Strategic Directions and New Actions for Goods Movement in the GTHA

David Kriger, P.Eng., MCIP *
President
David Kriger Consultants Inc., Ottawa

and

Vijay Gill, MBA
Assistant Vice President
CPCS Transcom Ltd., Toronto

* Corresponding author

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ABSTRACT

Metrolinx, an agency of the Province of Ontario, is responsible for developing and maintaining a Regional Transportation Plan and investment strategy for the Greater Toronto and Hamilton Area (GTHA). In 2008, its Board of Directors approved *The Big Move*, its first Regional Transportation Plan (RTP). The RTP is currently undergoing a legislated review. An updated draft plan will be published in mid-2017.

This paper describes the development of new strategic directions and a new action plan for goods movement in the GTHA, which was prepared in support of the current review of the RTP. The new action plan represents an update of the multi-partner plan developed to support *The Big Move*. The paper explains how the update responds to a review of new issues and challenges as expressed by Metrolinx and its public sector, private sector, organizational and academic partners. The paper points out that there are many challenges and opportunities in goods movement in the GTHA (and elsewhere). Addressing these needs requires coordination among many public and private sector interests, while allowing for and encouraging individual initiatives and innovations.

1. INTRODUCTION

1.1. Overview of Paper

Metrolinx, an agency of the Province of Ontario, is responsible for developing and maintaining a Regional Transportation Plan and investment strategy for the Greater Toronto and Hamilton Area (GTHA). In 2008, its Board of Directors approved *The Big Move*, its first Regional Transportation Plan (RTP). The RTP is currently undergoing a legislated review. An updated draft plan will be published in mid-2017.

Goods movement was an important part of *The Big Move*, and is an important part of the RTP review and update. The updated RTP will have policies that speak to goods movement directly, as well as showing how goods movement initiatives can complement Metrolinx's major transit infrastructure investments and sustainable transportation initiatives.

Drawing on work done in support of the RTP review, this paper summarizes the current state of goods movement in the GTHA and initiatives that have been taken to address goods movement needs. The paper begins by profiling current conditions and policies and by describing the multi-modal goods movement network. It then talks to key trends and issues that were identified through a stakeholder outreach. Next, the paper considers a proposed vision for goods movement, and assesses challenges and opportunities. Finally, the paper assesses an existing goods movement Action Plan in light of these new challenges and opportunities, and describes proposed updates to the Plan's strategic directions and actions. The paper concludes with an assessment of next steps to support the implementation of the updated action plan.

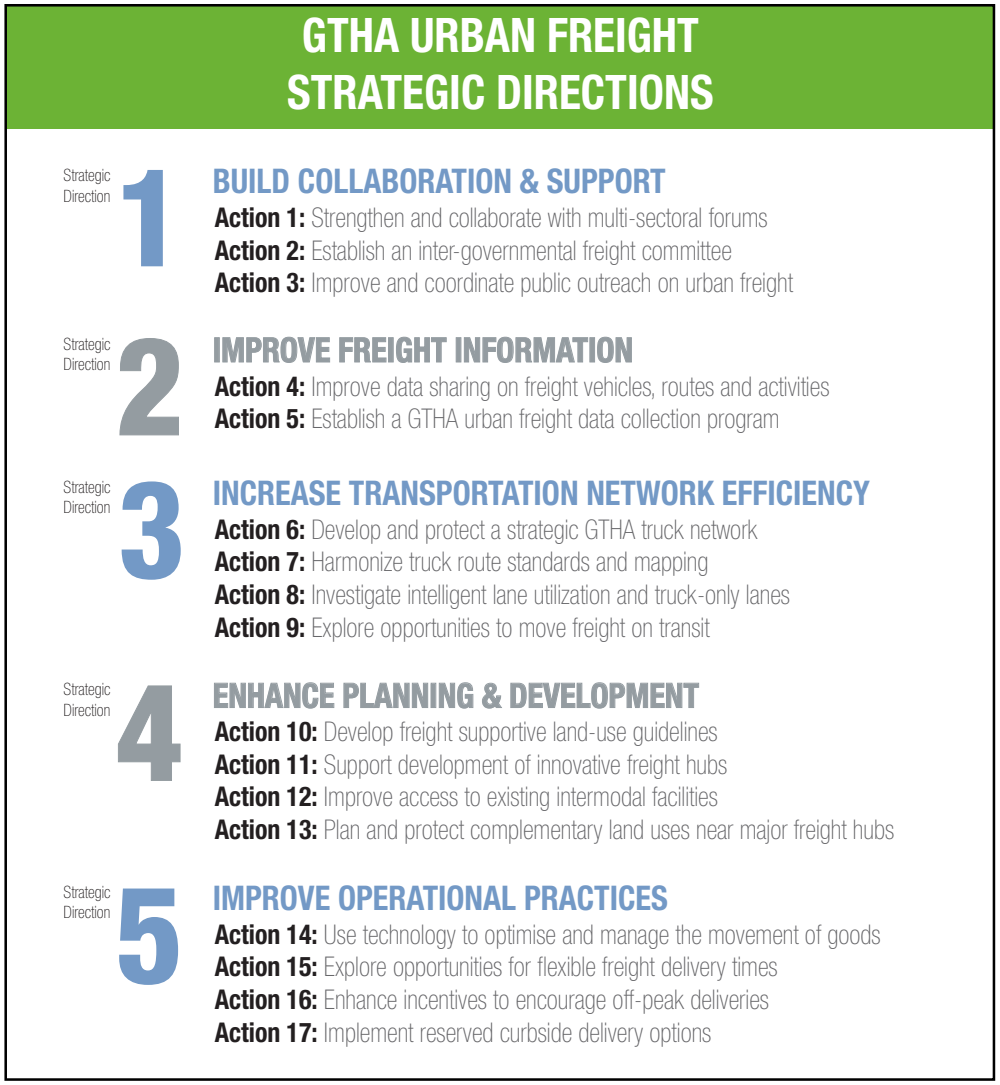
1.2. Basis

Metrolinx and its partners have long recognized the importance of efficient goods movement in serving the GTHA's economy and that of the country as a whole. Goods movement was one among several pillars of the original 2008 RTP. The goods

movement pillar called for the development of a comprehensive region-wide goods movement strategy. The resultant *GTHA Urban Freight Study* (1) was approved by Metrolinx's Board of Directors in February 2011.

The study was driven by extensive consultations with public agencies and with private sector thought leaders. It resulted in five strategic directions and 17 actions that provided a strong basis for addressing urban goods movement challenges in the GTHA. As Figure 1 shows (2), this *Action Plan* comprised a broad range of planning and operational improvements, predicated on increased collaboration and support among and between public and private goods movement stakeholders.

Figure 1. Strategic Directions and Action Plan



To help advance the *Action Plan*, Metrolinx established the GTHA Urban Freight Forum (UFF), which regularly brings together a group of public agencies, private industries, intermodal freight terminals, industry associations and researchers to exchange information, generate action, inspire innovation and review the delivery of the *Action*

Plan. The UFF fulfills Action 2 of the *Plan*. The UFF supports the delivery of these actions collectively and by individual partners.

In November 2012, the UFF issued its first *Status Update on the Action Plan* (3). The *Update* is a compendium of policies, data collection, actions, and research initiatives conducted by Metrolinx and individual members of the Urban Freight Forum.

Taken together, the 2008 RTP, the *GTHA Urban Freight Study* and *Action Plan*, and the *Status Update* served as the main points of reference for the development of the *Draft Urban Goods Movement Backgrounder*, which Metrolinx developed to inform goods movement policies for the new RTP. The *Draft Backgrounder* was completed in late 2015, and is the subject of this paper. The actual policies are not discussed in this paper, because they are being developed currently for inclusion in the updated RTP in 2017.

1.3. Acknowledgements

This paper is based on the *Draft Urban Goods Movement Backgrounder*, prepared for Metrolinx over the course of 2015 jointly by David Kriger Consultants Inc. and CPCS Transcom Limited. Appreciation is extended to Anthony Caruso, formerly of Metrolinx where he served as project manager for the initiative, and now with the Regional Municipality of Durham; Lisa Orchard, Alexandra Goldstein and Eric Petersen of Metrolinx; the many representatives of public sector, private sector and academic stakeholders who were consulted and interviewed as part of the work; and Peter Harrison, formerly of CPCS and now with the Province of Ontario's Financial Accountability Office. The authors also extend their appreciation to Eric Petersen of Metrolinx for several helpful suggestions regarding this paper.

The views expressed in this paper are those of the authors alone, and do not necessarily reflect the official policies of Metrolinx or any other agencies consulted or referenced herein or of any other organization.

2. A PROFILE OF GOODS MOVEMENT IN THE GTHA

2.1. Definition

The RTP is multi-modal and covers the primary modes for goods movement: air, marine, pipeline, rail, and road. At this point, it is useful to define what is meant by goods movement: (4)

> *Goods Movement is the movement of a physical product (e.g., food, gasoline, furniture or clothing), materials that are used to make other things (fabric, rubber, lumber, precious metals, etc.). A Service Movement is a movement by a person who provides services at different locations because of his or her job (e.g. plumbing, carpet cleaning or computer repairs). For the purposes of the RTP Review, the focus was on the goods movement as opposed to service movements.*

Without excluding inter-urban activity, the RTP focuses on urban goods movement, which has several components. Perhaps most visible and clear to the public are the "first

mile" and "last mile," which reflect, respectively, the initial pick-up of a good from a distribution centre or a manufacturer and its final delivery to a retailer or consumer. However, urban goods movement also is pervasive across the entire transportation system as unfinished goods and raw materials are moved between factories and warehouses, and finished goods move among modes, producers, and distribution centres. These movements are often seen by the public but are not well understood.

Note that many sources use the terms "urban freight" and "urban goods movement" interchangeably. For the purposes of the RTP Review, they were taken to mean the same thing. For consistency, the Backgrounder used "goods movement."

2.2. The Greater Toronto and Hamilton Area

The GTHA is comprised of four regional municipalities (Durham, Halton, Peel and York) and two single-tier municipalities (Hamilton and Toronto), as shown in Figure 2. Within the four regional municipalities are 24 lower-tier or local municipalities.

In 2011 the population of the GTHA was 6.8 million. Two-fifths of this population was concentrated in the City of Toronto, while the three most populous municipalities of Toronto, Peel, and York accounted for 75% of the population of the GTHA. (5) In 2011 the GTHA had 20% of Canada's population and 53% of Ontario's population. (6)

Over the next several decades, all parts of the GTHA are expected to experience continued and significant population growth, with a population of 10.1 million projected by 2041. Jobs (employment) are expected to grow from 3.5 million in 2011 to 4.8 million in 2041, a 29% increase. Even though population is expected to grow faster than jobs (a 39% increase), it is worth noting that the GTHA's employment represents fully 62% of Ontario's total employment, both in 2011 and in 2041. (5) This growth will contribute to greatly increased demand for goods and services in the GTHA, as well as demand for transportation infrastructure. These profiles underscore the importance of the GTHA to the Province's economy, which is expected to grow 2.5% in the near term. (7)

2.3. The Multi-Modal Goods Movement Network and Its Use

As Figure 2 also shows, the GTHA has a truly multi-modal network of infrastructure. Goods flow by air, marine, pipelines, rail, and road, and are interchanged between modes at major terminals including airports, marine ports, rail intermodal and transload facilities, and pipeline terminals. The backbone is the Provincial '400-series' expressway network serves as the inter-regional highway network (shown in the figure), which is complemented by a dense network of arterial and other major roads that are under the jurisdiction of the GTHA's municipalities and regions (not shown for clarity). The figure also shows the GTHA's two major international airports (Toronto Lester B. Pearson International Airport and Hamilton International Airport); major marine ports at Hamilton, Toronto and elsewhere; and three CP and CN intermodal rail terminals. An important emerging development is CN's proposed intermodal terminal in Milton, in Halton Region, which is denoted by an '**x**' in the figure. Together, these intermodal terminals serve as national, cross-border and international goods movement gateways for the GTHA.

The multi-modal goods movement network is operated, served and used by, or under the jurisdiction of, several different governmental and private sector organizations. As a

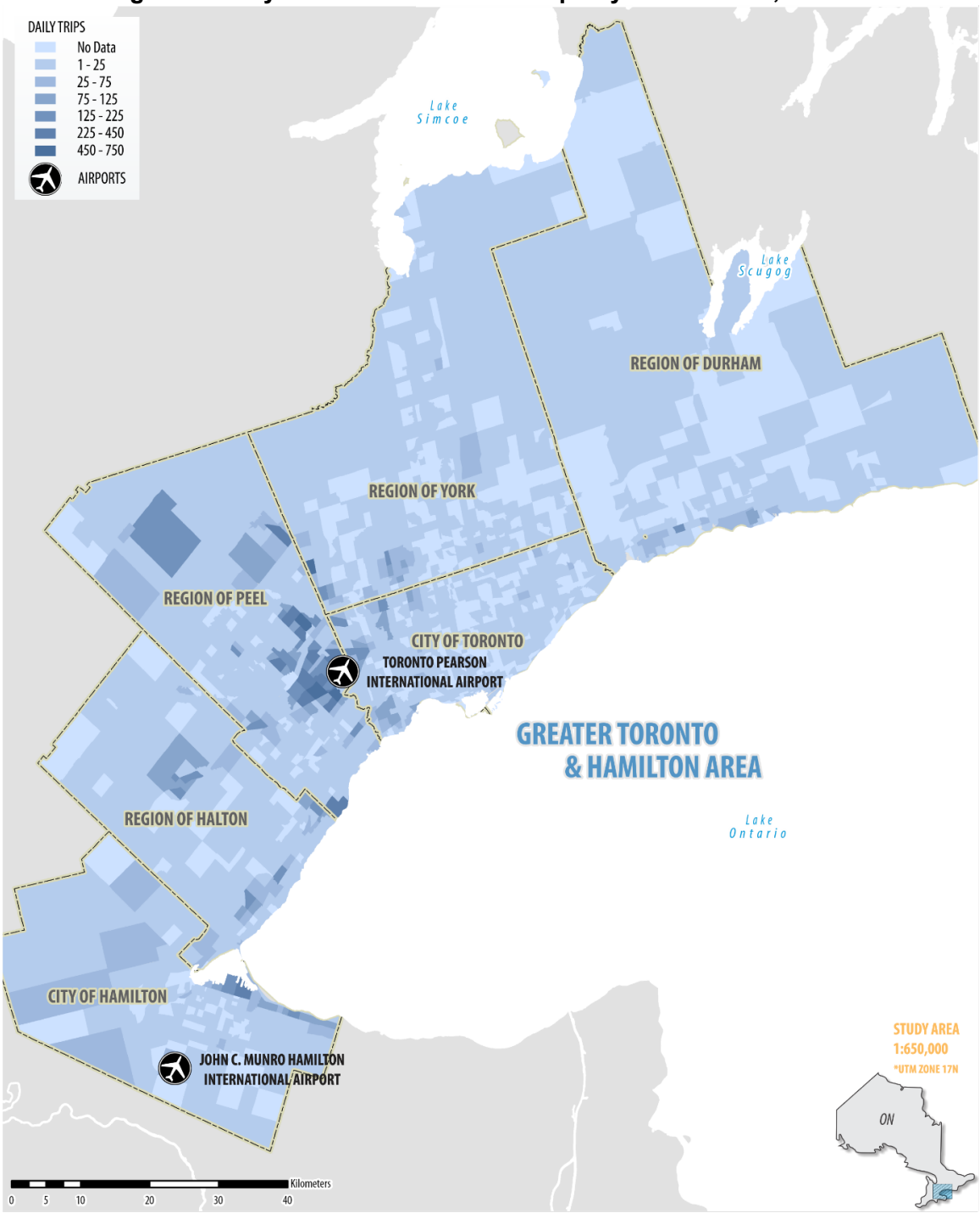
result, a broad range of public and private organizations has an interest in goods movement in the GTHA. Key public sector interests include Metrolinx, the Ontario Ministry of Transportation (MTO), Transport Canada, the ports and airports, and the municipalities. Key private sector interests comprise all large goods movement companies operating in the GTHA, including transportation and logistics business such as the railways, trucking companies, couriers, and logistics provides, as well as the shippers such as the major retailers, construction companies, and manufacturers.

Figure 2. The GTHA's Multi-Modal Goods Movement Network

Road-based goods movement is by far the most dominant component of urban goods movement in the GTHA, as it is in virtually every other Canadian municipality. Figure 3 shows daily commercial vehicle trips generated in each traffic zone in the GTHA based on the most recent MTO Commercial Vehicle Survey (CVS) data. The CVS is a

comprehensive roadside survey of heavy trucks that MTO and its partners have conducted at frequent intervals over the past several decades.

Figure 3. Daily Commercial Vehicle Trips by Traffic Zone, 2012



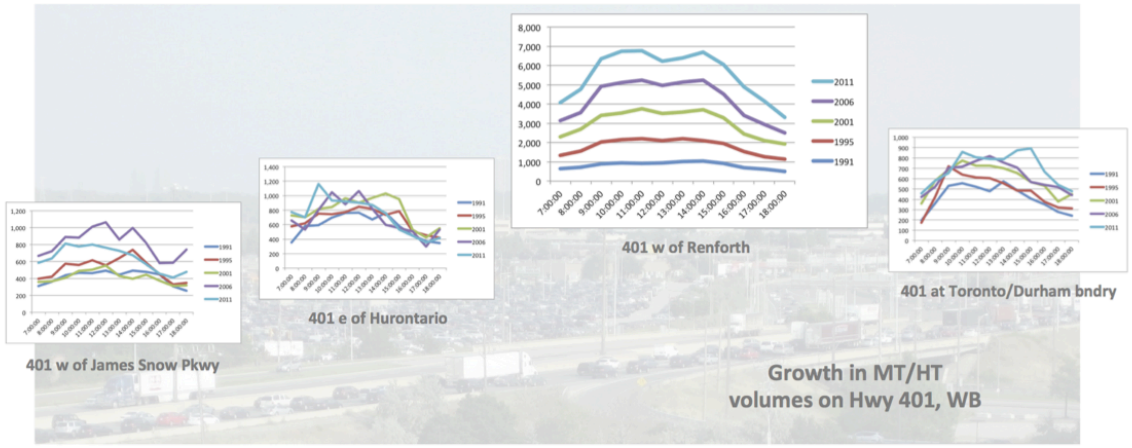
Source: CPCS analysis of MTO Commercial Vehicle Survey data

Because the CVS provides better coverage of Provincial highways than of arterial roads, given the location of the survey intercept points these data should be interpreted as

more representative of inter-regional or long-haul goods movement activity. Nonetheless, the figure shows the importance of Peel Region in general, and the Toronto Lester B. Pearson International Airport area in particular: Within the GTHA, Peel is the most specialized region in goods movement with over 7.7% of its labour force in transportation and logistics and 33% in shipper industries (6). The Hamilton Harbour area is another important activity area, as is the Milton logistics hub in central Halton Region (along Highway 401) and industries along the Queen Elizabeth Way in southern Halton.

Truck traffic has grown significantly in the GTHA. This demonstrated by Figure 4, which shows the growth in medium / heavy truck traffic between 1991 and 2011 at selected locations along Highway 401, one of North America's busiest highways. The greatest volumes occur within the City of Toronto, as depicted by Highway 401 west of Renforth Drive (the third graph from the left, and the largest graph). However, moving from west to east (left to right), the figure shows that truck traffic has generally increased *upwards* (in absolute volumes), *outwards* (into the suburban regions) and *between the peaks* (resulting in all-day peaks).

Figure 4. Progression of Growth in Truck Travel Across the GTHA



Source: DKCI analysis of DMG Cordon Count Data Retrieval System data for selected years

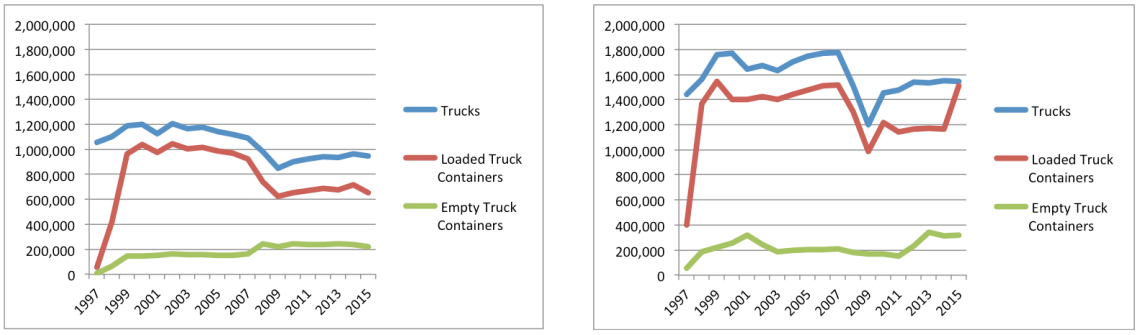
Some of this traffic reflects the GTHA's important role in cross-border trade. Figure 5 tracks annual truck volumes since 1997 at the Niagara frontier and at Windsor. All figures are outbound to the United States. The figure shows the numbers of both trucks and containers.[1] It can be seen that volumes at Windsor are about half-again greater than those at the Niagara frontier. Containerized traffic is a large component of cross-border activity, and that the large majority of containers are carrying goods. A noticeable drop in volumes is associated with the Great Recession: volumes since then have increased but have not yet reached pre-Recession levels.

These figures are based on the CVS, cordon counts and border-crossing statistics respectively. These sources are all well regarded and are widely used in transportation planning. They underscore the importance of goods movement data in describing current conditions and in informing policy. New data sources are now being utilized – notably, GPS truck fleet trip traces. However, additional data are still needed to

[1] Note that some trucks carry more than one container, depending on the size of the container.

complement the above, well-established sources: of interest are truck origin-destination surveys that focus on urban activity, and national multi-modal national flows by commodity type.

Figure 5. Annual Truck Volumes at Key Crossings, Outbound from Ontario



Buffalo – Niagara Falls (Niagara Falls – Fort Erie) **Detroit (Windsor)**

Source: DKCI analysis of US BTS, Border Crossing / Entry Data

2.4. Synopsis

In sum, the GTHA is served by a comprehensive multi-modal goods movement network. The size of the GTHA's population and employment, coupled with its position as the country's dominant urban area and the area's expected continued growth, mean that demand for goods movement will continue to grow.

Other factors will influence this demand. These include the changing nature of supply chains, which are evolving in response to technological, commercial and regulatory developments. Three trends that are currently affecting supply chains in the GTHA are noted below:

- Off-peak delivery (OPD) is the delivery of goods outside normal business hours (i.e., during the night, overnight, early morning and weekends), as a means of delivering goods more quickly and reliably than is possible during the day, given traffic congestion. Several urban areas elsewhere have implemented OPD successfully. MTO conducted a pilot test of off-peak delivery before and during the 2015 Pan Am / Parapan Am Games as a means to manage peak traffic volumes. Results showed a generally positive assessment from participants, with relatively few adverse concerns (i.e., noise) reported.

- E-commerce – that is, online shopping – is growing quickly, for both consumers and businesses. E-commerce reinforces the general trend in logistics towards smaller consignments, single orders and higher delivery frequency. However, e-commerce also is changing rapidly, as retail practices, consumer purchasing habits and the economy continue to evolve, and so e-commerce can both reduce and increase trip-making. A recent development is the introduction of pick-up points by many retailers, in which customers order a product online, and then pick it up themselves at the nearest retail outlet or at a consolidator's outlet. This practice offers customers the convenience of picking up the product at a time and location of their choosing, while also allowing carriers to reduce shipping costs

and unneeded delivery trips.

- Express delivery – that is, direct or rapid delivery – also is growing quickly. In part this growth is spurred by e-commerce; however, businesses of all types and sizes are increasingly relying on quick pick-up and direct delivery for their day-to-day operations. Implications include the need for express delivery drivers (and courier drivers) to have quick and direct access to businesses: in other words, whereas traditional deliveries are made at the loading dock which is located behind or at the side of the building, express delivery drivers require direct and quick access to the receiver's front desk. A lack of designated parking spaces close to the front door is often cited as an impediment for efficient express deliveries. (8)

3. GOODS MOVEMENT ISSUES AND OPPORTUNITIES

Detailed interviews were conducted with governments at all levels, the multi-modal ports and terminals, and a selection of private industries. The interviews provided important insight into goods movement issues, as well as opportunities for addressing them.

Based on these interviews, the GTHA's goods movement issues were grouped into three main topics: congestion, managing land use compatibility, and reducing the environmental impact of goods movement. It is worth noting that all of these issues can benefit from being addressed at a regional level – as in the RTP.

- Congestion. For private sector stakeholders, congestion was overwhelmingly the most important issue, as it affects their ability to move goods quickly and reliably around the region. Goods movement vehicles shoulder a disproportionate share of the burden of congestion owing to relatively high values of goods transported. Suggested solutions to congestion specifically related to goods movement include off-peak delivery, goods movement priority measures such as truck-priority lanes, and the prioritization of goods movement corridors for infrastructure and operational improvements.

- Managing land use compatibility. Land use planning and goods movement are strongly related. Ensuring that goods-movement-intensive land uses are appropriately located is a major issue for both the public and private sectors, so as to avoid conflicts with residential and other sensitive land uses while providing direct access to the major goods movement network. Conflicts in shared use of corridors also are important. Planning that incorporates goods movement - i.e., freight supportive planning - is key to reducing conflicts. Suggested solutions included Smart Growth for Freight - that is, adopting Smart Growth principles to goods movement, for example by clustering goods movement-intensive land uses to minimize truck-km; ensuring that loading / unloading and site access needs are integrated into Complete Streets schemes; freight supportive land use, which promotes the effective siting of goods-generating lands, and site development and corridor planning that accounts for goods movement needs. MTO's recently released *Freight-Supportive Guidelines* are a compendium of practices to guide municipalities in integrating land use and goods movement (9).

- Environmental impacts. The environmental performance of goods movement is also a key issue, in terms of air quality impacts, energy use, greenhouse gas emissions, noise and vibration. Reducing truck-km – that is, reducing the volume of trucks and/or the distances they travel - and regulatory initiatives were seen as the key opportunities. One suggested solution concerned the implementation of urban distribution (or consolidation) centres. These would be situated at strategic locations at the urban periphery, to allow transporters to bundle goods destined into dense urban cores. The aim is to reduce empty vehicle trips, circuitous routing and delays. Another solution considered improvements in vehicle and engine technologies – for example, through the use of all-electric vans for last mile deliveries, or retrofitting older diesel-powered trucks with filters that remove particulate matter and other pollutants. Regulatory or compulsory initiatives also were noted as being able to effect changes through, for example, the prohibition of older trucks in downtown areas, or moving vehicle deliveries to less-congested times of day through pricing schemes.

4. INCORPORATING GOODS MOVEMENT IN THE RTP VISION

The original 2008 RTP articulated a vision in which urban goods movement is quick, efficient, reliable, convenient, safe, low carbon, efficient in its use of resources (including road capacity), seamless across modes and jurisdictions, fair and equitable, and cutting edge.

A review of goods movement visions from other jurisdictions in the GTHA, Canada, the United States, and elsewhere suggested that the updated RTP vision must speak to all perspectives, both public and private sector. The vision also must be linkable to the wording of existing Provincial, Metrolinx, and municipal policies.

The draft overall vision for the RTP is expressed in terms of six “goals.” The goals are still being developed. From the perspective of goods movement, it was recommended that one of these goals (Goal E) introduce the concepts of *economy*, *reliability*, and *efficiency*, where:

- Economy refers to the availability of a goods movement system and services that support economic aspirations and maintain competitiveness for transporters and for the businesses they serve.

- Reliability refers to door-to-door travel times that are predictable with a high degree of confidence, using a goods movement system that is free of delays, especially unexpected delays, and provides redundancy in the multi-modal network so that drivers can switch easily to another route or mode if an incident occurs on their primary route.

- Efficiency refers to efficiencies in both operations and costs for the users and providers of the goods movement system.

These terms are especially meaningful to partners from the goods movement industry, while reinforcing *safety* and *environmental sustainability*, which already were included in Goal E and are important to everyone. These terms also retain key aspects of the original RTP vision.

5. ASSESSMENT OF STRATEGIC DIRECTIONS AND ACTIONS

The goals and objectives of Metrolinx's 2011 *Urban Freight Study* remain relevant to the current challenges of urban goods movement identified in the Backgrounder, and in light of goals and objectives that have been set out in studies by other GTHA agencies. The 2011 *Study*'s *Technical Backgrounder*, which assessed trends, issues, opportunities and potential solutions, generally is current and can serve as a useful reference to the analysis of the three key issues noted above.

Progress has been made on most of the 17 original actions, spearheaded by Metrolinx and its public sector, private sector and academic partners. Some actions have been accomplished (Action 10), initiated (Actions 1, 2 and 3), or explored and deemed unfeasible at this time (Actions 9 and 16). However, most actions remain relevant to addressing the three key issues noted above.

Table 1 lists the actions and proposed revisions. All actions except Actions 9, and 16 have been retained, with Action 16 (regarding OPD) effectively having been subsumed into Action 15 (flexible freight delivery times). Actions 1, 2, 3 and 10 were updated and rephrased to match current conditions and needs. In addition, the MTO proposed two new actions to promote road safety and to promote the use of long-combination vehicles.

6. PROPOSED UPDATED STRATEGIC DIRECTIONS AND ACTIONS

In light of the three key issues identified above – congestion, managing land use compatibility, and reducing the environmental impact of goods movement – the need to restate the strategic directions and the actions was identified. Moreover, additional actions were required to address these issues. As summarized in **Table 2**, this resulted in 13 actions, categorized according to five restated strategic directions.

Table 1. Assessment of 2011 Strategic Directions and Actions

No.	2011 Actions	Proposed Revised Actions
Strategic Direction 1: Build Collaboration and Support		
1	Strengthen and collaborate with multi-sectoral forums	Strengthen the UFF's role, while continuing to collaborate with multi-sectoral forums *
2	Establish an inter-governmental freight committee	Continue to work with an inter-governmental committee *
3	Improve and coordinate public outreach on urban freight	Continue and broaden outreach on urban freight *
Strategic Direction 2: Improve Freight Information		
4	Improve data sharing on freight vehicles, routes, and activities	Improve data sharing on freight vehicles, routes, and activities
5	Establish a GTHA urban freight data collection program	Establish a GTHA urban freight data collection program
Strategic Direction 3: Increase Transportation Network Efficiency		
6	Develop and protect a strategic GTHA truck network	Develop and protect a strategic GTHA truck network
7	Harmonize truck route standards and mapping	Harmonize truck route standards and mapping
8	Investigate intelligent lane utilization and truck-only lanes	Investigate intelligent lane utilization and truck-only lanes
9	Explore opportunities to move freight on transit	Remove: Deemed infeasible at this time
Strategic Direction 4: Enhance Planning and Development		
10	Develop freight supportive land-use guidelines	Guidelines have been developed, so rephrase to focus now on applying them
11	Support development of innovative freight hubs	Support development of innovative freight hubs
12	Improve access to existing intermodal freight facilities	Improve access to existing intermodal freight facilities
13	Plan and protect complementary land uses near major freight hubs	Plan and protect complementary land uses near major freight hubs
Strategic Direction 5: Improve Operational Practices		
14	Use technology to optimize and manage the movement of goods	Use technology to optimize and manage the movement of goods
15	Explore opportunities for flexible freight delivery times	Explore opportunities for flexible freight delivery times
16	Enhance incentives to encourage off-peak deliveries	Remove: Subsumed into Action 15. Incentives for OPD deemed infeasible
17	Implement reserved curbside delivery options	Implement reserved curbside delivery options

* Represents a rewording and/or refocusing of these specific actions.

Table 2. Recommended Update of Strategic Directions and Actions

Strategic Direction / Action	2011 UFS * Related Actions	New action being addressed	Further action recommended now
Strategic Direction 1: Build Collaboration and Support			
Action 1: Strengthen the UFF's role, while continuing to collaborate with multi-sectoral forums	✓		✓
Action 2: Continue to work with an inter-governmental committee	✓		✓
Action 3: Continue and broaden outreach on urban freight	✓		✓
Strategic Direction 2: Relieve Congestion for Goods Movement			
Action 4: Promote off-peak delivery	✓	✓	
Action 5: Deploy operational and infrastructural goods movement priority measures, including long-combination vehicles	✓	✓	✓
Action 6: Prioritize goods movement corridors for investment		✓	✓
Strategic Direction 3: Improve Land Use Compatibility			
Action 7: Encourage smart growth for freight **	✓		✓
Action 8: Apply complete streets approach **	✓	✓	
Action 9: Apply freight supportive land use guidelines	✓		✓
Action 10: Improve the incorporation of goods movement into planning process	✓	✓	
Strategic Direction 4: Reduce the Environmental Impact of Goods Movement			
Action 11: Study urban distribution (or consolidation) centres			✓
Action 12: Study technological and regulatory initiatives, including road safety			✓
Strategic Direction 5: Improve Goods Movement Data			
Action 13: Urban Goods Movement Data Program Phase 2	✓	✓	

* 'UFS' refers to the 2011 *Urban Freight Study*, from which the initial *Action Plan* was derived.

** Actions 7 and 8 have elements in common, but they are complementary: Action 7 focuses on land use, where Action 8 focuses on the corridors that link these land uses. Despite some commonalities, neither action can speak for the other. Moreover, the distinction here is consistent with how municipalities treat the two subjects.

Three columns in **Table 2** elaborate the disposition of the actions. A checkmark in the first column indicates that the action was part of the initial 2011 *Action Plan*. The second and third columns both indicate that an additional action has been proposed for inclusion in the *Plan*: the second column indicates that the action already is being addressed while the third action indicates that further initiatives are being recommended to address the action.

Among these last recommendations are the following initiatives:

- Assess needs for promoting long-combination vehicles and how they might be addressed and implemented (Action 5).
- Develop a strategic goods movement network, to inform the development of priorities for future improvements (Action 6).
- Examine the factors that influence freight sprawl, including land prices, access to the major goods movement transportation network, zoning, development approval times, economic development aspirations and so on (Action 7).
- Consider awareness and education programs for municipal planners, engineers, etc. on goods movement requirements for site planning, corridor planning, secondary plans, and so on (Action 9).
- Promote improved planning of accesses to key goods generators, through improved awareness of needs (including the impacts on national and international trade and competitiveness) and – potentially - the use of standardized benefit-cost analyses in road project planning and investment strategies (Action 10).
- Consider pilot projects to test concepts such as an urban distribution centre (Action 11).
- Assess needs for promoting road safety and how they might be addressed and implemented (Action 12).

None of these recommendations has any status: rather, they are presented for the future consideration of Metrolinx and its UFF partners. Note also that many of the recommendations would respond to multiple actions – for example, the long-combination vehicle recommendation is included under Action 5, as an operational priority measure; however, it also could be included as an Action 12 environmental benefit, given that more trailers (more cargo) could be transported with fewer power units.

Although the first strategic direction – build collaboration and support – has been retained unchanged, the other four directions have been rephrased. Strategic directions 2, 3 and 4 have been reworded to reflect the three key issues, described in Section 3 above. The fifth strategic direction represents a focusing of the original second direction (improve freight information), to focus explicitly on improving goods movement data. The existing, rephrased and new actions have been reorganized according to these directions. Note that the first and fifth directions in effect serve as ‘enablers’ for the other three strategic directions, while more generally serving to enhance the consideration of urban goods movement in transportation plans and decision-making throughout the GTHA, among both public and private sector interests.

Finally, note that Action 13 refers to a proposed goods movement data collection plan for the GTHA. This is based on a detailed 2013 multi-faceted data framework that was prepared for Metrolinx in 2013 (10). As part of the RTP review work, the framework was updated and an implementation plan was developed. The update proposes the conduct of an establishment survey / truck origin-destination survey, while also building upon new commercial GPS data sources and enhancing existing data activities such as the municipal and Provincial cordon count programs.

7. KEY PERFORMANCE INDICATORS FOR GOODS MOVEMENT

Metrolinx has proposed the development of Key Performance Indicators (KPIs) to measure progress and outcomes of the updated RTP. For urban goods movement, there is a need for performance indicators to take into account, first, for both public and private sector perspectives that include, second, travel times, reliability, cost, environmental sustainability, and safety.

In order to measure progress on urban goods movement metrics are required of the specific actions to be undertaken, as well for the broader performance of the transportation system, as it relates to goods movement. This broader performance is ultimately the reason for undertaking individual actions.

Table 3 lists the six proposed goods movement KPIs. These cover average travel times, reliability, cost, environment and safety (which has two components). Note that the measures are meant to describe system-wide (that is, GTHA-wide) conditions. Note also that the KPIs focus on road-based transportation, with the exception of the sixth KPI, which considers rail freight safety. The table also lists the intended outcomes of each KPI (that is, what they measure), the desirable outcome and the proposed method for calculating the KPI. For example, the first KPI measures travel times, and the desired outcome is a reduction in door-to-door delivery times. Note that the methods for each use data that do not necessarily exist yet, or which require analysis before they can be applied to the KPIs.

Table 3. Key Performance Indicators for Goods Movement - Proposed

Outcome	KPI	Desirable Outcomes Over Time	Methodology
Travel Times	Average goods movement travel time (travel speed)	Reductions in average door-to-door delivery times	Weight truck travel speeds on arterial road and highway segments by truck traffic and length of segment
Reliability	Goods movement buffer index	Reductions in the variability of door-to-door delivery times Reductions in the magnitude of the buffer time	Weight buffer indexes for arterial road and highway segments by truck traffic and length of segment
Cost	Goods movement price index	Reductions in the costs of moving goods within the GTHA	Report changes in the price of transportation, i.e. the cost to users of these services

Table 3. Key Performance Indicators for Goods Movement - Proposed

Outcome	KPI	Desirable Outcomes Over Time	Methodology
Environment	Goods movement air pollution index	Reductions in Criteria Air Contaminants and greenhouse gas emissions (and fuel consumption)	Assign emissions factors to arterial road and highway segments based on speed and mix of truck classes, aggregated (i.e., summed)
Safety	Goods movement vehicle road incidents involving injuries, fatalities and other reportable collisions	Reduction in the frequency and severity of accidents involving trucks	Aggregate all incidents and normalize for truck km travelled or tonne-kilometres. In addition, all injuries and fatalities and normalize for truck km travelled or tonne-kilometres.
	Freight train incidents involving injuries or fatalities	Reduction in the frequency and severity of freight train incidents	Aggregate all incidents and weight by rail car-kilometres or tonne-kilometres

The above measures are intended to inform the progress of the proposed goods movement actions, which have distinct short- and long-term impacts. Metrolinx is also considering the inclusion of truck activity (vehicle-kilometres travelled, or VKT) in the evaluation of alternate future RTP transportation scenarios. For this purpose, Metrolinx is considering total and congested truck VKT.

8. SUMMARY AND CONCLUSION

This paper describes work conducted to support the Legislated Review of Metrolinx's Regional Transportation Plan. The work develops new strategic directions and a new, updated *Action Plan* for goods movement in the GTHA.

The new *Action Plan* retains most of the 17 actions recommended from the earlier *Plan*. However, in light of three issues identified in the Backgrounder – congestion, managing land use compatibility, and reducing the environmental impact of goods movement – the actions have been updated and reconstituted as 13 Actions grouped within five strategic directions, which in turn have been updated to reflect current achievements and current needs. In addition, six key performance indicators have been proposed to measure progress towards these actions and strategic directions.

In conclusion, Metrolinx's work in support of the RTP review has elaborated the role of goods movement in achieving broader transportation, land use and economic development aspirations for a complex and dynamic urban region. It has also

emphasized the importance of having a seamless, region-wide framework for addressing goods movement challenges and opportunities and, especially, for having an action plan to address these needs in cooperation with governmental and private sector partners. Metrolinx's goods movement work further demonstrates how these actions can result in tangible benefits for all these partners. Metrolinx's Urban Freight Forum provides a venue for the exchange of ideas among public and private sector (and other) partners, bringing to the fore best practices and new opportunities that can benefit all stakeholders.

9. REFERENCES

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