necessarily the case. This also does not account for winter conditions. • Need for all streets to accommodate freight and emergency vehicles of varying sizes, including accommodating large vehicles in Complete Streets. • Ensure importance of links within, to and from the downtown for goods movement is understood, especially in the context of Complete Streets and sustainable transportation and the need to understand the dynamic interaction among the various users of the area's transportation system.

TABLE 16: DISRUPTORS AND NEW TECHNOLOGIES

Challenge and Issue Category	Specifics
Disruptors and new technologies. E-commerce, perhaps the most obvious manifestation of new goods movement technologies, is generating significant volumes of truck traffic in residential areas. There is a corresponding need to plan for and serve distribution centres. There is a need to manage pick-ups and deliveries. More broadly, the 2019 Ottawa *Goods Movement Backgrounder*, the ongoing *Greater Golden Horseshoe Multi-Modal Plan* and other goods movement strategies have noted the need to plan for future technologies as they come to broad use – such as crowdshipping, landing pads for drones, connected / autonomous vehicles, automated warehousing, additive manufacturing and similar. The potential of an ice-free Arctic shipping route might also have an important impact on CentrePort's market reach.	• E-commerce: results in increased demand in residential areas - even if using smaller vehicles, that's still more trips. Many courier trucks are less than full – inefficient. Demand for serving distribution hubs is high.

4.2 Opportunities for Goods Movement

Table 17 lists the issues (categories) and the associated opportunities. Note that these opportunities can be related to planning, design, operations, maintenance, data issues, application of advanced technologies, land use, and more. Note also that the opportunities are assigned to a single category for convenience; however, they can apply to multiple issues.

The appendix presents the findings of the literature review with specific details about each of the opportunities shown in Table 17 as well as other sample opportunities for improved goods movement.

TABLE 17: ISSUES AND POTENTIAL OPPORTUNITIES

Theme	Challenge and Issue Category	Potential Opportunities[14]
Land use and network planning	• Land use and goods movement • Network planning • CentrePort • Regional coordination • Importance of goods movement	• Rail – connected logistics zones • Strategic goods movement network • Truck route planning • Planning for LCVs • Freight-supportive land use guidelines • Freight councils
Managing the use of the network	• Network operations • Safety • Parking, loading and curbside management • Regulations on the use of the network • Congestion • Delays due to trains • Construction • Wayfinding • Consultation / communications	• Increase loading areas and truck parking • Vehicle parking reservation systems • Timesharing of parking spaces • Weight limits • Time windows for access to urban areas • Congestion charges • Nighttime delivery regulations (off-hours delivery) • Urban tolls • Route optimization • Wayfinding for trucks • On-street loading zones • Over-dimension vehicle permitting
Sustainable urban goods movement	• Environmental impacts • Shared use of streets	• Install delivery systems suitable for bicycles and pedestrians • Urban consolidation centres • Urban freight integration with protected bicycle lanes • Low emissions zones • Tradeable permits and mobility credits • Local logistics space • Mobile depot / micro-consolidation centre • Flexi no-contact delivery solutions (lockers) • Crowdsourced delivery • Limited traffic zones • Zero emission zone for City Logistics
Disruptors and new technologies	• Disruptors and new technologies	• Electrification of road freight transport • Underground urban loading • Urban air mobility • Seasonal logistics • Connected and autonomous vehicles • Zero-emissions van subsidy scheme • Applicability of new technologies in cold-weather conditions

[14] See Appendix for details about each of these opportunities.

4.3 Truck Route Network Update

An immediate opportunity that resulted in the process of completing this project was the update to Winnipeg's truck route network. The overall objective of designating a truck route network is to minimize truck traffic on local streets that would otherwise seek the shortest routing to an origin/destination if truck routes were not made available. The existing truck route network was developed based on years of operation, knowledge of Winnipeg's unique transportation system, political/citizen pressures, and the principles outlined in Section 2.2.1. While individual routes have been added and removed over the years, the network has not undergone a complete system-wide review in over 40 years. Changes to the truck route network can become politized and represent a major investment in administrative energy and resources. As such, they should only be pursued in cases where benefits significantly outweigh negative implications. This project completed a data-driven review of the truck route network ensure that it accommodates goods movement needs in Winnipeg while balancing competing interests for capacity of Winnipeg's Road network.

An iterative truck route selection process was developed to independently establish a truck route network for the City founded on a data-driven quantitative assessment of street segments using criteria that is relevant to decisions regarding truck route designation. The evaluation criteria used in the development of this updated network is described as follows:

A. **Existing high truck demand** was evaluated based on intersection count data, where a segment approaching an intersection with a peak hour heavy truck volume exceeding 15 veh/hr would pass this criterion.

B. **High latent truck demand** was evaluated based on an unconstrained traffic model developed by MORR, where a segment with a truck attractiveness score of greater than 60 would pass this criterion.

C. **Divided or one-way cross section** was evaluated based on street cross section, where a segment with a divided or one-way cross section would pass this criterion.

D. **Low vulnerable road user (VRU) activity** was evaluated based on four sub criteria that included: segment with less than 30 intersection pedestrian crossings during the peak hour, segment less than 50 m from a school, segment less than 50 m from a senior complex, and segment not on an on-road bicycle facility.

E. **Adjacent manufacturing land use** was evaluated based on land-use zoning as defined in Winnipeg Zoning By-Law No. 200/2006, where a segment that is within 50 m of a heavy or medium manufacturing zone would pass this criterion.

F. **Adjacent to non-residential land use** was evaluated based on land-use zoning as defined in Winnipeg Zoning By-Law No. 200/2006, where a segment that was further than 30 m from a single- or two-family residential zone would pass this criterion.

G. Required for network connectivity was evaluated based on a visual mapping exercise using an 800 m buffer on the previously approved truck route segments to fill any network gaps through an iterative process that evaluated connection alternatives.

The recommended updated truck route network is shown in Figure 45.

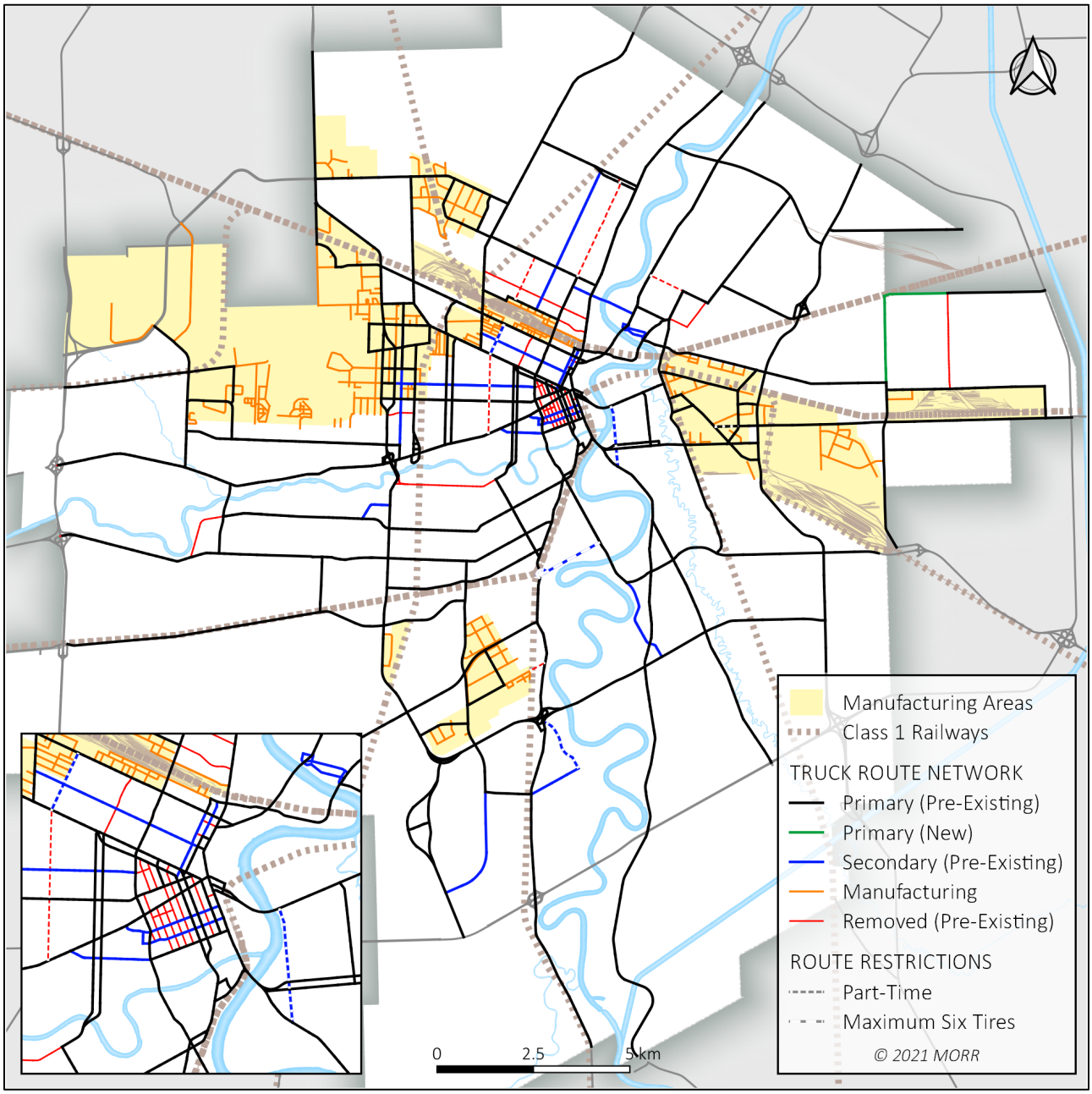


FIGURE 45: RECOMMENDED TRUCK ROUTE NETWORK

4.4 Summary

This chapter has described goods movement issues and associated opportunities for Winnipeg and its metropolitan region. Key points to note are:

- The issues represent a range of perspectives, including those voiced by industry stakeholders and through the TMP and other aspirational documents as well as from data analysis from Chapter 2 and Chapter 3 of this study. They cover short-term operational and regulatory issues as well as a long-term sustainable transportation future.
- The issues can be organized meaningfully into four themes: land use and network planning, managing the use of the network, sustainable urban goods movement, and disrupters and emerging technologies. Many of these issues are common to other Canadian cities although with a unique Winnipeg-specific perspective – in particular, Winnipeg's role as key intermodal transportation hub, which has both internal (urban) and external (long-distance) manifestations; and, Winnipeg's role as the core of a larger region.
- A literature review has yielded 36 potential opportunities for addressing these issues. It can be noted that the potential opportunities cover both in-the-field initiatives that can tangibly impact how goods are moved (e.g., ways to manage on-street operations) and procedural enablers that will support these tangible outcomes (e.g., improved regional coordination). These opportunities also cover a range of functions including land use planning, site plan approvals, corridor planning, traffic operations, safety, design, engineering and more. They also can involve many actors including the City of Winnipeg, the surrounding municipalities, the Province of Manitoba, the Federal government, CentrePort, the Winnipeg Richardson International Airport, the railways, landowners, developers, transportation and logistics providers, retailers, distributors, industries and the public.
- A data-driven, systematic method was developed for updating Winnipeg's existing truck route network. This method resulted in the first update to this network in over 40 years.

5 STRATEGIC FRAMEWORK

The strategic framework for goods movement in Winnipeg and its metropolitan region is shown in Figure 46. The framework contains the following strategic objectives:

A. Protect the viability of goods movement in land use planning and development.

B. Promote seamless intermodal connectivity.

C. Collaborate with regional partners to increase goods movement safety, efficiency, and reliability and ensure inter-jurisdictional coordination of plans and policies.

D. Invest in transportation infrastructure and operational improvements to improve the movement of goods and anticipate new technologies.

E. Improve the services provided for goods movement in the last mile.

F. Prioritize data collection on freight-related issues to help with decision making and, going forward, support the development of improved analytical tools.

Each strategic objective comprises between three and eight actions to ensure the objective is met during implementation of the plan. Details about each strategic objective and associated actions follow.





FIGURE 46: GOODS MOVEMENT STRATEGIC FRAMEWORK

5.1 Strategic Actions

Table 18 to Table 23 identify the 35 actions that form part of this goods movement study.

TABLE 18: ACTIONS FOR STRATEGIC OBJECTIVE A - PROTECT THE VIABILITY OF GOODS MOVEMENT IN LAND USE PLANNING AND DEVELOPMENT

Action #	Action	Description
A1	Approve the update to Winnipeg's truck route network and use the update method as the basis for regular network reviews and updates going forward.	A new systematic process for updating the truck route network to ensure objectivity in the process has been developed as part of this strategy. Approving this method and the resulting network will ensure that Council decisions on future updates to Winnipeg's truck route network can be informed objectively. Public Works Department should review the truck route network regularly to ensure that it is always current to meet needs as they emerge while providing a systematic way to address any concerns raised by residents or by Council and inform decisions objectively. This is in line with how other major Canadian cities update their own truck route networks. A critical update will be required when the WMR goods movement network is developed which is anticipated to start in 2021 as per the Winnipeg Metropolitan Region Regional Growth and Servicing Draft Plan 20-50.
A2	Designate a strategic goods movement network.	A Strategic goods movement networks (SGMNs), which is based on the truck route network, defines a priority network for goods movement, which in turn informs investment priorities for network improvements, asset management for road/intersection upgrades and operational/signalization reviews (i.e., ensuring that freight is always considered explicitly in budgeting and planning decisions). By definition, the SGMN ensures that major freight generators are properly connected with each other (see also Strategic Direction B). The SGMN also is used to identify and address potential conflicts between freight movement, rapid transit, Complete Streets and other existing or planned corridor uses - in this way, each need can be met. The SGMN also informs long-range corridor land use planning decisions. The SGMN serves as the spine of the City's multi-modal freight network, meaning it should include both road and rail networks, thereby informing decisions and priorities for grade separations. Where the truck route network is intended to be updated frequently, the SGMN can serve for several years before it needs updating (e.g., at the frequency of the OCP or TMP update).

Action #	Action	Description
A3	Develop freight supportive guidelines for incorporating goods movement into corridor planning, design, and operations.	Develop guidelines that explicitly consider goods movement in terms of land use and transportation planning, site design, road design and operations, and road maintenance. The guidelines would be supported by current practices for incorporating goods movement into policy documents and zoning by-laws. The guidelines should be used to inform the implementation of Complete Street corridors, corridors that have high levels of transit service, etc. They should also be used to inform priorities for corridor design: this avoids an either-or situation (either a Complete Streets corridor or a major truck corridor), so as to properly accommodate all needs in balanced and safe ways according to the context.
A4	Work with stakeholders to plan for the accommodation of long combination vehicles (LCVs) in future commercial / industrial developments.	The continued growth of LCV operations into and out of Winnipeg, coupled with the unique operational requirements of these vehicles, require that Winnipeg and surrounding municipalities explicitly consider them in the designation of future employment lands and the planning of road accesses. This will ensure an adequate supply of LCV-compatible industrial lands is available (including on-site circulation and trailer coupling / decoupling) and that access to those lands (geometric, structural and operational adequacy of the access roads and the associated intersections and interchanges) meets the needs of these vehicles.
A5	Implement a policy whereby the movement of goods is explicitly considered in all development proposals.	Goods movement is currently either not considered or minimally considered in land use plans (master plans and secondary plans). In the interest of achieving the city's economic development, land use planning, and sustainability aspirations, a policy should be developed to ensure that goods movement and access to developments by commercial vehicles is explicitly addressed in development proposals. The policy should contain guidelines to plan for off-street loading, including differentiating between the design needs for in-and-out couriers/express delivery and loading bays for longer-term loading / unloading; off-street circulation of trucks; vehicle parking and storage; opportunities to combine off-street loading among neighbouring properties; etc. These policies should align with the regional development blueprint set in the finalized WMR Regional Growth and Servicing Plan 20-50.

Action #	Action	Description
A6	Create a regional planning committee for development approvals.	The existing lack of coordination in planning approvals between jurisdictions in the Metropolitan region can result in safety and operational problems for freight transportation and other road users. It is essential that the movement of goods be recognized as a regional issue and in the absence of a Regional Planning Authority, there should be a committee charged with the evaluation of any development applications located near jurisdictional boundaries of members of the Metropolitan region.

TABLE 19: ACTIONS FOR STRATEGIC OBJECTIVE B - PROMOTE SEAMLESS INTERMODAL CONNECTIVITY

Action #	Action	Description
B1	Maintain viability of Winnipeg Richardson airport as a 24/7 operation and continued development of CentrePort as focus areas for goods movement.	One key is to ensure that planned development on adjacent lands or beneath the airport flight paths does not inhibit the ability of these facilities to carry on freight operations during the night-time hours. For example, Toronto's Pearson Airport is subject to night-time curfews because flight paths are over residential areas, which developed after the airport was constructed. Hamilton International Airport has no restrictions because residential development has not been permitted beneath the flight paths. The Winnipeg Airport Vicinity Protection Area Regulation going into affect in November 2021 sets development restrictions around Winnipeg Richardson airport which supports the Winnipeg International Airport Noise Exposure Forecast Study and Planning Recommendations. This regulation should be considered in all future goods movement discussions and plans.
B2	Deploy corridor management planning adjacent to rail corridors.	The object is to limit the encroachment of residential development along key rail corridors, so as to avoid pressures for limiting freight activity and access to intermodal terminals and yards. Guidelines exist (see especially *FCM-RAC Guidelines for New Development in Proximity to Railway Operations*) and is endorsed buy the WMR Regional Growth and Servicing Plan 20-50 . The creation of a map that identifies the "key" rail corridors and which specific policies apply would be important. The policies should state what developers and the City have to do to achieve the desired outcome of limiting the encroachment of residential development.

B3	Coordinate with neighbouring rural municipalities to ensure the cross-boundary coordination of infrastructure to serve key freight generators that are located across or adjoining the City's boundaries.	CentrePort, which transcends the boundary with the Rural Municipality of Rosser, is a key example. One of the biggest inhibitors of CentrePort's development is the lack of servicing infrastructure. Coordinate with the RM to ensure servicing infrastructure is prioritized for this development to ensure continued economic development. CentrePort has been designated an employment area by the finalized WMR Regional Growth and Servicing Plan 20-50.

TABLE 20: ACTIONS FOR STRATEGIC OBJECTIVE C - C. COLLABORATE WITH REGIONAL PARTNERS TO INCREASE GOODS MOVEMENT SAFETY, EFFICIENCY, AND RELIABILITY AND ENSURE INTER-JURISDICTIONAL COORDINATION OF PLANS AND POLICIES.

Action #	Action	Description
C1	Create a regional goods movement advisory council	The Council's role would be to provide advise to the City of Winnipeg and the Winnipeg Metropolitan Region on matters involving freight project priorities and policy considerations that affect the movement of freight into, around and out of Winnipeg and its metropolitan region. It would provide a forum for regional freight stakeholders to discuss public-private collaborations, public outreach, infrastructure development needs, and other topics related to goods movement. Membership could be comprised of representatives from the private and public sectors, economic development agencies, educational institutions (with involved in freight systems planning and design), the trucking association, the Winnipeg Richardson International Airport, CentrePort, and other key stakeholders interested in the freight industry.
C2	Coordinate with the provincial government to harmonize truck size and weight regulations in the Metropolitan Region	The existing discontinuities in gross vehicle weight regulations in the southwest area of Winnipeg and the Perimeter Highway can result in lower productivity or increased weight-related violations for trucks that must access the Perimeter Highway. By ensuring harmonization of regulations throughout the region, truck productivity can increase.

Action #	Action	Description
C3	Create a new position for a freight transportation coordinator within Winnipeg Public Works	This position would be responsible for the planning, design, operational, and regulatory issues associated with the movement of freight transportation in Winnipeg and its Metropolitan Region. This position will also be responsible for coordinating with Metropolitan Region municipalities on all issues involving freight transportation to ensure the safe, efficient, and environmentally friendly movement of goods in the region.
C4	Review snow clearing policies in the Metropolitan Region	In collaboration with Manitoba Infrastructure, each municipality in the metropolitan region should conduct a thorough evaluation of their snow clearing policies and their alignment with MI's policies to ensure freight and courier transportation is not hindered by existing policies or snow clearance priorities. Any policies that hinder freight transportation should be updated to ensure seamless mobility of freight vehicles of all sizes, including small vehicles, vans, commercial cargo bicycles, and others.
C5	Partner with the private sector, neighbouring municipalities, senior governments, and others to pilot new freight transportation solutions	Pilot projects can reduce costs and risks while also establishing partnerships with the private sector or other levels of government as new, innovative solutions are developed. Some of the actions recommended in this plan can be initially implemented in the form of a pilot to ensure success and to explore issues and opportunities resulting from their implementation. Recent examples elsewhere are the deployment by couriers of cargo bicycles in dense urban cores with the support of the municipality, for which Montréal, Toronto and New York City are recent examples; and an on-street loading management strategy for an urban corridor in New York City. For this action, the City and/or the Winnipeg Metropolitan Region should work with private industry to initiate pilot projects that can demonstrate improvements to the movement of goods to/from/through Winnipeg and its metropolitan region.

TABLE 21: ACTIONS FOR STRATEGIC OBJECTIVE D - INVEST IN TRANSPORTATION INFRASTRUCTURE AND OPERATIONAL IMPROVEMENTS TO IMPROVE THE MOVEMENT OF GOODS AND ANTICIPATE NEW TECHNOLOGIES

Action #	Action	Description
D1	Review and update signal timing plans to enhance the flow of goods on Inner Ring Road corridors while maintaining a safe environment for all other users.	The review of signal timing plans to ensure coordination and progression along Inner Ring Road corridors (like Perimeter Highway) can improve goods movement efficiency and reliability by reducing delay and mitigating congestion associated with traffic signals. Although signal timing plans are regularly reviewed to improve conditions for all traffic, the intent here is to focus on how the changed timings can improve the flow of trucks.
D2	Investigate the feasibility of piloting a truck-only lane on a high truck volume corridor	The potential primary and direct benefits of truck lanes include travel time savings, reliability improvements, safety improvements, emission reductions, and increased truck productivity. In addition, separating trucks and cars can potentially increase capacity for general purpose lanes and reduce the probability of collisions between cars and trucks. Identify a corridor(s) with high truck volumes, sufficient right-of-way and appropriate configuration / operating conditions, and investigate the feasibility of implementing a pilot project for the introduction of truck-only lanes. Depending on the results from this pilot project, this concept could be expanded to other high-use corridors in Winnipeg.
D3	Complete the western extension of Chief Peguis Trail	Expedite the completion of the western extension of Chief Peguis Trail Extension West (CPTEW) to increase the efficiency of freight transportation in the northern area of Winnipeg.
D4	Evaluate the need for improved traffic control at key freight generators and attractors in Winnipeg and surrounding municipalities	Working in consultation with indurstry members, evaluate the need for traffic control (e.g. traffic signal or other type) at key freight generators and attractors in Winnipeg and municipalities in the Metropolitan Region (e.g., Symington Yards, CN Intermodal Terminal, and others)
D5	Conduct road safety assessments to improve truck safety on the Perimeter Highway	The Perimeter Highway accounts for more than 10% of all collisions involving large trucks in the region. There should be regional collaboration to conduct road safety assessments on the Perimeter Highway from the truck perspective to ensure geometric, operational, and other issues are addressed to improve truck safety.

Action #	Action	Description
D6	Investigate the feasibility of implementing fibre cables and other infrastructure to accommodate future/emerging vehicle-infrastructure communications.	Many cities are pro-actively installing new communications technology infrastructure whenever new roads are constructed and existing roads are rehabilitated, in order to anticipate the advent of vehicle-to-infrastructure (V2I) communications that enable/support such technologies as connected and autonomous vehicles.
D7	Evaluate the feasibility of an east-west freight corridor connecting CentrePort with Transcona and the CN Intermodal Terminal	Several issues inform the need to examine the feasibility of an east-west corridor connecting the airport, Centreport, and industrial areas in the west to key freight hubs in the east of Winnipeg, passing through or near downtown. In addition, such a corridor would represent an improvement at strengthening crosstown goods movement with the added benefits of potentially improving road safety and creating opportunities for applying urban design principles to the new facility, as identified in Complete Streets 2.0.
D8	Identify alternative routing options for east-west truck movements through downtown Winnipeg	Given that Action D7 is not something that could be realized in the near term, the City should investigate feasible alternatives for goods movement through downtown Winnipeg to ensure economic development continues to grow for east-west activity.

TABLE 22: ACTIONS FOR STRATEGIC OBJECTIVE E - IMPROVE THE SERVICES PROVIDED FOR GOODS MOVEMENT IN THE LAST MILE

Action #	Action	Description
E1	Review provision and management of on-/off street loading areas and truck parking	The provision of on- and off-street loading and parking areas should be considered in tandem. This means reviewing the adequacy and location of loading spaces and their utilization and dimensions, the special requirements of courier / express delivery, opportunities to consolidate off-street loading especially in high-density areas, enforcement, opportunities to promote the safe use of carbon-neutral vehicles and especially bicycles, potential for deploying urban consolidation centres to manage downtown deliveries especially at construction sites, availability of loading spaces during the off-hours, provision of loading in pedestrian areas and more. City site plan approvals should mandate off-street loading space for all development applications where practical. Current bylaws should be reviewed to ensure that off-peak deliveries are not limited or prohibited.
E2	Investigate the feasibility of implementing a Vehicle Parking Reservation System for downtown Winnipeg and other areas of high loading demand	A Vehicle Parking Reservation System allows drivers to program or book a parking space online or via phone near the loading/unloading location. This is a technological innovation that would be new to Winnipeg and the Metropolitan Region where constant monitoring of loading/unloading queues takes place through tracking cameras.
E3	Promote / enable off-peak and flexible deliveries	As a way of reducing deliveries during congested times of day, the City should evaluate the potential for off-peak deliveries (OPD) and other means of making deliveries more flexible. These measures could include working with major retailers and transporters to pilot an OPD program downtown, deploying secure lockers to drop off parcels without having to go to a recipient's home, ensuring that high-rise condos and other residential areas are designed to be able to securely receive after-hours deliveries (e.g., night-time delivery of courier packages) and more.

Action #	Action	Description
E4	Support the transition to low-/zero-carbon freight vehicles	Although large urban delivery fleets are moving towards the use of electric vehicles (EV) and other alternative-fuel vehicles, it is financially challenging for the many independents and small fleet operators to do so. The City can help by working with senior governments to subsidize the purchases of EVs and other alternative technology vehicles, deploying public rapid-charging stations for EVs, designating priority loading areas for low-/zero-carbon vehicles, investigating the feasibility of urban consolidation centres (and, most likely, subsidizing their development) and more. This will align with future regional plans like the WMR's Zero Emission Vehicle (ZEV) Strategy Plan whose development is anticipated to start in 2024.
E5	Collaborate with private industry to investigate opportunities to promote and expand bicycle delivery systems.	Freight trucks can have difficulty operating on urban roads due to insufficient curb space to unload goods. Some couriers and transporters have found that cargo bicycles are cost-effective ways to avoid the time lost in searching for loading spaces (i.e., there is a business case, let alone the contribution to reducting GHGs, etc.) Cargo bicycles designated for freight transportation can provide a smaller and more flexible means of completing deliveries in the first or last mile of the supply chain (e.g. delivery of mail, courier delivery, package delivery, home delivery, etc.). Delivery systems friendly to these vehicles can include deployment of microhubs to enable quick transfer of goods from trucks to bicycles at strategic locations, proper signing for bicycle traffic, bicycle infrastructure, collaboration with businesses for the installation of parking facilities at the destination points and more.
E6	Investigate opportunities for moving goods via public transport.	Some cities have investigated the opportunity to move freight via public transport during the night-time, when public transport routes do not operate for the public. However, the evidence is that this works best on routes with high volumes of freight that are concentrated to/from a single origin or destination (e.g., mail from the central sorting depot, or waste being transported to a collection site). Nonetheless, the opportunity could be investigated.

TABLE 23: ACTIONS FOR STRATEGIC OBJECTIVE F - PRIORITIZE DATA COLLECTION ON FREIGHT-RELATED ISSUES TO HELP WITH DECISION MAKING AND, GOING FORWARD, SUPPORT THE DEVELOPMENT OF IMPROVED ANALYTICAL TOOLS.

Action #	Action	Description
F1	Implement a systematic truck traffic screenline counting program across Winnipeg and key adjacent freight generators.	The City operates a traffic monitoring program that determines average daily traffic information, which is used for planning, design, operations, maintenance, and other services. The current count programs includes trucks but there are gaps and inconsistencies. Trucks should be counted by class and should be distinguished from other large vehicles such as transit buses. Data should be available for the commuter peak hours/periods as well as the inter-peak and 24-hours. The City should also identify the need for new screenlines that capture activity to and from major freight generators, and should work with the surrounding municipalities to ensure that key generators are also included in the screenline system (presumably on a cost-sharing basis). The data should be reported consistently and uniformly across the coverage area, much the same way that the MHTIS reports its data across the Province. The data should be counted at least annually at key screenlines. This system should result in the generation of an annual truck flow map for Winnipeg and the Metropolitan Region, which will require collaboration with Manitoba Infrastructure.
F2	Reinstate the Manitoba Highway Traffic Information System in the Metropolitan Region	Manitoba Infrastructure should reinstate the Manitoba Highway Traffic Information System focusing on truck traffic in the metropolitan region. This is an essential data source that is needed to inform decisions about planning, design, operations, and maintenance of transportation services pertaining to trucking.
F3	Design, develop and implement a region-wide establishment / truck origin-destination survey, supplemented by special generator surveys at key freight terminals	The available data sources, exemplified by the StreetLight GPS data used for the TMP freight model, predominantly capture medium/heavy trucks that operate in fleets and largely serve the regional / long-haul movement of freight. Although these sources are important, they miss a substantive part of the freight activity in and around the city; namely, smaller vehicles that engage primarily in urban deliveries as well as vehicles of all sizes that are owned / operated independently. Moreover, the GPS data, while providing 24/7 coverage, cannot capture information on what is being carried, in what units, to/from what land uses, and so on. Meeting these gaps is essential to transitioning to tour-based truck models, to match the same advancements in the passenger model and, from the freight perspective, allow operational and policy initiatives to be tested (e.g., the impact of off-peak delivery and the transition to smaller, carbon-neutral vehicles, which the GPS data cannot handle).

Action #	Action	Description
		To address these gaps, there is a need to conduct establishment / truck origin-destination surveys, which many cities use to expand and leverage their GPS. In these surveys, establishments (public- and private-sector businesses) are sampled to describe their activities and then a sample of their trucks is then asked to complete a trip diary for 1 or more days. The surveys should cover Winnipeg and the metropolitan region, recognizing both the integration of the city and its surrounding for freight movement and commensurate with the model's study area coverage. Special generator surveys should be added to the core establishment/truck OD surveys to capture activity at key intermodal terminals such as CentrePort and the rail intermodal terminals.
F4	Design, develop, and implement a commodity flow survey in the region and beyond	Commodity flow surveys describe the goods that are moved by all modes across a large region. They complement establishment/truck OD surveys which are focused on urban, road-based activity. Statistics Canada's Canadian Freight Analysis Framework (CFAF) is a start, but the data are not consistently defined, using available modal sources that are defined and detailed in varying ways for different modes and provided from varying sources. The US Commodity Flow Survey provides a more wholistic example with respect to sampling and capturing cohesive data. Notwithstanding CFAF's initiative, we recommend that the Province of Manitoba embark on its own commodity flow survey which would capture Province-wide commodity flows by all economic sectors over all modes (road, rail, marine and air). This would serve as the basis for understanding the impacts of multi-modal flows to, from and through Winnipeg and the metropolitan region. The data base would support economic development, land use planning, the planning of services and more, as well as serving for an eventual model of the supply chain as well. The Province-wide commodity flow survey would be updated approximately every 5 years to ensure there is a standard basis for measuring freight activity performance over time and to support future planning, investment, and economic development initiatives.
F5	Collect cargo data at the Winnipeg Richardson International Airport	Given that there is no current reporting requirements on air tonnage origin-destination transport, nor any detailed reporting on commodities and value of goods arriving at the airport, the creation of a database containing this information is important for proper performance evaluation, as well as to understand the demand for freight activity in Winnipeg related to the airport. Working in collaboration with the WAA and Transport Canada, encourage the creation and maintenance of freight activity databases containing the following information about freight transportation to,

Action #	Action	Description
		from, and through Winnipeg by air at the Winnipeg Richardson International Airport: commodities by value, commodities by tonnage; and commodities by origin, and destination.
F6	Modify the provincial collision report form	Addressing truck safety issues would benefit significantly from having a better understanding of the types of trucks involved in collisions, the characteristics of those vehicles, cargo being carried, and other specific issues pertaining to the units involved. The Manitoba collision report form should be modified to include a section that specifically deals with commercial vehicles so that it can be filled out by officers in cases where these vehicles are involved. The City and the Metropolitan Region should work with MPI and Manitoba Infrastructure to implement this important change.
F7	Use these data to develop advanced freight modelling tools to support policy, design, and operational needs.	Use the collected establishment / truck OD survey and counts to develop tour-based urban freight models across Winnipeg and the metropolitan region (building on the updated freight model that was developed for this study) to more completely cover urban freight activity on local and regional roads, as well as a Province-wide commodity flow model to estimate multi-modal freight movements to, from and through Winnipeg.

5.2 Economic Analysis of Strategic Actions

Table 24 contains the costs associated with each of the actions for this study. The table also includes potential funding mechanisms and sources to the implementation of each action.

TABLE 24: IMPLEMENTATION COSTS AND POTENTIAL FUNDING SOURCES

Action #	Action	Cost	Funding Mechanisms/Sources
A1	Approve the update to Winnipeg's truck route network and use the update method as the basis for regular network reviews and updates going forward.	$40,000 to prepare systematic procedure (done) with $5,000 annual update	City of Winnipeg Public Works
A2	Designate a strategic goods movement network.	$150,000 - $200,000 to develop SGMN, including data and stakeholder consultation. $100,000 for common design and operational guidelines, including stakeholder consultation.	City of Winnipeg Public Works
A3	Develop freight supportive guidelines for incorporating goods movement into corridor planning, design, and operations.	$250,000 to develop the guidelines including stakeholder consultation, review of current policies and procedures (context), assessment of loading, logistical practices and other needs, review of practices elsewhere for incorporation into the guidelines, and preparation of guidelines.	City of Winnipeg Planning and Public Works, and potentially Winnipeg Metropolitan Region and Manitoba Infrastructure
A4	Work with stakeholders to plan for the accommodation of long combination vehicles (LCVs) in future commercial / industrial developments	$75,000 to develop the manual including stakeholder consultation, review of current policies and procedures, assessment of needs, review of practices elsewhere for incorporation into the manual, and preparation of manual.	City of Winnipeg Planning and Public Works

Action #	Action	Cost	Funding Mechanisms/Sources
A5	Implement a policy whereby the movement of goods is explicitly considered in all development proposals	$200,000 to develop the manual including stakeholder consultation, inventory and review of current policies and procedures, assessment of needs, review of practices elsewhere for incorporation into the manual, and preparation of manual. The intent is to build on existing policies and procedures, adding the goods movement lens. Should also include training workshops for staff, consultants, developers, etc.	City of Winnipeg Planning
A6	Create a regional planning committee for development approvals	$10,000 set-up cost to design, prepare mandate and terms of reference, work through protocols and function, etc. $10,000 (annual cost for portion of one City staff person's time to manage the council) - assumes City serves as secretariat.	City serves as secretariat and provides staff person as PT resource. WMR and MI supply services-in-kind (e.g., additional staff resources).
B1	Maintain viability of Winnipeg Richardson airport as a 24/7 operation and continued development of CentrePort as focus areas for goods movement.	$75,000 for policy development, including stakeholder consultation.	City of Winnipeg Public Works with Planning, RM of Rosser
B2	Deploy corridor management planning adjacent to rail corridors.	$75,000 to review FCM-RAC guidelines in view of specific Winnipeg context, including stakeholder consultation.	City of Winnipeg Public Works, with Planning
B3	Coordinate with neighbouring rural municipalities to ensure the cross-boundary coordination of infrastructure to serve key freight generators that are located across or adjoining the City's boundaries.	$50,000 to develop protocol, including consultation to gain consensus among City, RMs and WMR.	WMR, City of Winnipeg Public Works and RMs
C1	Create a regional goods movement advisory council	$20,000 set-up cost to design, prepare mandate and terms of reference, work through protocols and function, etc. $20,000 (annual cost for portion of one City staff person's time to manage the council) - assumes City serves as secretariat.	City serves as secretariat and provides staff person as PT resource. WMR and MI supply services-in-kind (e.g., additional staff resources).

Action #	Action	Cost	Funding Mechanisms/Sources
C2	Coordinate with the provincial government to harmonize truck size and weight regulations in the Metropolitan Region	$50,000 to review policies, including stakeholder consultation.	Manitoba Trucking Association, City of Winnipeg Public Works, MI Motor Carrier office
C3	Create a new position for a freight transportation coordinator within Public Works	$125,000, assuming a full-time staff person and accounting for benefits.	City staffing budgets. Could represent a re-assignment of an existing staff position.
C4	Review snow clearing policies in the Metropolitan Region	$100,000 to review and update all policies and create a coordinated policy among all jurisdictions including best practice research and stakeholder consultation.	WMR sponsors, conducts, or coordinates with support from City of Winnipeg, local RMs and MI.
C5	Partner with the private sector, neighbouring municipalities, senior governments, and others to pilot new freight transportation solutions	Variable depending on the initiative being tested. Some costs may be taken up by the public sector through the provision of in-kind services. Some costs may be taken up by the private sector through the provision of in-kind services or equipment.	City of Winnipeg Public Works, WMR, MI, Transport Canada, academia and private sector partner.
D1	Review and update signal timing plans to enhance the flow of goods on Inner Ring Road corridors while maintaining a safe environment for all other users.	$2,000 (assumed) in City staff time, per signalized intersection.	City of Winnipeg Public Works, RMs and MI for signalized intersections in their respective jurisdictions.
D2	Investigate the feasibility of piloting a truck-only lane on a high truck volume corridor	$100,000 for study, including stakeholder consultation.	City of Winnipeg Public Works.
D3	Complete the western extension of Chief Peguis Trail	The CPTEW has an estimated Class 3 budget cost of $486.6m, Main Street to Brookside Boulevard. For the Main Street - McPhillips Street alone, the Class 3 estimate is $262.3m. (All figures are $2019.) Benefit-cost ratios and ROIs are not available.	City of Winnipeg Public Works (debt financing)

Action #	Action	Cost	Funding Mechanisms/Sources
D4	Evaluate the need for improved traffic control at key freight generators and attractors in Winnipeg and surrounding municipalities	$100,000 for study, including stakeholder engagement.	City of Winnipeg Public Works, land owners served by improved access (e.g., CN).
D5	Conduct road safety assessments to improve truck safety on the Perimeter Highway	$175,000 for study, including stakeholder engagement, assessment of problems, candidate solutions to address the problems (including modelling), evaluation of solutions, recommendations, and implementation plan/costs.	MPI and MI
D6	Investigate the feasibility of implementing fibre cables and other infrastructure to accommodate future/emerging vehicle-infrastructure communications.	$250,000 for study including costing information, assessment of problem, implementation plan, timing, and other.	City of Winnipeg Public Works
D7	Evaluate the feasibility of an east-west freight corridor connecting CentrePort with Transcona and the CN Intermodal Terminal	$450,000 for study including stakeholder engagement, assessment of problem, candidate solutions, modelling, evaluation of solutions, recommendations (including timing and, if applicable, phasing), recommendations and implementation plan/costs.	City of Winnipeg Public Works
D8	Identify alternative routing options for east-west truck movements through downtown Winnipeg	$200,000 for study including stakeholder engagement, assessment of problem, profile of current conditions and trends, new data collection, generation of potential solutions (routes), analysis (modelling), evaluation of solutions (routes), recommendations and implementation plan/costs.	City of Winnipeg Public Works
E1	Review provision and management of on-/off street loading areas and truck parking	$250,000 for study including stakeholder engagement, assessment of needs, review and assessment of candidate practices and treatments, and recommendations including timing and costs.	City of Winnipeg Public Works and Planning

Action #	Action	Cost	Funding Mechanisms/Sources
E2	Investigate the feasibility of implementing a Vehicle Parking Reservation System for downtown Winnipeg and other areas of high loading demand	$200,000 for feasibility study including stakeholder engagement, assessment of needs, review of existing systems elsewhere, and recommendations including timing, costs, cost recovery, operations, and enforcement.	City of Winnipeg Public Works
E3	Promote / enable off-peak and flexible deliveries	$150,000 for feasibility study including stakeholder engagement, assessment of current conditions; identification of potential partners and locations; review of relevant policies, regulations and bylaws, review and assessment of practices elsewhere; and recommendations including costs, timing and regulatory implications.	City of Winnipeg Public Works
E4	Support the transition to low-/zero-carbon freight vehicles	Costs can vary depending on the program, especially if the City and Metropolitan Region's contribution is for subsidies rather than paying for total costs. Begin with a $150,000 feasibility study including stakeholder engagement, inventory of potential opportunities (locations, participants, etc.), review of potential practices and solutions, assessment of costs and requirements, and recommendations including costs and timing.	City of Winnipeg Public Works, WMR, MI
E5	Collaborate with private industry to investigate opportunities to promote and expand bicycle delivery systems.	$150,000 feasibility study including stakeholder engagement, inventory of potential opportunities (including opportunities to build on existing Active Transportation initiatives), review of potential practices and solutions, assessment of costs and requirements, and recommendations including costs and timing.	City of Winnipeg Public Works, individual RMs, MI

Action #	Action	Cost	Funding Mechanisms/Sources
E6	Investigate opportunities for moving goods via public transport.	$50,000 including problem / opportunity statement, identification of potential markets, review of experience elsewhere, assessment of applicability to Winnipeg and recommendations including implementation costs and timing.	City of Winnipeg Public Works, Winnipeg Transit
F1	Implement a systematic truck traffic screenline counting program across Winnipeg and key adjacent freight generators.	Assuming the continued deployment of MioVision or similar counting technologies, the costs assume a 1/3 increase in the City's annual budget.	City of Winnipeg Public Works
F2	Reinstate the Manitoba Highway Traffic Information System in the Metropolitan Region	$200,000 for system setup and $175,000 per year for operation and maintenance of the system (includes generation of annual statistics for total traffic and truck traffic by road segment in the region, on-line access to statistics, annual report, and on-demand information). Assumes counts conducted by MI and excludes Winnipeg.	MI
F3	Design, develop and implement a region-wide establishment / truck origin-destination survey, supplemented by special generator surveys at key freight terminals	$300,000 - $400,000	City of Winnipeg Public Works, with potential contributions from WMR, RMs, MI, Transport Canada, CentrePort, WAA and Class I railways.
F4	Design, develop, and implement a commodity flow survey in the region and beyond	$400,000 if Province of Manitoba alone; likely reduced if part of a Canada-wide initiative because fixed costs of survey design, etc. would be shared. To be meaningful and cost-effective, the survey should cover all of Manitoba and, ideally, it should be conducted as part of a national effort.	MI, in association with Economic Development, Finance, Agriculture and Resource Development and other Government of Manitoba departments, with potential contributions from Statistics Canada and Transport Canada.
F5	Collect cargo data at the Winnipeg Richardson International Airport	$50,000	WAA, providing service in kind to assemble and collate the data from the carriers that serve the airport.

Action #	Action	Cost	Funding Mechanisms/Sources
F6	Modify the provincial collision report form	$75,000 to update form and reporting database	MPI in association with MI, WPS, and RCMP
F7	Use these data to develop advanced freight modelling tools to support policy, design, and operational needs.	Advanced freight model: $400,000 Commodity flow model: $500,000	Advanced freight model: City of Winnipeg, WMR, MI Commodity flow model: MI, Economic Development, Agriculture and Resource Development, with City of Winnipeg and WMR

5.3 Implementation Plan

This section presents an implementation and phasing strategy, identifying priority actions over the short term (2-5 yrs), medium term (5-10 yrs), and long term (>10 yrs). In addition to the short-term actions, the implementation and phasing strategy also identifies several 'quick win' actions that the City and the Metropolitan Region should begin within the next two years. These have been identified as *immediate* in the implementation plan.

Table 25 shows the implementation plan and phasing strategy for the actions in this study. The table also identifies stakeholders who would be most suitable to lead and support each action, mechanisms for performance monitoring, and available tools to ensure implementation.

TABLE 25: GOODS MOVEMENT IMPLEMENTATION PLAN

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
A1	Approve the update to Winnipeg's truck route network and use the update method as the basis for regular network reviews and updates going forward.	Immediate	Lead: City of Winnipeg	Proportion of recommended changes over time	New systematic update process and supporting GIS databases and counts
A2	Designate a strategic goods movement network.	Short term	Lead: City of Winnipeg Support: WMR, MI	State of SGMN network (i.e., % road-km usable for trucks v % road-km/intersections that have deficiencies)	New truck route GIS databases and counts, TAZ-level employment by type and population
A3	Develop freight supportive guidelines for incorporating goods movement into corridor planning, design, and operations.	Short term	Lead: City of Winnipeg Support: WMR, RMs, MI	Periodic review of how the guidelines have been applied. Stakeholder input	Existing corridor plans, policies, and procedures. Existing plans and guidelines for implementing active transportation corridors, transit priorities, loading, etc.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
A4	Work with stakeholders to plan for the accommodation of long combination vehicles (LCVs) in future commercial / industrial developments	Short term	Lead: City of Winnipeg Support: WMR, RMs, MI	Periodic review of applications. Stakeholder input	Existing land use plans, policies, and procedures. Existing zoning and by-laws impacting industrial / commercial land use and development. Current LCV policies and route approval requirements. Studies submitted as part of LCV route approvals.
A5	Implement a policy whereby the movement of goods is explicitly considered in all development proposals	Short term	Lead: City of Winnipeg Support: WMR, RMs, MI	Periodic review of how the policy has been used in plan development at all levels.	Existing land use planning, policies, and procedures.
A6	Create a regional planning committee for development approvals	Immediate	Lead: WMR Support: City of Winnipeg, RMs and possibly Manitoba Infrastructure	Number of development applications received and reviewed. Number of development applications approved by all relevant parties. Number of meetings held each year.	Existing development approvals, policies, and procedures for each agency. Current protocols and procedures for addressing cross-jurisdictional development approvals, formal and informal.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
B1	Maintain viability of Winnipeg Richardson airport as a 24/7 operation and continued development of CentrePort as focus areas for goods movement.	Immediate	Lead: City of Winnipeg Support: WMR, RM of Rosser	Avoidance of conflicting developments	Existing City and RM land use and zoning policies
B2	Deploy corridor management planning adjacent to rail corridors.	Short term	Lead: City of Winnipeg and WMR Support: Railways	Avoidance of conflicting developments Number of incidents of pedestrian encroachment onto active rail lines	Existing City and RM land use and zoning policies
B3	Coordinate with neighbouring rural municipalities to ensure the cross-boundary coordination of infrastructure to serve key freight generators that are located across or adjoining the City's boundaries.	Short term	Lead: WMR Support: City of Winnipeg, RMs	Number of infrastructure / development plans that have a potential cross-boundary impact reviewed and approved under this process.	Existing City and RM cross-boundary land use and infrastructure planning protocols and procedures (formal and informal)

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
C1	Create a regional goods movement advisory council	Immediate	Lead: City of Winnipeg and WMR Support: MI, Economic Development, WPS, RCMP, Transport Canada Class I railways, WAA, CentrePort. MTA, educational institutions.	Number of meetings held each year Number of actions initiated each year. Number of actions completed/implemented or approved for governmental funding each year	Existing formats and terms of reference from other City advisory councils to guide protocols, functions, etc.
C2	Coordinate with the provincial government to harmonize truck size and weight regulations in the Metropolitan Region	Short term	Lead: WMR Support: City of Winnipeg, MI	Number of regulations harmonized	Existing City and MI truck size and weight regulations and policies.
C3	Create a new position for a freight transportation coordinator within Winnipeg Public Works	Short term	City of Winnipeg Public Works.	Number of freight issues addressed annually, by type of enquiry and response	City Public Works, economic development or land use staff complement from which to draw a resource.
C4	Review snow clearing policies in the Metropolitan Region	Short term	Lead: WMR Support: City of Winnipeg, RMs, MI	Creation, acceptance, and implementation of agreed/consensus policy.	Existing policies and practices.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
C5	Partner with the private sector, neighbouring municipalities, senior governments, and others to pilot new freight transportation solutions	Medium term	Lead: City of Winnipeg Support: WMR, MI, Transport Canada, U Manitoba / U Winnipeg, private sector partner(s)	KPIs to be tied to specific objectives of each initiative, but should include quantifiable measures (e.g., reduction in VKT, changes in costs, on-time performance) as well as qualitative measures	Performance metrics and data for current ways of transporting goods
D1	Review and update signal timing plans to enhance the flow of goods on Inner Ring Road corridors while maintaining a safe environment for all other users.	Short term	Lead: City of Winnipeg, WMR Support: RMs and MI for their respective jurisdictions. Ensure that signal progressions are consistent on corridors that cross jurisdictional boundaries.	% and absolute reductions in average truck and general traffic travel times, especially during peak periods. Changes in traffic volumes along Inner Ring Road corridors, alternative corridors, and intersecting streets.	Established procedures and protocols used by each jurisdiction to review signal timing plans.
D2	Investigate the feasibility of piloting a truck-only lane on a high truck volume corridor	Short term	Lead: City of Winnipeg	Reduction in travel time, operating costs, changes in road safety, increased goods movement efficiency.	Travel time studies on candidate corridors for autos and for trucks. Micro-simulation models of traffic flows on candidate corridors.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
D3	Complete the western extension of Chief Peguis Trail	Short term	Lead: City of Winnipeg	Demonstrated case for the timing and prioritization of the complete or phased CPTEW.	Securement of funding for the CPTEW, whether for the complete section or phased.
D4	Evaluate the need for improved traffic control at key freight generators and attractors in Winnipeg and surrounding municipalities	Medium term	Lead: City of Winnipeg Support: Affected stakeholders	Demonstrated case for implementing improved traffic control at candidate intersections, including reductions in intersection delays, conflicts, and collisions.	Intersection turning movement counts by vehicle type. Intersection models (e.g., Synchro).
D5	Conduct road safety assessments to improve truck safety on the Perimeter Highway	Short term	Lead: MI and WMR. Support: City of Winnipeg, MPI	Changes in frequency of truck collisions Changes in frequency of total collisions Changes in the severity of these collisions.	MI collision records involving large trucks on the Perimeter Highway.
D6	Investigate the feasibility of implementing fibre cables and other infrastructure to accommodate future/emerging vehicle-infrastructure communications.	Medium term	Lead: City of Winnipeg and WMR Support: MI	Road-km of arterial and collector roads that have fibre optics infrastructure installed.	Capital investment plans and updates.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
D7	Evaluate the feasibility of an east-west freight corridor connecting CentrePort with Transcona and the CN Intermodal Terminal	Medium term	City of Winnipeg	Changes to truck and auto traffic flows in vicinity of the corridor (i.e., across the City given that this facility could be expected to impact a very large area of the City).	VISUM passenger model, updated through the *Core Framework*, and the new freight model prepared as part of the *Goods Movement Study*.
D8	Identify alternative routing options for east-west truck movements through downtown Winnipeg	Short term	City of Winnipeg	Changes to truck and auto traffic flows with and without the new truck route(s) in place, with a focus especially on downtown Winnipeg, as measured by level of service, speeds and volumes.	Screenline and intersection counts. Truck route policy, network, and regulations.
E1	Review provision and management of on-/off street loading areas and truck parking	Short term	Lead: City of Winnipeg Support: Winnipeg Parking Authority	Supply and utilization of on- and off-street loading areas and truck parking areas, assessing separately for courier/express deliveries and regular truck loading/unloading. Compliance rate.	On-street loading and parking inventory, policies, and regulation. Off-street loading requirements and development approval requirements.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
E2	Investigate the feasibility of implementing a Vehicle Parking Reservation System for downtown Winnipeg and other areas of high loading demand	Medium term	Lead: City of Winnipeg Support: Winnipeg Parking Authority, MTA, local business associations, local couriers.	Supply and utilization of on-street loading areas, assessing separately for courier/express deliveries and regular truck loading/unloading. Compliance rate.	On-street loading and parking inventory, policies, and regulation. Off-street loading requirements and development approval requirements.
E3	Promote / enable off-peak and flexible deliveries	Short term	Lead: City of Winnipeg Support: WMR, MTA, local business associations, local couriers	Changes in door-to-door travel times, delivery reliability, fuel use, GHG, trucker productivity. Expected impacts of night-time deliveries on residents and businesses.	Loading and delivery policies, bylaws, and regulations. Business hours of operation, noise, etc. policies, bylaws, and regulations.
E4	Support the transition to low-/zero-carbon freight vehicles	Short term	Lead: City of Winnipeg and WMR Support: Efficiency Manitoba, MI	Expected changes in door-to-door travel times, delivery reliability, fuel use, GHG, courier productivity. Customer acceptance. Changes in transportation and logistics costs among participating trucking/courier companies and retailers.	Loading and delivery policies, bylaws, and regulations.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
E5	Collaborate with private industry to investigate opportunities to promote and expand bicycle delivery systems.	Short term	Lead: City of Winnipeg Support: WMR	Diversion of goods from trucks and corresponding reduction in truck traffic and congestion levels and in negative impacts such as noise, vibration, and pollution.	Active transportation plans and policies.
E6	Investigate opportunities for moving goods via public transport.	Short term	City of Winnipeg	Expected diversion of goods from trucks and corresponding reduction in truck traffic and congestion levels.	Winnipeg Transit route structure.
F1	Implement a systematic truck traffic screenline counting program across Winnipeg and key adjacent freight generators.	Immediate	City of Winnipeg	Number of major freight generators covered in screenline program, within City and beyond. Extent of geographic and temporal coverage. Frequency of counts.	Existing City count databases, count equipment and reporting processes.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
F2	Reinstate the Manitoba Highway Traffic Information System in the Metropolitan Region	Immediate	MI	Number of count stations counted each year on Provincial highways Number of count stations located in Winnipeg and the WMR	Existing Manitoba Highway Traffic Information System databases and reports.
F3	Design, develop and implement a region-wide establishment / truck origin-destination survey, supplemented by special generator surveys at key freight terminals	Medium term	Lead: City of Winnipeg Support: WMR, RMs, MI, Transport Canada, CentrePort, WAA	Sample coverage by geography (core, urban areas, suburbs, rural communities), economic sector (all, possibly grouped), establishment size (SML, measured by employee size or similar), vehicle types (light, medium, heavy).	Complements screenline counts, MHTIS counts and City's freight model.
F4	Design, develop, and implement a commodity flow survey in the region and beyond	Medium term	Lead: WMR and City of Winnipeg Support: MI, Manitoba Economic Development, Statistics Canada, Transport Canada.	Sample coverage by geography (Province-wide) and ensuring representative sampling by economic sector and mode.	Canadian Freight Analysis Framework database could be used as a reference (although this has limited usage because it is made up of disparate and incomplete data by mode). US Commodity Flow Survey data could serve as a reference.

Action #	Action	Priority	Responsibility	Performance Monitoring	Available Tools
F5	Collect cargo data at the Winnipeg Richardson International Airport	Medium term	Lead: WAA Support: WMR, Manitoba Economic Development, Transport Canada	Coverage of all carriers Representativeness and completeness of data (cargo type, value, OD, etc.)	WAA cargo reporting, flight activity, waybills, etc.
F6	Modify the provincial collision report form	Medium term	Lead: MPI Support: City of Winnipeg, MI, WPS, RCMP	Extent of coverage across Manitoba by jurisdiction	Existing collision report form, databases and reports
F7	Use these data to develop advanced freight modelling tools to support policy, design, and operational needs.	Medium term	*Advanced freight model* Lead: City of Winnipeg Support: WMR, MI *Commodity flow model* Lead: WMR Support: Economic Development, City of Winnipeg	Progress towards implementation	Existing Winnipeg VISUM passenger and freight modelling suite

APPENDIX A: SAMPLE OPPORTUNITIES FOR IMPROVED GOODS MOVEMENT

TABLE OF CONTENTS

1. Increase Loading Areas and Truck Parking A147
2. Install Delivery Systems Suitable for Bicycles & Pedestrians A149
3. Urban Consolidation Centres A151
4. Vehicle Parking Reservation Systems A153
5. Timesharing of Parking Spaces A155
6. Urban Freight Integration with Protected Bicycle Lanes A157
7. Weight Limits A159
8. Time Windows for Access to Urban Areas A161
9. Low Emission Zones A163
10. Congestion Charges A165
11. Nighttime Delivery Regulations (Off-Hours Delivery) A167
12. Tradeable Permits and Mobility Credits A169
13. Urban Tolls A171
14. Route Optimization A173
15. Electrification of Road Freight Transport A175
16. Underground Urban Loading A177
17. Wayfinding for Truck A179
18. Local Logistics Space (ELP) A181
19. Mobile Depot / Micro-Consolidation Centre A183
20. Urban Air Mobility A185
21. Seasonal Logistics A187
22. Flexi No-Contact Delivery Solutions (Lockers) A189
23. Crowdsourced Delivery A191
24. Connected and Autonomous Vehicles A193
25. Limited Traffic Zones (LTZs) A195
26. Development of Rail - Connected Logistics Zones A197
27. ZE Van Subsidy Scheme A199
28. Zero Emission Zone for City Logistics (ZECL) A201
29. New Regulations for On-Street Loading Zones A203
30. Strategic Goods Movement Network A205

31. Truck Route Planning A207
32. Planning for LCVs A209
33. Freight-Supportive Land Use Guidelines A211
34. Freight Councils A213
35. Over-Dimension Vehicle Permitting A215
36. Applicability of New Technologies in Cold Weather A217

1. Increase Loading Areas and Truck Parking

Overview

Parking and cargo area-related strategies focus on designation of sidewalk parking for cargo vehicles, installation of appropriate signage, re-distribution of sidewalk space, and enforcement. This involves making infrastructure and policy changes to current street design and cargo areas to accommodate existing and future traffic, including trucks.

Successful modification and update of current regulations, land use codes and rezoning strategies requires coordination between all planning and transportation stakeholders and organization. Positive and negative impacts on all road users should be considered. Careful planning is needed when allocating sidewalk space as loading zones, implementing fees, and other parking restrictions. Investment costs to update parking regulations are low and implementation times are short. The construction of new truck parking sites, or the increase of existing areas for this purpose, may require higher capital investments.

Application in Other Jurisdictions

- *Orlando (Florida)* – Freight permits are only granted to businesses with loading and unloading requirements in downtown. The vehicles used must have a gross vehicle weight of 5,000 lbs or a vehicle width exceeding 80 inches.
- *Salt Lake City (Utah)* –Freight zone areas are posted throughout the city and cargo zone licenses are issued by the government for vehicles that require conveyance or loading/unloading. Parking is restricted to half hour.
- *City of Victoria (British Columbia*) – Starting January 1, 2020, the City introduced another Commercial Loading Permit Program. The City uses 20-minute meters to regulate business loading and unloading areas that are accessible for vehicles with a length of six meters or longer.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☐	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Holguín-Veras, J., (2015, pp. 37-42).
- Allen, J., (2007).
  -

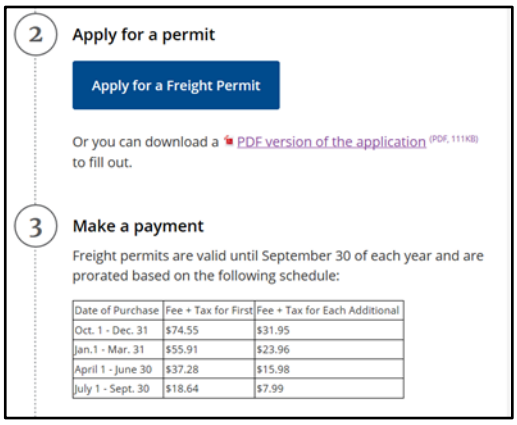
Advantages

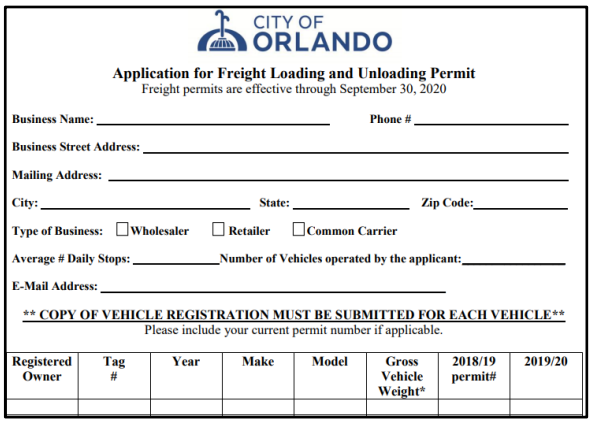
Advantages	Public Agency	Public	Trucking Industry
Reduced congestion		x	x
Enhanced safety	x	x	x
Reduce miles traveled			x
Reduce traffic/parking violations		x	x
Improved mobility		x	
Improved operational efficiency	x	x	x
Environmental sustainability		x	

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
May require retrofitting existing developments	x		
May result in lack of curbside space		x	
Requires public and private-sector acceptance			x
May not be feasible at specific locations			x

Images





Note: Orlando, Florida requires an online application to order or renew a Loading and Unloading Permit for specific areas of the city.

Taken From:
https://www.orlando.gov/Parking-Transportation/Parking/Freight-Loading-and-Unloading-Permit

2. Install Delivery Systems Suitable for Bicycles & Pedestrians

Overview

Freight trucks often have difficulty operating on urban roads due to insufficient curb space to unload goods. Cargo bicycles, human powered or electric, are classified as two or three-wheeled vehicles designed for cargo transportation. These vehicles can provide a smaller and more flexible means of completing deliveries in the first or last mile of the supply chain (e.g. delivery of mail, courier delivery, package delivery, home delivery, etc.).

Non-motorized delivery systems, like bicycles, pose a lower risk to pedestrians and cyclists in comparison to delivery trucks or vans. They travel at a lower speed, generate minimal emissions, and produce less noise.

Application in Other Jurisdictions

- *Frankfurt (Germany) and Utrecht (Netherlands)* – These cities announced their goal of becoming climate-neutral by 2030 and one of the strategies implemented is the 2017 DHL's City Hub pilot. This pilot aimed at making inner-city deliveries from their central hub, City Hub, using electric vehicles like the Cubicycle, DHL's special cargo bicycles. These bicycles carry a container that can weigh upto125 kgs.
- *New York City (USA)* – Prior to the implementation of the cargo tricycles, one of the local bakeries made pickups and deliveries using cargo vans. Recognising the benefits and challenges of using load tricycles and exploring similar routes between the same fixed points, experienced drivers found the most efficient routes to travel from flagship stores to different places under varying traffic conditions through out the day.
- *Paris (France)* –Implementation of this strategy by La Petite Reine (2003) resulted in reduction of 156,248 km of diesel van activity. This helped reduce the use of fossil fuel, and CO2, CO, and NOx emissions (NO, NO_2). The strategy is currently in operation.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☐	☐	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☐	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Key Sources

- NYSERDA. (2014, pp. 24 - 52).
- City of Rotterdam (2019).
- DHL. (2017).
- Holguín-Veras, J., (2015, pp. 104).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduced congestion	x	x	x
Improve environmental sustainability/CO_2 emissions reduction		x	
Reduce traffic/parking violations		x	x
Improved mobility	x	x	
Improved operational efficiency	x	x	x
All weather operations for the freight tricycles operate in all weather conditions except under unless subjected to city warnings or severe snowfall	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Partners are required needed for successful implementation of the initiative	x		x
Requires public and private-sector acceptance	x		x
May not be feasible at specific locations			x

Images



Taken from:
https://www.dpdhl.com/en/media-relations/press-releases/2017/dhl-expands-green-urban-delivery-city-hub-cargo-bicycles.html



Taken from:
https://newsroom.hermesworld.com/international/emission-free-delivery-hermes-commences-tripl-electric-scooter-trials-in-gottingen-85/

3. Urban Consolidation Centres

Overview

Urban Consolidation Centres are strategically located terminals where cargo is consolidated and redistributed as per delivery destinations. The objective is to bring individual shipments or partial loads to the same area to reduce congestion (empty road trucks), reduce CO_2 emissions and improve intramodal conflicts in urban areas. However, close coordination between stakeholders is necessary to avoid inconvenience and confusion when initiating the UCC.

For these centres to succeed they must benefit the receiving party, cannot lead to higher costs in the supply chain and provide a strong revenue model for logistics service providers with continuity in local and national policies governing logistics.

Application in Other Jurisdictions

- *Hammarby, Stockholm (Sweden)* – An Urban Consolidation Centre was included in a construction project of 8,000 apartments. The objective was to control the distribution of goods to prevent congestion by large number of delivery vehicles. The measure was satisfactory and there was a reduction in noise, emissions and vehicle traffic in the area.
- *Yokohama (Japan)* – Due to the strong concentration of traffic on Motomachi Street, lacking sufficient parking areas for cargo trucks with high noise and emission pollution, a study was carried out to improve goods movement in the area. A clean urban goods transportation pilot was launched with the support of several entrepreneurial traders in the area. They built an urban consolidation centre that helped meet the initial objective of a making the area safe and clean, free of emissions and noise.
- *Bristol (United Kingdom)* – After the implementation of the Urban Consolidation Centre, it is estimated that trucks trips for participating goods receivers decreased by 77%, equivalent to 5,374 trips and 106,566 km by truck. This corresponds to significant emission and traffic reductions (CO_2 and NOx (NO, NO_2)).

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☐	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☐	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Holguín-Veras, J., (2015, pp. 81 - 86).
- Allen, J., (2007, pp. 59 - 65).
- S. Rhodes, S., (2012, pp. 83 - 86)
- SUGAR. (2011, pp. 182 - 186, 228 - 231).
- Taniguchi, E., (2012, pp. 103, 106)

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce congestion		x	x
Reduce vehicle-miles traveled			x
Improve environmental sustainability	x	x	x
Reduce curbside occupation time		x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Difficult to enforce			x
Requires high capital investments	x		x
Design or adequacy of the urban consolidation centre	x		x
May face opposition from unions and suppliers		x	x
May require public subsidies			x
May increase operational costs	x		x

Images



Taken from:
https://civitas.eu/sites/default/files/stockholm_experiences_of_ucc.pdf



Taken from:
https://maximumload.wordpress.com/

4. Vehicle Parking Reservation Systems

Overview

The Vehicle Parking Reservation System is an initiative that allows drivers to program or book a parking space online or via phone near the loading/unloading location. The investment is associated with intelligent transport systems (ITS) and constant monitoring of loading/unloading queues through tracking cameras. The measure provides a safer environment for both drivers and pedestrians by eliminating street parking from cargo vehicles during loading/unloading operations.

Application in Other Jurisdictions

- *Toyota City (Japan)* – Truck drivers would originally park in places near the loading or unloading point, leading to mobility and safety issues for pedestrian. Once the reservation system was in place, drivers could book a parking site online or via telephone, and when arriving at the destination have the security of having a free parking space designated for them. This reduced the parking of vehicles in restricted locations and improved safety for pedestrians.
- *Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Ohio, and Wisconsin (USA)* – In these states, the government-supported Truck Parking Information Management System (TPIMS) provides drivers, owners and administrators with up-to-date, real-time information on the availability of parking space across the country's different roads. This provides peace of mind and safety for drivers who need to rest properly after a long day of work.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Holguín-Veras, J., (2015, pp. 38 - 44).
- Taniguchi, E., (2012, pp. 76, 117)
  -

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduces congestion		x	x
Improves environmental sustainability		x	
Reduces vehicle-miles traveled			x
Enhances safety		x	

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Requires enforcement	x		x
Requires private-sector acceptance	x		
May require additional parking space due to high demand	x		x

Images



Taken from: https://www.mobility.siemens.com/global/en/portfolio/road/parking-solutions/truck-parking.html



Taken from: https://trucksparkhere.com/

5. Timesharing of Parking Spaces

Overview

Successful implementation of timeshare of parking spaces requires proper coordination of on-street parking with the schedule of pickups and deliveries of conveyors, load generators and receivers. It requires load/unload timing to be optimized since unregulated street parking results in limited parking availability, improper use of spaces and increased congestion due to double parking. Demand for parking in neighborhoods increases as population and land-use develops. Hence, it is important that the neighborhoods actively monitor parking spaces as they are a scarce asset.

Application in Other Jurisdictions

- *Sendai (Japan)* – The city identified street parking as a major problem, with studies reporting approximately 40% of parked vehicles as cargo trucks. They implemented a pilot program to verify the dimensions of the trucks allowed to load or unload in the previously identified areas as per the regulations and then regulated loading and unloading times at these locations between the carrier and the cargo owner. The program was successful due to the cooperation of all stakeholders involved.
- *Bilbao (Spain)* – Delivery space booking is a proven solution for medium-sized cities that have problems with delivery locations due to the high influx of vehicles. These systems can identify vehicles that make use of the charging/unloading bays without prior coordination and send a message to the appropriate authority for enforcement. Lack of load/unload bays and congestion is the main issue leading to the acquisition of a delivery space reservation system. An initial investment was made for the development of the Delivery Space Reserve System in Bilbao that now ensures better management of loading/unloading bays across the city.
- *Sydney (Australia)* – Grain Corp implemented a vehicle loading reseed system which is done through an internet platform, thereby avoiding unnecessary congestion, and waiting time for carriers.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Holguín-Veras, J., (2015, pp. 39, 46, 84, 90).
- Taniguchi, E., (2012, pp. 80, 129).
- Torrentellé (LEITAT), (2012, pp. 152).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Increase efficiency		x	x
Reduce congestion		x	x
Improve parking availability		x	x
Reduce vehicle-miles traveled			x
Improve environmental sustainability	x	x	x
Improve route optimization due to less km driven and less fuel consumption		x	x

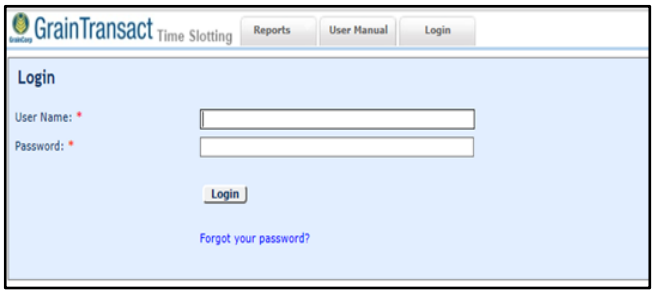
Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Some carriers may not have training for the use of the tool which may lead to some inconvenience.			x
Requires high/moderate coordination among multiple stakeholders/jurisdictions	x	x	x
Requires high/moderate capital investments	x		x

Images



Taken from:
https://vancouver.ca/streets-transportation/reserve-metered-spaces.aspx



Taken from:
https://timeslotting.graincorp.com.au/timeslotting/login.aspx
http://www.graincorp.com.au/grains/truck-booking

6. Urban Freight Integration with Protected Bicycle Lanes

Overview

Urban freight integration with protected bicycle Lanes is a system of protecting bicycle lanes from loading/unloading areas with a physical or spatial buffer along different truck routes with the aim of improving safety and predictability for cyclists, pedestrians, and cargo trucks.

Application in Other Jurisdictions

- *Chicago, Illinois (USA)* – The city installed a larger network of a protected bicycle paths. Compared to unprotected bicycle lanes, that only use paint marks as visual cues, protected bicycle lanes reduce the possibility of truck-to-cyclist traffic accidents by designating space for all road users to reduces speeds, avoid bicycle accidents, and increase predictability.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☐	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Key Sources

- US Department of Transportation: Federal Highway Administration, (2017).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce congestion		x	x
Improve parking availability		x	x
Reducing the accident rate of cyclists		x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Delay in implementation time (training to all stakeholders)	x	x	x
Changes in the signalization of the roads	x		

Images



Taken From:
https://ops.fhwa.dot.gov/publications/fhwahop16080/index.htm

7. Weight Limits

Overview

Weight limits are implemented to protect road infrastructure and sensitive environments from physical damage when they are not originally designed for heavy vehicle usage. Restrictions are specifically targeted at VHGs, due to their larger size and/or weight.

Authorities typically set weight limits and dimensions for trucks at the state level. Local authorities may impose additional limits, usually on individual routes, or seasonal restrictions to protect critical infrastructure.

Application in Other Jurisdictions

- *Ljubljana (Slovenia)* – The city implemented measures to ensure loading/unloading times do not interfere with the movement of tourists and shoppers in the area. Therefore, vehicles weighing more than 7.5 tons cannot be present in the area during specific hours i.e. 06:30 to 09:00 hours and 14:00 to 17:00 hours. Implementation of the measure has retained tourists and increased accessibility to local attraction in the historic part of the city.
- *Seattle, (USA)* – Due to congestions at the city center, the heavy-duty trucks are restricted on certain streets during times specified by the city. These streets require trucks to get a permit if they want to operate Monday to Friday between 09:00 and 15:00 hours. They do not require permission from 19:00 to 06:00 hours.
- *Prague (Czech Republic)* – Cargo vehicles travelling to the city center are restricted to a maximum of 3.5 tons and 6 tons on the periphery streets. Vehicles above this weight limit can only enter the city if they have a permit granted by the governing authority.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☐	☐	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Key Sources

- Seattle Department of Transportation. (2016, pp. 24 - 25).
- S. Rhodes, S., (2012, pp. 82)
- European Commission. (2013)
- MDS Transmodal Limited (2014, pp. 58).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Improve preservation of road infrastructure	x	x	
Reduce emissions generated by heavy-duty vehicles		x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Increase operating cost			x
Increase in lower capacity vehicles (deliveries) in areas with restrictions	x	x	x

Images



Taken from: https://urbanaccessregulations.eu/countries-mainmenu-147/ireland/dublin-ar



- **Taken from:** https://www.reliance-foundry.com/blog/removable-bollard-benefits

8. Time Windows for Access to Urban Areas

Overview

Time window schedules place access restrictions in select urban areas to limit cargo vehicles to enter and/or load during specific times of the day. Access is controlled and enforced by physical barriers and/or license plate recognition cameras.

Application in Other Jurisdictions

- *Bristol (United Kingdom)* – At the Broadmead Mall, loading times for cargo vehicles are restricted between 05:00 to 08:00 hours and 18:00 to 20:00 hours, which has been well received by buyers and recipients of merchandise.
- *Ferrara (Italy)* – Cargo vehicles have a specific timeframe to enter the city centre, between 06:00 and 11:00 hours and 15:30 and 17:30 hours, but low-emission vehicles can enter the city throughout the working day.
- *La Rochelle (France)* – Cargo vehicles can only access the city centre between 06:00 to 07:30 hours, with an exemption for vehicles operating to and from the city's Urban Consolidation Center.
- *New York (USA)* – The city created delivery windows on truck routes, with a secured curb space. This results in a reduction of double parking that leads to congestion - which is an effective solution for all road users.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☐	☐	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Key Sources

- MDS Transmodal Limited (2014, pp. 56).
- Holguín-Veras, J., (2015, pp. 68).
- New York City Department of Transportation, (2015, pp. 12).
- Taniguchi, E., (2012, pp. 121, 122).
- European Commission. (2013)

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce traffic congestion		x	
Improve air quality		x	
Improve parking conditions on congested urban streets	x	x	
Improve noise mitigation		x	
Improve road safety		x	x

Disadvantages

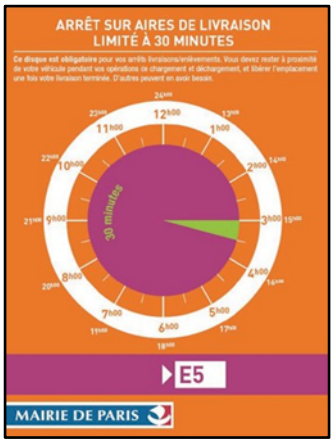
Disadvantage	Public Agency	Public	Trucking Industry
Increase distribution costs		x	x
Poor utilization of vehicles			x
Requires high coordination among jurisdictions	x		
Increase operational costs			x
Increase vehicle-miles travelled		x	x

Images



Note: Urban redevelopment for new delivery spaces

Taken from: http://www.sugarlogistics.eu/pliki/handbook.pdf



Note: The sign of starting time of delivery

Taken from: https://www.piarc.org/en/order-library/17001-en-Public%20sector%20governance%20over%20urban%20freight%20transport

9. Low Emission Zones

Overview

Low Emission Zones (LEZs) are characterized by limiting vehicle access to certain areas of the city that do not meet minimum environmental requirements, known as Euro III or higher in some countries. Using vehicles that meet these requirements reduces emissions of fine particulate matter, nitrogen dioxide and ozone. In these areas, heavy vehicles are limited, and this encourages carriers to modernize their fleet of vehicles with more environmentally friendly alternatives.

Application in Other Jurisdictions

- *Stockholm (Sweden)* – With the implementation of LEZs, vehicle emissions in the city centre reduced by 10% - 15%, concentration of air pollutants reduced by 10% - 14%, and traffic volumes reduced by 21%. Four years after the introduction if LEZs, Particulate Matter (PM) emissions from heavy vehicles across the city decreased by 40%.
- *Rotterdam (Netherlands)* – The municipality set goals to achieve a clean (emission free) city by 2025. However, it has been a slow process due to the high investment costs of converting diesel vehicles to electric vehicles.
- *London (United Kingdom)* – LEZ was implemented to limit the entry of high polluting heavy vehicles, promote the improvement of existing vehicles (especially diesel vehicles) and incentivize switching to cleaner vehicle alternatives. The outcome of the implementation is to improve air quality in the city and reduce the detrimental impacts of vehicular emissions on public health. There was a 2.5 to 3.1% decrease in emissions within the zone, and 1% outside the area.

Additional Information

Type of Application

☑ Planning	☐ Design	☑ Operations	☐ Maintenance
☐ Data-related	☐ Land Use	☑ Policy or Regulation	☐ Other

Approximate Cost

☐ Low	☐ Med	☐ High	☑ Unable to Assess

Level of Success in Other Places

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Effort for Implementation

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Key Sources

- European Commission. (2013)
- City of Rotterdam. (2019).
- Ying Wang. (2016)
- Giuliano, G., (2013).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce emissions		x	
Traffic reduction		x	
Reductions in trips			x
Improve quality of life in city centres		x	
Promote efficient multi-modal mobility solutions	x	x	x
Decrease parking pressure	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
High investment cost to improve cargo vehicles so they produce less emissions.			x
Investment in time and resources to train people in the face of these new changes	x	x	x
Citizens' complaints about non-acceptance to change	x	x	

Images



Taken From: https://www.rotterdam.nl/wonen-leven/stappenplan-zero-emissie/Roadmap-ZECL.pdf



Taken From: https://www.theaa.com/driving-advice/fuels-environment/london-low-emission-zone

10. Congestion Charges

Overview

Congestion charges is a measure where road users are charged a fee to access a defined urban area to discourage unscheduled or unnecessary travel, thereby, reducing road congestion. Applying these kinds of measures provides additional benefits of improved air quality and reduced emissions.

Application in Other Jurisdictions

- *Stockholm (Sweden)* – Vehicle emissions in the city centre decreased by 10 to 15% after the implementation of the congestion tax, and air pollutants have decreased by 10 to 14% due to reduced traffic volumes and shorter travel distances. Although the congestion charging policy has had complications and caused inconveniences, implementation has been effective in alleviating congestion. Also, it created revenue which is an important source of capital funding for improving road infrastructure.
- *Oslo (Norway)* – The city has implemented a congestion charge within designated low emission zones. The cost depends on the Euro standard, type of fuel, time, and distance, with set schedules for the application of the collection.
- *Singapore* – The country has installed an electronic charging gantry at entrances to designated areas, and each vehicle has a transmitting unit. When the vehicle passes through the gantry, the system automatically deducts the appropriate charge from the smart cash card. The Electronic Road Pricing (ERP) system can encourage drivers to choose one road in preference to another, and achieve the redistribution of traffic flow, helping for the good road use.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- MDS Transmodal Limited (2014, pp. 65 - 67).
- Ying Wang. (2016)
- Transport for London & Mayor of London. (2017).
- Transport for London & Mayor of London. (2018).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce congestion	x	x	x
Reduce traffic emissions	x	x	x
Improve quality of life in city centres		x	
Promote efficient multi-modal mobility solutions	x	x	x
Decrease parking pressure	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Non-conformity in retailers within the cargo area	x	x	
Congestion charging schemes are complex and expensive to implement for city authorities	x		
Business relocation from downtown area, causing recession within the zone	x	x	

Images



Taken From: https://www.wri.org/publication/study-international-practices-low-emission-zone-and-congestion-charging



Taken From: https://www.independent.co.uk/news/uk/home-news/us-diplomats-london-congestion-charge-penalties-american-embassy-year-tfl-transport-for-london-a8118821.html

11. Nighttime Delivery Regulations (Off-Hours Delivery)

Overview

Facilitating the development of nighttime deliveries alleviates daytime congestion and introduces a more efficient use of road infrastructure. Cost-benefit analyses should be performed for the inclusion of low noise equipment so that residents in the area are not affected by the noise generated at night.

Application in Other Jurisdictions

- *Rotterdam (Netherlands)* – The municipality introduced evening delivery windows for emission-free goods transport. This waiver can be requested for emission-free lorries and vans.
- *New York (USA*) – After the implementation of nighttime deliveries there was an improvement in employee productivity due to shorter wait times to load/unload. Delivery trucks can be more efficient as their wait time for receiver availability was significantly reduced. Parking locations were more readily available during these hours, with drivers reported feeling safer and less stressed - which shortened the supply chain for carriers, improved the ease of conducting business for drivers and reduced the risks for road accident.
- *Barcelona (Spain) & Dublin (Ireland)* – Typical loading/unloading times are from 22:00 to 06:00 hours and this initiative has been successful in alleviating congestion in the city during the day.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- City of Rotterdam. (2019).
- S. Rhodes, S., (2012, pp. 82 - 88)
- Torrentellé (LEITAT), (2012).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce congestion	x	x	
Promote efficient multi-modal mobility solutions			x
Enhance road safety	x	x	x
Decrease parking pressure	x	x	x
Fewer deliveries during normal business hours allows stores and restaurants to focus more on their customers.		x	

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Poor utilisation of vehicles		x	x
Existing laws and regulations are often major hurdles to widespread adoption	x		
Noise generated by loading and unloading operations		x	
Lack of staff to receive deliveries during out-of-hours period			x
Increase the costs of distribution		x	x

Images



Taken from: https://civitas.eu/sites/default/files/sto_7.4_night-time_deliveries_using_clean_and_silent_vehicles.pdf

12. Tradeable Permits and Mobility Credits

Overview

The proposed measure was based on the concept of "mobility credits". Each trip to the defined area would cost a certain number of "credits" (virtual currency), which is a direct charge to the user or the company operating the road cargo vehicle. All vehicle operators are entitled to a certain number of free credits for a defined period. If the initially allocated credits are depleted and more travel to defined areas are required, additional credits would have to be paid for to the city. If companies or carriers require entry to the area and have a more environmentally friendly distribution systems, they would have the benefit paying a lower cost per credit.

Application in Other Jurisdictions

- *Krakow (Poland)* – This measure was implemented to control access to the city center –area with the largest congestion. Traffic in the area was reduced and the measure was well received by citizens and carriers. However, implementation was expensive due to the necessary technological infrastructure upgrades required for this system.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Villani, D. (2010).
- MDS Transmodal Limited (2014, pp. 68 - 72).

Advantages

Advantages	Public Agency	Public	Trucking Industry
More sustainable urban distribution	x	x	x
Reduce congestion	x	x	x
Reduce emissions	x	x	x
Improve quality of life in city centres		x	
Promote efficient multi-modal mobility solutions	x		x
Decrease parking pressure		x	x
Better operational planning of loading/unloading companies			x

Disadvantages

Disadvantage	Public Agency	Public	Trucking Industry
Expensive to implement	x		
Complex to design	x		
Investment in training on the new measure	x	x	x
Complaints in the credit implementation process by company or person	x	x	

Images





Taken From: https://civitas.eu/sites/default/files/703.pdf

13. Urban Tolls

Overview

An urban toll is where the entrance to an area is subject to payment. The implementation of this measure has additional benefits, such as a significant improvement in air quality and noise reduction. The fees collected can be used to improve road infrastructure and the transport system.

Application in Other Jurisdictions

- *Trondheim (Norway)* – The city introduced the Toll System for times with the highest congestion in 2009 (reduced car trips from 58 % to 52,9 %). Since 2017, the results have been very positive, with a decrease in traffic at the city's toll stations since its implementation. In addition to reducing congestion, air quality has also improved during this time. Revenues are earmarked for improving the road network and for developing environmentally responsible transport solutions.
- *Oslo (Norway)* – The city seeks to reduce atmospheric emissions generated by vehicle congestion as well as noise levels in some areas of the city. The toll stations have been implemented since 1990 and has been steadily improved over the years.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Holguín-Veras, J., (2015, pp. 73 - 76).
- Ricci, A., (2017).
- Polis, I. (2019).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce road congestion within the urban area		x	
Improve the quality of public transport	x	x	
Introduce technical innovation	x	x	x
Improve the quality of the environment	x	x	x
Improve road freight distribution		x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
High costs of technological implementation	x		
Increase the costs of distribution		x	x

Images



Taken From: https://www.eltis.org/discover/news/smarter-congestion-charging-gothenburg-sweden-0



Taken From: https://www.visitoslo.com/en/transport/by-car/toll-ring

14. Route Optimization

Overview

Route optimization is the process of determining the most efficient form of freight transport. With this measure, trucks only use routes designated for them by the local government. It is important that urban authorities enforce this to prevent drivers from using wrong routes. Delivering maps to freight-generating companies and others in the transport chain is an effective tool to disclose the information so that companies are informed, and the measure implemented yields the shortest travel time with the least amount of pollution.

Application in Other Jurisdictions

- *Tallinn (Estonia)* – Optimal routes for cargo vehicles were developed, signalization was improved, and route download codes were generated in the GPS systems that were made available to the transporters.
- *Seattle (USA)* – In October 2015, the City of Seattle passed legislation to establish a network of streets for heavier cargo containers to be transported between the Port of Seattle, industrial enterprises and rail yards with appropriate permits.
- *New York (USA)* – The city has two different types of roads - local truck routes and truck routes. Both types are duly signaled in the city with maps available on the network for carriers. This is to benefit drivers and help them locate specific streets and intersections. The map also contains useful information on truck road signage, weight limits and dimensions, overweight/oversized permits, truck-related violations, as well as resources related to city, regional and state trucks.
- *Vancouver (Canada)* – The city's 2017 regional goods movement strategy proposes that the Regional Truck Route Network (RTRN) must be efficiently managed.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Key Sources

- S. Rhodes, (2012, pp. 66).
- Rannala, M., (2013)
- Seattle Department of Transportation. (2016).
- METRO VANCOUVER. (2017).
- Department of Transportation New York City. (2020)

Advantages

Advantages	Public Agency	Public	Trucking Industry
Less investment needs	x	x	x
Improve route decisions			x
Reduce congestion	x	x	x
Quick strategies	x		x
Noise reduction		x	
Reduction of transport related pollution	x	x	x
Reduce freight traffic in the city centre		x	

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Training is required for hauliers in road corridors	x		x
Requires high coordination among jurisdictions	x		
Increase vehicle-miles-traveled			x

Images





Taken from: https://civitas.eu/sites/default/files/mimosa_final_evaluation_report_part_tal7_1.pdf

15. Electrification of Road Freight Transport

Overview

The eHighway system consists of an infrastructure that provides a continuous supply of energy to heavy-duty vehicles, with substations along the eHighway, that halves the energy consumption while maintaining total mobility. By using this technology for even 30% of the fleet, electronic roads can save millions of tons of CO_2 each year and reduce energy consumption compared to traditional roads.

Application in Other Jurisdictions

- *Sweden* – The world's first electric road opened in June 2016. Electric roads can complement a future fossil-free transport system. The Swedish Transport Administration demonstrated this with various technical solutions for electric roads with heavy traffic.
- *Carson, California (USA)* – The city of Carson continues to test this technology, as further development can lead to the deployment of electronic transportation systems that will reduce emissions and benefit public health.
- *Germany* – Vehicles with alternative transmissions and fuels are increasingly widespread in the road transportation sector. Hybrid models in combination with an air contact line have been operating on German roads for some time now by operating transportation services on pre-defined routes. With these configurations, it is easy to comply with the access restrictions and limit emission values that apply in some regions and cities in Europe.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Siemens AG. (2017).
- Federal Ministry of Transport and Digital Infrastructure Germany. (2019).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduction of CO2 emissions	x	x	x
Cost savings for freight carriers		x	x
Noise reduction		x	

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
High cost of implementation (Infrastructure)	x		
Investment in investigation and development	x		x
High investment in fleet renewal			x

Images





Taken From: https://www.mobility.siemens.com/global/en/portfolio/road/ehighway.html

16. Underground Urban Loading

Overview

Underground urban loading systems are networks of cargo pipes that are newly built or integrated into modified and existing pipes. Cargo capsules can be loaded with pallets and can operate autonomously on dedicated tracks.

Application in Other Jurisdictions

- *Germany* – In the Logistics Innovation Program 2030, the Federal Ministry of Transport and Digital Infrastructure manages resources to ensure that local authorities implement innovative pilot schemes, such as the introduction of underground pipelines for the movement of goods. This program is further motivated by the goal to reduce CO_2 emissions by 2025 and have zero emissions by 2030.
- *Perugia, Italy* – The city supports the development of innovative solutions, one of which is the testing an underground urban cargo system (Pipenet) that allows cargo packages to be efficiently transported through a network of pipes.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Federal Ministry of Transport and Digital Infrastructure Germany. (2019).
- Cockram, G., (2010).

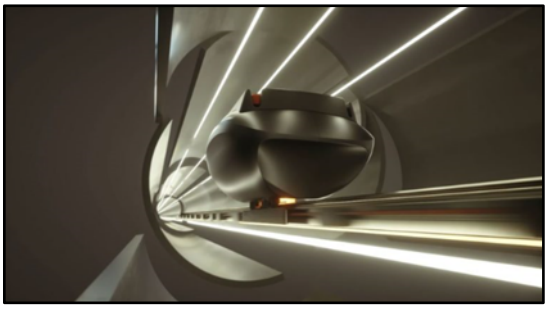
Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce environmental impact	x	x	
Low energy consumption	x	x	
Higher freight capacity	x	x	
Reductions in noise			
Minimal to no impact on climate	x	x	
Reduced traffic accidents, injuries, and fatalities.	x	x	
Reduced petroleum fuel consumption.	x		
Less impact on road infrastructure	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Economic losses for transport companies			x
Investment in investigation and development	x		
Increase in driver unemployment rate	x		x
High cost of implementation	x		

Images



Taken From: https://www.magway.com/



Taken From: https://www.cnbc.com/2019/11/14/underground-tunnels-could-deliver-more-than-600-million-parcels-a-year.html

17. Wayfinding for Truck

Overview

Wayfinding consists of informative signals that guide people through a physical environment while improve their understanding and experience of space. People need visual cues such as maps, directions, and symbols to guide them to their destinations through effective signs and signals that contribute to a sense of peace of mind, and security.

Application in Other Jurisdictions

• *Seattle (USA)* – Implementation began in 2017 with the goal of improving safety for the movement of cargo trucks, (maps, signs on city streets). It was then expanded to intermodal facilities and on state roads to improve route decisions and reduce illegal movements. It is a fast, low-cost strategy to help truck drivers identify authorized routes and avoid routes with height and weight restrictions.

• *Ontario (Canada)* – The province uses this measure as clear, easily identifiable, consistent, and specific signals help create efficient and safe routing, regardless of the complexity, density, and volumes of traffic on the road network. Guidance is very important for the movements of specialized trucks (dangerous and large goods) and this measure provides an overall safety benefit when directing trucks to low-risk roads.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☐	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Key Sources

- Seattle Department of Transportation. (2016, pp. 78).
- Ministry of Transportation Ontario. (2016).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Improve route decisions	x		x
Reduce illegal movements	x	x	x
Low cost of implementation	x		
Prevents traffic accidents	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Delays in budget approval for implementation	x		
Training is required for haulers in road corridors	x		x

Images



Taken from: https://frazierassociates.com/portfolio-item/virginia-museum-of-the-civil-war-vmi/



Taken from: http://www.seattle.gov/Documents/Departments/SDOT/FreightProgram/Proposed_HHC_

18. Local Logistics Space (ELP)

Overview

ELPs consists of a small structure available in the city center where goods are stored and delivered. At this point the inverse logistics of the returned goods is managed and provides the option of home delivery through environmentally friendly means in some cities. It is the best solution for central areas where trucks have limited accessibility.

Application in Other Jurisdictions

- *Bordeaux (France)* – The ELP is a small structure located near the historic center and offers a range of delivery and goods collection services to companies in the area affected by the construction of one of the tram lines. This initiative was maintained even after the completion of construction of the tram line due to the positive results it generated in the city.
- *Grenoble (France)* – The city seeks a more efficient logistics transport system while improving air quality. It has a comprehensive plan to transport low-traffic goods and has announced the end of diesel by 2025. This project was named Urby and is in Fontaine, 4 km from the city centre. It is a new grouping centre where goods are gathered and delivered to companies and merchants while managing return processes to the cargo sender when necessary.
- *London (England)* – The centre, located in a designated area of the city is used as a transhipment service for the transfer of packages from suburban depot to electric vans and tricycles for final delivery.

Additional Information

Type of Application

☑ Planning	☑ Design	☑ Operations	☐ Maintenance
☐ Data-related	☐ Land Use	☐ Policy or Regulation	☐ Other

Approximate Cost

☐ Low	☑ Med	☐ High	☐ Unable to Assess

Level of Success in Other Places

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Effort for Implementation

☐ Low	☑ Med	☐ High	☐ Unable to Assess

Key Sources

- SUGAR. (2011).
- LE GROUPE LA POSTE. (2019).
- Browne, M., (2011).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Low cost operation in terms of infrastructure	x		x
Can be moved from one site to another one	x	x	x
Adaptable to different city sizes	x	x	x
Reduced environmental impact	x	x	x
Reductions in noise	x	x	
Reduce congestion	x	x	x
Improve quality of life in city centres		x	
Improve freight delivery facilitation		x	

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Delays in the implementation process	x		x
Investment in training on the new measure	x		x

Images





Taken From: https://le-groupe-laposte.cdn.prismic.io/le-groupe-laposte%2Fecf8f777-3d9d-4ffc-bdd6-28c04297c25b_groupe-la-poste-white-paper-urban-logistics-2019august27-ok.pdf

19. Mobile Depot / Micro-Consolidation Centre

Overview

Mobile depot is a subset of vehicles that are used as distribution centres. They are located at strategic points to deliver goods by environmentally friendly means of transport (last mile). Human-powered or electric cargo vehicles are used to make the final delivery to the customers.

Application in Other Jurisdictions

- *Manhattan, New York (USA)* – currently has 22 curbside "depot" locations served by 80 - 100 non-depot Fresh Direct trucks. Each truck remains in place for shifts of 4 - 8 hours (it is used only for food delivery). Non-depot Fresh Direct trucks do not consume large amounts of diesel fuel for refrigeration and help with air quality.
- *Brussels (Belgium)* – The city utilizes a mobile trailer warehouse equipped with a loading dock, a small storage area, and an office. The trailer is loaded with all deliveries in the city centre for the day, towed to a central location in the city. Delivery personnel use electrically assisted or person-propelled vehicles to complete deliveries, then returned to the trailer to reload. They did not continue to use this model due to high logistical deployment and maintenance costs.
- *London (England)* – A test was conducted with cooperation and partnership with clients such as DX, TNT, and Hermes. This was the basis of Gnewt Cargo's delivery business in the city centre, and cooperation with the Crown Estate allowed development of new micro consolidation centres. The project was implemented between 2017 and 2018, which identified improvements in traffic reduction and emissions, the results were satisfactory, but this measure has not yet been officially implemented.

Additional Information

Type of Application

☑ Planning	☐ Design	☑ Operations	☐ Maintenance
☐ Data-related	☐ Land Use	☐ Policy or Regulation	☐ Other

Approximate Cost

☐ Low	☑ Med	☐ High	☐ Unable to Assess

Level of Success in Other Places

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Effort for Implementation

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Key Sources

- Salama, P., (2014).
- Verlinde, S., (2014).
- Clarke, S., (2017, pp. 49).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduction of greenhouse gasses	x	x	x
Reduction of kilometers travelled		x	x
Decrease in traffic congestion	x	x	x
Reduction of noise		x	
Reduce freight vehicles traveling into urban centres with partial loads.		x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Increase in operating costs		x	x
Impacts of fleet and technology changes			x

Images



Taken From: http://www.transportengineer.org.uk/article-images/57017/TNT-city-centre-mobile-sorting-concept-trailer-BIG.jpg?width=300&height=200&scale=canvas



Taken From: https://www.dhl.com/us-en/home/press/press-archive/2020/dhl-opens-first-of-its-kind-mobile-pop-up-store.html

20. Urban Air Mobility

Overview

Urban air mobility is an automated and on-demand air freight transport service, flown without a pilot. Companies are looking for new ways to make contactless deliveries to protect the health of customers and employees without affecting their performance. However, these new technologies are costly and vulnerable to damage.

Drones have been used in some countries for testing with companies such as Matternet, Amazon, DDC and UPS.

Application in Other Jurisdictions

- *France* – La Poste began testing drone delivery systems in December 2014.
- *Switzerland* – Since March 2017, Matternet is working with the government mail system and Swiss Post, to deliver emergency medical supplies.
- *Canada* – The country has remote communities that have difficulty obtaining supplies. Drone Delivery Canada conducted tests in September 2018 as part of the successful BVLOS Pilot Project, delivering general medical supplies and packages for DDC customers who were part of the project.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☐	☐	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☐	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Matternet. (2020).
- Euromonitor International Ltd. (2018).
- The Current State of Drone Delivery Worldwide. (2019)
- French Post Uses Drones to Deliver Mail to Hard-to-Access Alpine Village. (2019)

Advantages

Advantages	Public Agency	Public	Trucking Industry
Lower transportation cost		x	
Facilitate freight delivery		x	
Improve road safety		x	
Reduction of kilometers travelled			x
Decrease in traffic congestion		x	x
Reduction of noise		x	
Reduced environmental impact	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Increase in operating costs		x	x
Impacts of fleet and technology changes			x
It is necessary to work on security issues to avoid theft or damage of the new equipment to be used.	x		
Increased unemployment rate for drivers and couriers	x		x
High weather dependency (Drones).		x	x

Images



Taken From: https://www.smartcitylab.com/blog/mobility/driverless-taxis-for-contactless-deliveries-in-california/



Taken From: https://www.post.ch/en/about-us/innovation/innovations-in-development/drones?shortcut=opp-en-about-us-company-innovation-swiss-post-s-innovations-for-you-drones#impressions

21. Seasonal Logistics

Overview

Seasonal Logistics refers to specific times in a year where the peak consumption is experienced, such as Black Friday, Singles Day in Asia, Christmas, or Cyber Monday. During these times, companies in the logistics sector must deal with additional responsiveness as comprehensive management of the entire supply chain must be resolved in the short term. The key is to have as much information as possible, in fact, knowing the location and real-time status of shipments allows you to identify problems and activate an immediate contingency plan if necessary.

Application in Other Jurisdictions

- *China* – e-commerce continues to build an intelligent logistics network (Cainiao Network Technology) where the most important thing is data. This is to minimize delivery times to customers and make greater profits in different industries.
- *Vietnam* – DHL is working on the implementation of a same day delivery logistic where the customer can follow up on their order and determine the delivery point in real time. This type of development could also be used as crowdsourced delivery.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☐	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☐	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Key Sources

- Euromonitor International Ltd. (2018).
- Hu, M. (2020).

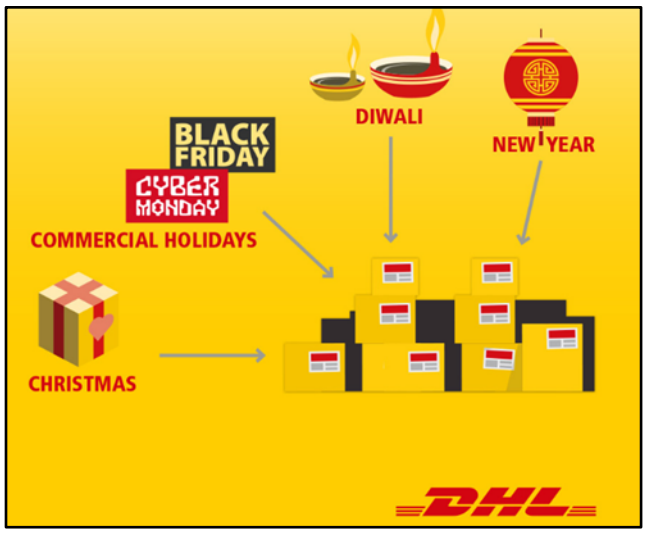
Advantages

Advantages	Public Agency	Public	Trucking Industry
Generate employment on specific days of the season		x	
Increased traffic control in the city	x	x	x
Route optimization		x	x

Disadvantages

Disadvantage	Public Agency	Public	Trucking Industry
More congestion in seasonal days by large number of deliveries.	x	x	
Little acceptance of the unification of information in a single network of logistical information.	x	x	x

Images



Note: Seasonal Logistics refers to specific times where the highest consumption is presented, such as Black Friday, Singles Day in Asia, Christmas, or Cyber Monday.

Taken From: https://www.dpdhl.com/content/dam/dpdhl/en/media-center/media-relations/infographics/2018/infographic-last-mile-logistics-seasonal-logistics.jpg

22. Flexi No-Contact Delivery Solutions (Lockers)

Overview

The lockers are containers that can be used to either receive or send goods; due to the high demand for online sales, demand for package delivery has increased. Lockers provide carriers with an additional method to deliver the goods at previously defined places, such as near households. It has made the lives of the two parties involved in the chain easier due to the decrease of waiting times for receipt availability and increased customer satisfaction. Lockers can be in retail stores and malls as well as in campus and office settings.

Application in Other Jurisdictions

- *Hungary* – customers buy items on the web and request delivery to specific location of their choice, which are called Pick Packs in Hungar. When the item arrives, the customer is notified by email or SMS and can pick it up at any time during opening from 8:00 to 20:00 hours, 7 days a week.
- *California (USA)* – the company Smiota offers the option of Refrigerated or Frozen Locker especially for medical deliveries.
- *Spain* – The city has installed Citibox Smart Mailboxes across neighbourhoods. This is a great service for reverse logistics too - if there are any issues with the goods, they are left again in the locker and the use of the locker is free.
- *Canada, France, Germany, Italy, and Spain* – Amazon lockers are self-service kiosks where customers can pick up their goods.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☐	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Key Sources

- Van Audenhove, (2015).
- California, https://smiota.com/
- Spain, https://citibox.com/en
- https://www.amazon.com/b?node=6442600011

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce re-delivery attempts		x	x
Reduce package theft from the doorstep		x	x
Save Staff Time			x
An alternative drop-off		x	x
Improve Security		x	x
Facilitates reverse logistics		x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Complaints from dissatisfied customers in the change process.		x	x
There are a restrictions size and weight		x	
People should be trained to make use of this technology.	x	x	x

Images



Taken From: https://snailelockers.com/



Taken From: https://citibox.com/blog/10-productos-mas-vendidos-online-espana/

23. Crowdsourced Delivery

Overview

Crowdsourcing is the practice of utilizing the knowledge or tools of a group for a common goal. These systems have created many new last mile delivery solutions, as the popularity of online shopping grows, retailers are pushed to provide cheap and reliable shipments. Instead of building their own logistics networks, they hire independent drivers through apps where customers can select a desired time slot to ensure that they will not miss a delivery while tracking their packages. Couriers use their own means of transportation to deliver, often from a retailer's store. Using crowdsourced companies reduces fleet infrastructure and management costs, or employee benefits while providing customers with fast delivery.

Application in Other Jurisdictions

- *Stockholm (Sweden)* – In 2013, DHL launched the unique *MyWays* platform to facilitate last mile deliveries, the mobile app connects people who order flexible deliveries with those who offer to transport packages along their daily routes for a small fee.
- *DoorDash* – This technology company that connects people with local businesses in cities such as New York, Seattle, Toronto, Miami, Vancouver, Winnipeg among others, facilitate door-to-door delivery of food and household essentials.
- *UberEats* – The service is an option to order food from home and it is possible to rate the food and delivery service after. Shipping can be controlled in real time and the cost of the service depends on the distance and travel time to delivery.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☐	☐	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☐	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Key Sources

- A. Alnaggar, (2019).
- DHL, (2013).
- Joerss, M., Schröder, (2016).
- Shenle, P., (2015).
- https://www.doordash.com/en-US
- https://www.ubereats.com/ca

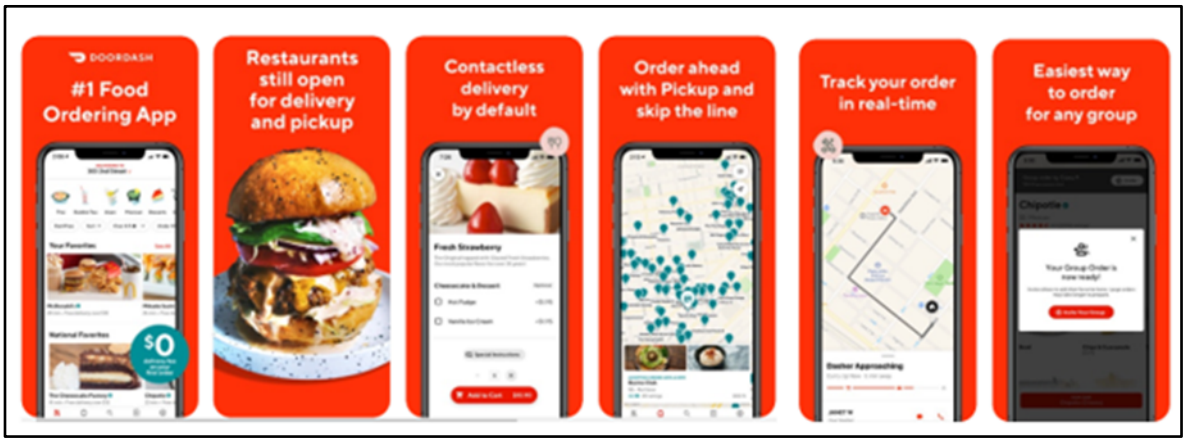
Advantages

Advantages	Public Agency	Public	Trucking Industry
Less operating costs for last-mile transportation for food		x	x
Hiring and managing a fleet of drivers is a tedious process that would no longer be the responsibility of the company that sells the product.		x	x
Employment generation		x	

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Informal employment generation	x		
Regulate the delivery staff recruitment system	x		x
More operating costs for delivery same day		x	x

Images



Take From: https://apps.apple.com/app/id719972451?mt=8

24. Connected and Autonomous Vehicles

Overview

Connected or autonomous vehicles are vehicles capable of transiting the roads without a driver operating any of the control systems. Global market disruptors like pandemics (COVID-19 in 2020) lead to massive, short- and long-term challenges in trying to control the spread of the disease. The best way to minimize risks is by having minimal to zero contact with others in the entire supply chain. For this reason, autonomous vehicles have become an important tool for healthcare personnel for laboratory sample management and transportation for processing. It is also very useful in the food distribution industry.

Application in Other Jurisdictions

- *China* – The Hercules Project, an autonomous logistics vehicle used for the transport of less-contact goods, was crated for the COVID-19 outbreak. The main objective was to make contactless deliveries to prevent the spread of the virus.
- *Florida (USA)* – Four autonomous vehicles began operating to transport COVID-19 tests from a test site to a processing lab (March 30, 2020).
- *California (USA)* – The Nuro company offered its unmanned vehicle to provide contactless deliveries, and are currently used to transport food, water, and other supplies as per need.

Additional Information

Type of Application

☐ Planning	☐ Design	☑ Operations	☐ Maintenance
☐ Data-related	☐ Land Use	☐ Policy or Regulation	☐ Other

Approximate Cost

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Level of Success in Other Places

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Effort for Implementation

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Key Sources

- Tianyu, L., (2020).
- Ford, T. (2020).
- Ferguson, D. (2020).

Advantages

Advantage	Public Agency	Public	Trucking Industry
Support for medical staff		x	
Emergency support		x	
Reduce traffic emissions		x	
Less noise		x	

Disadvantages

Disadvantage	Public Agency	Public	Trucking Industry
Low availability of Autonomous Vehicle	x	x	x
High investment in technology	x		x

Images



Taken From: https://arxiv.org/pdf/2004.07480.pdf



Taken From: https://medium.com/nuro/helping-the-heroes-during-covid-19-49c189f216a2

25. Limited Traffic Zones (LTZs)

Overview

Limited Traffic Zone is an designated area with limited access for certain vehicles, especially trucks, and regulates the use of the street to help solve problems like air pollution, congestion, and noise. They are regulated by government entities.

Europe has successfully implemented this strategy across the continent, helping residents and travelers. A website provides all the information related to the Urban Access Regulations throughout the territory.

Application in Other Jurisdictions

- *Funchal (Portugal)* – In 2012, Funchal automated this strategy, which seeks to protect and improve historical heritage and urban image. It also maintains the reduction of traffic and improves the quality of life of residents. They installed retractable bollards and license recognition systems for better control.
- *Siena (Italy)* – Has the oldest limited traffic area in Italy, and one of the first LTZs in Europe. The LTZ of its historic center is equipped with special electronic doors that seamlessly coordinates with the tele pass system and are equipped with cameras that operate 24/7 to aid enforcement.
    - *NOTE:* In most Italian cities the city centers are designated as LTZs. The hotel sector, located at the city centre, is responsible for managing permits in their respective LTZ to give access to tourists travelling with their vehicles. They must provide the police the vehicle data to avoid visitors being fined. Despite the complexity of the regulations, the rules are very clear and for the benefit all the stakeholders.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- CIVITAS, (2013).
- Polis, I. (2019).
- Bauleo, L., (2019).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Noise mitigation	x	x	x
Urban landscape preservation	x	x	x
Reduce traffic emissions	x	x	x
Redistribution of road space	x	x	x
Congestion reduction	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
ZTL zones can be quite confusing to drivers who are not familiar with the system.	x	x	x
Investment in signalization	x		
Training citizens	x	x	
Implementation of new forms of delivery of goods for the last mile in areas with this restriction			x
High cost of implementation	x		

Images



Taken From: https://www.fromhometorome.com/driving-in-rome-the-ztl-fines/



Taken From: https://urbanaccessregulations.eu/countries-mainmenu-147/italy-mainmenu-81/rome

26. Development of Rail - Connected Logistics Zones

Overview

Development of rail - connected logistics zones is land-use planning for modal integration where large-scale distribution parks are developed on the edges of urban areas connecting to rail networks.

The option to use railways is more effective for lower transportation costs, reduced environmental impact, and improve energy savings.

Application in Other Jurisdictions

- *Paris (France)* – The Monoprix rail project in Paris comprises of a train that arrives at Paris Bercy station every night, where the pallets are then transferred to trucks, to be delivered in the morning. The train uses regional and urban passenger train tracks to reach the Bercy terminal. This project generates an annual saving in by reducing the use of diesel trucks and reduction emissions CO_2 and NOx. The project has reduced the environmental impact of the supply chain, but the operation costs remain high.
- *Switzerland* – The measure was implemented by installing containers in which the waste was taken by train to an incineration plant for disposal. Containers were installed at locations that had more congestion, resulting in reduction in environmental pollution and mobility issues.

Additional Information

Type of Application

☑ Planning	☐ Design	☐ Operations	☐ Maintenance
☐ Data-related	☑ Land Use	☑ Policy or Regulation	☐ Other

Approximate Cost

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Level of Success in Other Places

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Effort for Implementation

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Key Sources

- SUGAR. (2011, pp. 41 - 45).
- Giuliano, (2013).
- Taniguchi, E., (2012, pp. 142 - 150)

Advantages

Advantages	Public Agency	Public	Trucking Industry
Shorter transport distances	x	x	x
Reduce congestion	x	x	x
Reduce energy consumption and traffic emissions	x	x	x
Improve quality of life in city centres	x	x	x
Promote efficient multi-modal mobility solutions	x		x
Enhance road safety	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
May require public subsidies	x		
It requires conditioning specific physical spaces for unloading trucks and loading to train.	x		
Requires potential modifications to trucks to unload on the train.			x

Images



Taken From: https://europeforvisitors.com/germany/cars/vw-transparent-factory-photos-4.htm



Taken From: PIARC (2012). Public Sector Governance of Urban Freight Transport

27. ZE Van Subsidy Scheme

Overview

ZE van subsidy scheme is a benefit that the government confers on companies or natural persons to buy an electric van and begin the switch to clean energy. The incentive encourages entrepreneurs to modify their fuel consumption fleet to an eco-friendlier electric one. The vehicles can be used to transport goods, passengers or as a family vehicle. The main objective is to maintain low emissions for the well-being of the community and the environment.

Application in Other Jurisdictions

- *Rotterdam (Netherlands)* – This measure was initiated by the central government and is facilitated by the local municipalities. It was enforced until December 2019, then discontinued due to the COVID-19 crisis. This initiative may be restarted in due time as the city remains committed to building a greener transport system and reducing carbon emissions by 2050.
- *Germany* – The environmental bonus was introduced by the government where half of the cost is borne by the State and other half by the car manufacturer. When purchasing vehicles without local CO_2 emissions, a bonus payment can be claimed.
- *United Kingdom* – This measure remains in effect and applies to vehicles that meet an established eligibility criterion based on:
  - Vehicle type
  - Zero emission range
  - Vehicle and battery warranty
  - Battery or fuel cell degradation
  - CO_2 emissions
  - Maximum speed
  - Fuel cell and electric transmission train
  - Discharge safety and electrical safety

Additional Information

Type of Application

☑ Planning	☐ Design	☐ Operations	☐ Maintenance
☐ Data-related	☐ Land Use	☑ Policy or Regulation	☐ Other

Approximate Cost

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Level of Success in Other Places

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Effort for Implementation

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Key Sources

- City of Rotterdam (2019).
- BUNDESMINISTERIUM FÜR WIRTSCHAFT UND ENERGIE, (2018).
- UK Department for Transport. (2020).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce emissions	x	x	x
Improve quality of life in city centres		x	
Implementation of new technologies		x	

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Require public subsidies	x		
High cost to transporters for switching from fuel vehicles to electricity.			x
Resistance to change			x

Images



Take from: https://www.buyacar.co.uk/cars/economical-cars/low-emission-cars/536/government-electric-car-grant-the-complete-guide



Take from: https://www.greencarguide.co.uk/2019/09/ford-transit-tourneo-custom-plug-in-hybrids/

28. Zero Emission Zone for City Logistics (ZECL)

Overview

The goal of this measure is to designate a specific area of the city to be emission-free where only 100% environmentally friendly electric vehicles or last mile technologies can enter.

Application in Other Jurisdictions

- *Rotterdam (Netherlands)* – The city is currently drafting the rules and maps necessary to able to meet the zero emissions target in a logistics area of the city. They aim to have these regulations in effect by 2025.
- *Amsterdam (Netherlands)*– The city is currently constructing a logistics center near the city center which will be accessible with zero emissions vehicles from 2021. However, they are yet to redefine the type and distribution of the "last mile".

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- City of Rotterdam (2019).
- Alderperson, M., (2020).
- Quak, H., (2016).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Reduce CO_2 emissions and improve air	x	x	x
Improve both air quality and accessibility in the city	x	x	
Reduced congestion	x	x	
Reduce miles traveled			x
Improved mobility	x	x	x
Improve quality of life in city centres	x	x	x

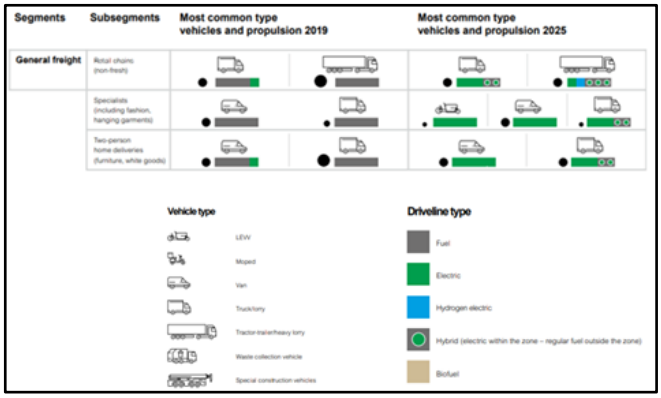
Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
High investment by change or conditioning of cargo vehicles			x
Regulating areas	x		
Increase in operating costs		x	x
High cost of implementation	x		

Images



Taken From: https://amsterdamlogisticcityhub.nl/en



Taken From: City of Rotterdam. (2019). Roadmap ZECL Moving towards Zero Emission City Logistics (ZECL) in Rotterdam in 2025. June 2020, de City of Rotterdam.

29. New Regulations for On-Street Loading Zones

Overview

On-street loading zones are parking zones identified and marked for loading/unloading of goods. Due to the lack of supervision and control in the loading/unloading areas on the street, mobility can be greatly affected. Cities have implemented measures to install better signage, fines, and/or the designation of discharge areas only for environmentally friendly vehicles. The measure aims to create emission-free zones that allows for a significant improvement in the lives and health of residents and visitors.

Application in Other Jurisdictions

- *Brussels (Belgium)* – Due to the lack of control in areas intended for loading and unloading, Brussels implemented new signage and fines in case of non-compliance which resulted in the mobility improvements.
- *Ontario (Canada)* – The Freight Supportive Guidelines provides specific loading and unloading schedules to avoid double street parking that causes traffic congestion. Improvements in industry signaling and detailed analysis was conducted to identify whether changes to road infrastructure is necessary.
- *New York (USA) – The city* aims to motivate residents to switch to environmentally friendly vehicles, by implementing loading and unloading zones for zero-emission vehicles. This has been in consideration since 2014 but is not yet implemented.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Key Sources

- Taniguchi, E., (2012, pp. 136 – 139)
- Salama, P. (2014).
- Holguín-Veras, J., (2015, pp. 38-42)
- Ministry of Transportation Ontario. (2016).

Advantages

Advantages	Public Agency	Public	Trucking Industry
Improve mobility	x	x	x
Reduce congestion	x	x	x
Decrease parking pressure	x	x	x
Facilitate freight delivery and services		x	x
Promote efficient multi-modal mobility solutions	x	x	x
Reduce environmental impacts NY Case (GLZ-Green Loading Zones)	x	x	

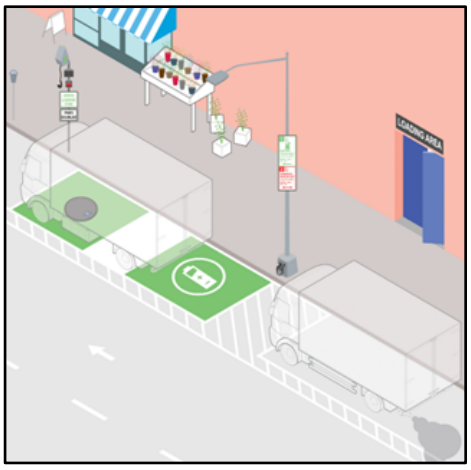
Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Only zero-emission vehicles (NY Case GLZ)			x
A detailed analysis of the area is required to locate the loading and unloading points (GLZ)	x		
Invest time in defining the right signal for charging and unloading bays	x		
Training program for staff using these areas	x		

Images



Taken From:
https://leblogdumono.be/zone-livraison/



Taken From:
https://wxystudio.com/projects/planning/green_loading_zones

30. Strategic Goods Movement Network

Overview

Strategic goods movement networks (SGMN) are planning tools that identify priorities for freight network improvements. An SGMN is a strategic, connected and continuous network of multi-modal corridors that facilities the movement of freight. It promotes reliability through redundancy, by ensuring that alternative routes and even alternative modes are available through seamless connections. SGMNs connect all major intermodal terminals (rail, marine and air) and major goods-generating activity centres with each other and with the major multi-modal network system.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Key Sources

- Kriger, D. et al. (2013). *Peel Region Strategic Goods Movement Study*.
- Kriger, D. et al. (2018). *GTHA Strategic Goods Movement Network.*
- City of Regina. *Truck route map*.
- Maricopa Association of Governments (2017). *Smart Moves, Freight Network for the Phoenix Metropolitan Area.*

Application in Other Jurisdictions

- *Peel Region (Ontario)* – Just west of Toronto, Peel has Canada's largest concentration of freight-generating industries and terminals. Peel's SGMN provides a multi-jurisdictional 'road map' for asset management, operational improvements and road upgrades to maintain a reliable level of service and smooth connections throughout the Region.
- *Greater Toronto-Hamilton Area (Ontario)* – Metrolinx developed a long-term road and rail SGMN for the Toronto-centred mega-region. This SGMN informs Metrolinx's 2041 Regional Transportation Strategy, identifies potential conflicts between planned rapid transit and SGMN roads and between passenger rail and freight rail for resolution, and informs land use plans along SGMN corridors.
- *City of Regina (Saskatchewan)* – The City of Regina has adopted a two-tiered truck network system that controls where larger trucks can and cannot go. Although not an SGMN, this example is included here because it shows how an SGMN could be used to designate and plan for such a system – in particular, showing which roads would and would not be best suited for conversion to Complete Streets.
- *Phoenix (USA)* - This major freight hub developed an SGMN to help identify road corridors that were eligible for Federal improvement funds.

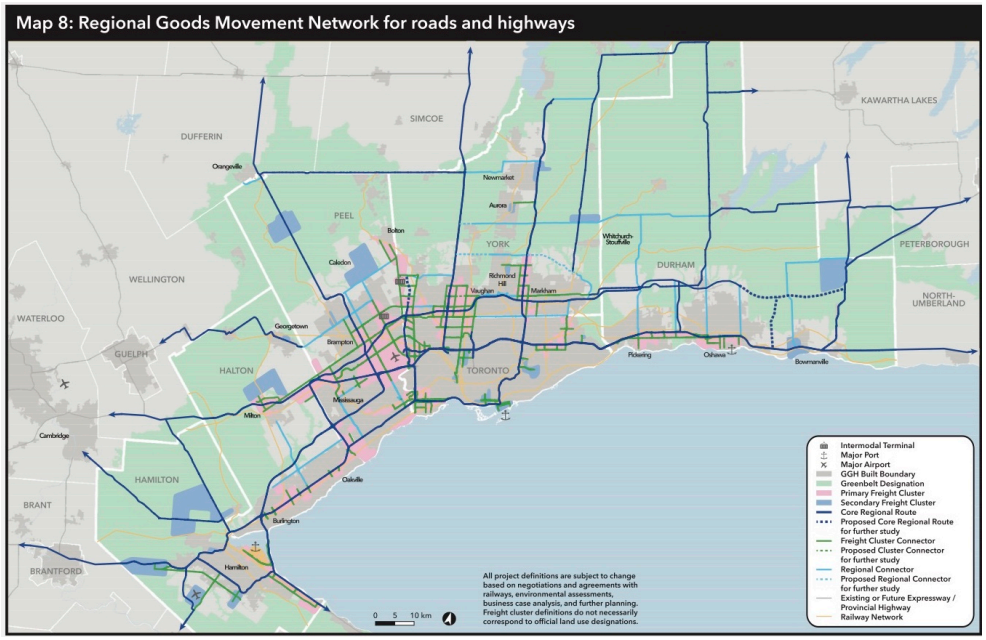
Advantages

Advantages	Public Agency	Public	Trucking Industry
Improve mobility	x	x	x
Facilitate seamless intermodal connectivity	x	x	x
Facilitate uniform state of good repair	x	x	x
Facilitate freight delivery and services		x	x
Anticipates and addresses potential conflicts between transit investments and freight	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Can require multi-jurisdictional buy-in	x		
May need to resolve priorities between transit and freight investments	x		

Images



Taken From:
2041 Regional Transportation Plan for the Greater Toronto and Hamilton Area, Metrolinx, 2018.

31. Truck Route Planning

Overview

Whereas SGMNs inform land freight network and land use plans, truck route networks inform day-to-day truck operations. They typically comprise a map that shows the roads on which trucks are and are not permitted, and conditions of use (e.g., time-of-day restrictions and seasonal loads limits). They are intended to minimize the use of trucks on roads that were not designed for them and/or that traverse residential neighbourhoods and other sensitive areas. They also are intended to provide a direct and well-connected network for truckers and clear, concise rules for its use. However, in some municipalities the process for adding or removing a specific segment of the truck route network is made on an *ad hoc* basis, driven by residents' complaints about trucks and less by an objective analysis of specific conditions and needs. This results in a disjointed network that can be problematic for trucking while often simply transferring problems to other locations.

Accordingly, several municipalities have adopted a systematic process for updating and changing their truck route networks. The process provides an objective basis for Council decisions, taking into account several factors. Among the most common are road classification and function, continuity, connectivity, adequacy of capacity (number or width of lanes), avoidance of conflicts with other users especially cyclists and pedestrians, avoidance of intrusion in sensitive areas and adjacent land uses.

Additional Information

Type of Application

☑ Planning	☐ Design	☐ Operations	☐ Maintenance
☐ Data-related	☑ Land Use	☑ Policy or Regulation	☐ Other

Approximate Cost

☑ Low	☐ Med	☐ High	☐ Unable to Assess

Level of Success in Other Places

☐ Low	☐ Med	☑ High	☐ Unable to Assess

Effort for Implementation

☑ Low	☐ Med	☐ High	☐ Unable to Assess

Key Sources

- Region of Waterloo, truck route policy
- City of Ottawa, *Truck Route Designation Policy*.
- City of Hamilton, *Truck Route Master Plan.*

Application in Other Jurisdictions

- *Region of Waterloo (Ontario)* – In place since 1991, the Region of Waterloo's policy provides a systematic basis for assessing residents' complaints and requests for changes as well as a basis for updating the network as demands change.
- *City of Ottawa (Ontario)* – Adopted in 2005, Ottawa's policy mandates an annual review and update of the city's urban and rural truck route network, taking into account changing demands and residents' complaints and requests for changes. This analytical basis then informs Council's decisions.
- *City of Hamilton (Ontario)* – Hamilton developed a detailed master plan for its truck route network in 2010. A key element was the desire to maintain access to the Port of Hamilton while minimizing intrusion through the adjacent neighbourhoods and heavy truck traffic through the downtown. The plan is currently being updated.

Advantages

Advantages	Public Agency	Public	Trucking Industry
Maintains trucking mobility and accessibility	x	x	x
Provides a systematic evaluation basis according to clearly defined rules	x	x	x
Minimizes *ad hoc* decisions while still respecting residents' and political prerogatives	x	x	x
Can be updated regularly	x	x	x
Provides clear direction for truckers	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Can be a political flashpoint among the public agency, the public and the trucking industry	x	x	x

32. Planning for LCVs

Overview

Manitoba and other Canadian provinces have policies and procedures in place that govern the issuance of permits for Long Combination Vehicles (LCV) routes. These permits are also subject to the approval of those municipalities through which the approved route passes and whose roads might also be used for final origin and destination. These off-highway local routes can be subject to detailed operations review by the applicant, to ensure that turns, clearances and the like can be made safely by an LCV.

LCV routes are approved on a case-by-case basis. Accordingly, it is difficult to predict where and how many applications will be made in a given period. However, continued growth is expected in industry's uptake of LCVs. As a result, many municipalities have started to consider how they plan for LCVs in the designation of future employment lands and the planning of road accesses that will serve them. This allows municipalities to ensure an adequate supply of LCV-compatible industrial lands is available (including on-site circulation and trailer coupling / decoupling), control where these lands will be located (i.e., which highway interchanges or accesses potentially will be needed for access), ensure the geometric, structural and operational adequacy of the access roads and the associated intersections and interchanges, and work with adjoining jurisdictions to understand and mitigate potential upstream and downstream network and land use impacts.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Key Sources

- Kriger, D. (2019). *City of Ottawa Goods Movement Backgrounder.*

Application in Other Jurisdictions

- *City of Ottawa (Ontario)* – To inform its industrial land strategy, the City of Ottawa investigated the planning requirements to help anticipate the location of future employment lands and the requirements for access roads to support LCV use.

Advantages

Advantages	Public Agency	Public	Trucking Industry
Anticipates demands for LCV use	x	x	x
Allows jurisdictions to control where LCVs can be used	x	x	x
Enables collaborative efforts between jurisdictions to pre-plan land use and accesses	x	x	x
Provides clear direction for trucking companies and land developers	x	x	x
Enables network improvements to be made in a timely and cost-efficient manner	x	X	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Cannot always anticipate future needs for LCV, especially if permitted land uses and zoning change	x	x	x

33. Freight-Supportive Land Use Guidelines

Overview

Land use and corridor plans consider freight but often at a high level and, sometimes, even secondarily. Some jurisdictions have developed planning guides that provide a freight perspective. The guidelines provide strategies and direction in the area of land use and transportation planning, site design, road design and operations, and implementation strategies. They are illustrated by best and good practices for incorporating goods movement into policy documents and zoning by-laws. Some of the guidelines also consider how to support sustainable urban freight, LCVs and other current topics.

Application in Other Jurisdictions

- *Province of Ontario (Canada)* – The Province of Ontario developed a comprehensive freight land use and corridor planning guideline to support land use planning at all levels, including site plan design, as well as corridor planning. Although use of the guideline is not mandated, municipalities are the key intended audience.
- *Austroads (Australia)* – These guidelines focus on planning truck access in industrial areas. Among other considerations, the guidelines noted the need to account for changing vehicle sizes in the development of access plans (for example, the growing use of longer-combination vehicles), the use of consistent access standards for both local and arterial roads and the need to examine both road access to the site and access within the site

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☐	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Key Sources

- MORR et al. (2016)). *Freight-Supportive Guidelines.*
- Austroads. (2014).*Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas*.

Advantages

Advantages	Public Agency	Public	Trucking Industry
Allows land use and corridor plans to recognize and accommodate freight needs	x		x
Educates planners, the public, industry and political decision-makers	x	x	x
Provides an integrated perspective on freight needs	x		x
Provides direction for developers and businesses	x		x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
May need more specificity for applications	x		

34. Freight Councils

Overview

Many urban areas have introduced freight advisory councils in order to anticipate goods movement issues, propose solutions and coordinate plans and priorities. These public-sector – private-sector forums provide a venue for exchanging ideas, research and networking. They are especially important for providing a voice for industry into public-sector plans and initiatives and for bringing together adjoining municipalities. Some councils have sponsored data collection and the development of digital tools that inform freight needs (e.g., wayfinding), while others have brought in guest speakers to talk about research in logistics and other topics that can benefit industry (thereby increasing trust between the public and private sectors and increasing the attractiveness of participating in the forum).

Application in Other Jurisdictions

- *Peel Region (Ontario)* – Peel Region's Goods Movement Task Force brings together governments at all levels, infrastructure and freight hub owners and key freight industry interests to ensure a coordinated, action-oriented process for anticipating and addressing operational and planning needs on the region's road and highway networks. The Chair of Regional Council is the nominal head of the Task Force, enabling political 'championing' at the highest level.
- *Philadelphia region (USA)* – The Delaware Valley Regional Planning Commission, the regional transportation planning agency, sponsors a freight council that has achieved success in bringing together officials from two adjoining states, port, airport, railways and several municipalities to coordinate plans, priorities and needs. The freight council also has extensive outreach on freight topics in order to inform planners in the municipalities.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☑	☑	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☑	☑	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☑	☐	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Key Sources

- Peel Region. (no date). *Peel Region Goods Movement Task Force.*
- Delaware Valley Regional Planning Commission. (no date). *Freight Planning*.

Advantages

Advantages	Public Agency	Public	Trucking Industry
Provides a venue for the coordination of plans and priorities among different jurisdictions and between the public and private sectors	x		x
Supports research	x		x
Anticipates problems	x		x
Provides a voice for industry with public agencies	x		x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Must have a reason for meeting and ensure that outcomes benefit private interests – i.e., not sufficient to be a 'talking shop' or a venue for rubber-stamping public sector plans	x		x

35. Over-Dimension Vehicle Permitting

Overview

The movement of over-size / over-weight vehicles typically requires permitting by all relevant jurisdictions whose roads and highways will be used over the planned path. Applications can be made for individual, once-only trips and for repeated trips. The permitting process ensures that the route can be negotiated safely in terms of geometric clearances, operations and structural / pavement loads. The process also anticipates changes that might be needed such as the temporary relocation of overhead traffic signals (the costs of which are commonly borne by the applicant). There may also be a need for police escorts and disruptions to other traffic.

Industry observers and permitting authorities note that trucker compliance in ensuring that applications have been secured from all applicable jurisdictions and the coordination and timely turnaround of applications by the respective jurisdictions have been problematic. The lack of compliance can result in safety problems, damage to infrastructure and a loss of fees. Processing challenges can mean costly delays to the carrier.

To address these challenges, some provinces have developed 'one-stop' multi-jurisdictional permitting processes that, in part, use automated mapping to quickly identify usable routes.

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☐	☐	☑	☐

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☑	☐

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Key Sources

- Alberta Transportation. (no date). *TRAVIS.*
- Saskatchewan Government Insurance. (no date).

Application in Other Jurisdictions

- *Alberta Transportation (Alberta)* – Alberta's TRAVIS system covers permitting and routing for more than 280 municipalities across the province, as well as Provincial highways. The system enables auto approval and routing, thereby quickening processing time. The system has been credited with increasing permitting compliance six-fold.
- *Saskatchewan Government Insurance (Saskatchewan)* – In collaboration with the Ministry of Highways and Infrastructure SIG developed a partially automated approval system, using digitized maps of the Provincial highway network to speed up routing and permitting. The system does not include municipal roads, for which the permits must be obtained through the relevant municipality. However, the database does incorporate regular updates of highway conditions (e.g., construction). The system also enables the rapid calculation of distances and fees preparatory to the issuance of a permit. The 2016 deployment of the system used existing databases, and – after the initial development costs – the system has improved safety (due to compliance) and has reduced staff review time.

Advantages

Advantages	Public Agency	Public	Trucking Industry
Integrates routing among multiple jurisdictions along the path	x		x
Automates and speeds up the review process	x		x
Increases compliance and increases safety	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Initial development cost	x		

36. Applicability of New Technologies in Cold Weather

Overview

Stakeholders noted the challenges of deploying and operating new GHG-reduction technologies in cold weather. Some of these challenges arise from the adaptation of technologies that were developed for and tested in the United States and other warm climates. Vehicle equipment standards and requirements fall under Federal jurisdiction, and the Canadian Trucking Association and others raised concerns about the need for future mandated GHG-reducing equipment to be fully tested in Canadian conditions before they are deployed. Consequences of partially tested equipment include in-service failures, poor reliability and the resultant increases in operating costs. In the meantime, some technologies have been developed and taken up in Canada, and there are several Federal and Provincial tests of adapted technologies. Some examples are cited below.

Application in Other Jurisdictions

- *Transport Canada (Canada)* – A two-year study of cold-weather operations of compress natural gas refuse trucks in Winnipeg and Montreal found no significant operational concerns. The most common factors impacting satisfactory performance in cold climates were fuel quality and contaminants.
- *IGA Grocers (Québec)* – In 2018, a Québec grocery chain converted a gasoline-fueled light refrigerated home delivery van to electric power, using technology developed in Québec. The conversions cost between $25,000 and $100,000. However, the electric conversion kit has a considerably longer lifespan (1 million kilometres) than a conventional gasoline engine. The rechargeable battery has a range of 150 km, which provides adequate coverage for the vehicle's typical daily itinerary of 120 km. Electricity costs are approximately 10% of the equivalent gasoline costs, resulting in an estimated annual energy savings of $3,000 (at 2018 prices).

Additional Information

Type of Application

Planning	Design	Operations	Maintenance
☐	☐	☑	☑

Data-related	Land Use	Policy or Regulation	Other
☐	☐	☑	☐

Approximate Cost

Low	Med	High	Unable to Assess
☐	☑	☐	☐

Level of Success in Other Places

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Effort for Implementation

Low	Med	High	Unable to Assess
☐	☐	☐	☑

Key Sources

- Lawson A et al. (2013). *Evaluation of the Winter Performance of Compressed Natural Gas Refuse Trucks*.
- Brown D. (2018). *IGA rolls out zero-emission home delivery van*.

Advantages

Advantages	Public Agency	Public	Trucking Industry
Increased reliability promotes uptake	x	x	x
Adapting technologies to the realities of how transporters work increases their uptake	x	x	x

Disadvantages

Disadvantages	Public Agency	Public	Trucking Industry
Initial development costs can be high	x		x
Testing is required in Canadian environments	x		x

Images



Taken From:
M Allimann, *IGA introduces its first 100% electric delivery van*, www.novae.ca, posted March 12, 2018