

## **Best Practices in Urban Goods Movement**

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## ABSTRACT

Metrolinx, the regional transportation planning agency in the Greater Toronto-Hamilton Area (GTHA), recently sponsored a major urban freight study. The study focused on “urban goods movement”, meaning that it considered the movement of goods on the multi-modal urban transportation system as well as the system’s connection with land use. Inter-urban goods movement modes (rail, air and marine) were considered only with regard to their terminals and the urban freight they generate.

This paper focuses on the approximately 25 ‘best practices’ that were identified as part of the background research for the study as potentially applicable to the GTHA. The best practices cover a broad range of perspectives: public and private sector; short- and long-term; capital improvements and system operations; transportation system and land use. They were derived from consultation with industry thought leaders and with area governments, and from a review of the international practical (i.e., as opposed to theoretical) literature. They are significant because they represent practical initiatives from the GTHA, Canada, the United States and around the world. Thus, these best practices should be of interest to other urban areas across Canada as they seek to address their own goods movement issues. Indeed, these best practices provide food for thought by Metrolinx and other public and private stakeholders in the GTHA for future initiatives.

The paper begins by presenting a categorization of the best practices. It then describes the best practices, where they have been applied, key attributes and characteristics, measures of success, obstacles and how these were overcome.

## 1. INTRODUCTION

### 1.1 Overview

The *GTHA Urban Freight Study* was commissioned by Metrolinx to address one of the Regional Transportation Plan’s nine key “Big Moves” (1), which seeks to identify actions that will improve the efficiency and capacity of urban goods movement within the GTHA, in order to enhance economic competitiveness and reduce emissions.

The *GTHA Urban Freight Study* was documented in two reports. This paper briefly reviews the study process which is described in the Technical Backgrounder. It then describes how extensive industry consultation was combined with research into current conditions in the GTHA and practices elsewhere to derive a set of Actions to improve urban goods movement: These Actions are the focus of this paper. The findings are summarized in the GTHA Urban Freight Study Final Draft Report, and both reports can be found on the Metrolinx Urban Freight Study site (2).

### 1.2 Study Process

The *GTHA Urban Freight Study* was conducted by a team led by HDR | iTRANS on behalf of Metrolinx. The purpose of this work was to gain an understanding of the current urban freight environment in the GTHA by identifying trends, issues and challenges, and to develop a set of potential Actions for improving the GTHA freight environment. The key components of this work were:

1. An Environmental Scan to describe the current conditions of the urban freight system in the GTHA through examination of the available data;
2. A review of Best Practices to summarize what is being done elsewhere to improve urban freight, and

3. A formation of Challenges, Actions and Directions including identification of urban freight issues in the GTHA; selection and description of a set of Actions that shows promise to address issues in the context of the GTHA ; and develop some strategic directions for the improvement of the urban freight network.

The work included research and technical analysis, as well as an extensive consultation program. Issues and trends were identified by the Environmental Scan and through consultation with government, academia and industry representatives. Potential Actions for improving the urban freight environment in the GTHA were shortlisted through consultation with the stakeholders and through research of some of the best practices related to urban freight occurring around the world. Criteria were developed to establish the feasibility and applicability of each Action. The criteria included assessment of expected costs, expected benefits, involved parties, funding requirements, etc. Each Action was subsequently described using these criteria, and logical groupings of Actions were formed to describe how they interrelate and complement each other.

### **1.3 Organization of Paper**

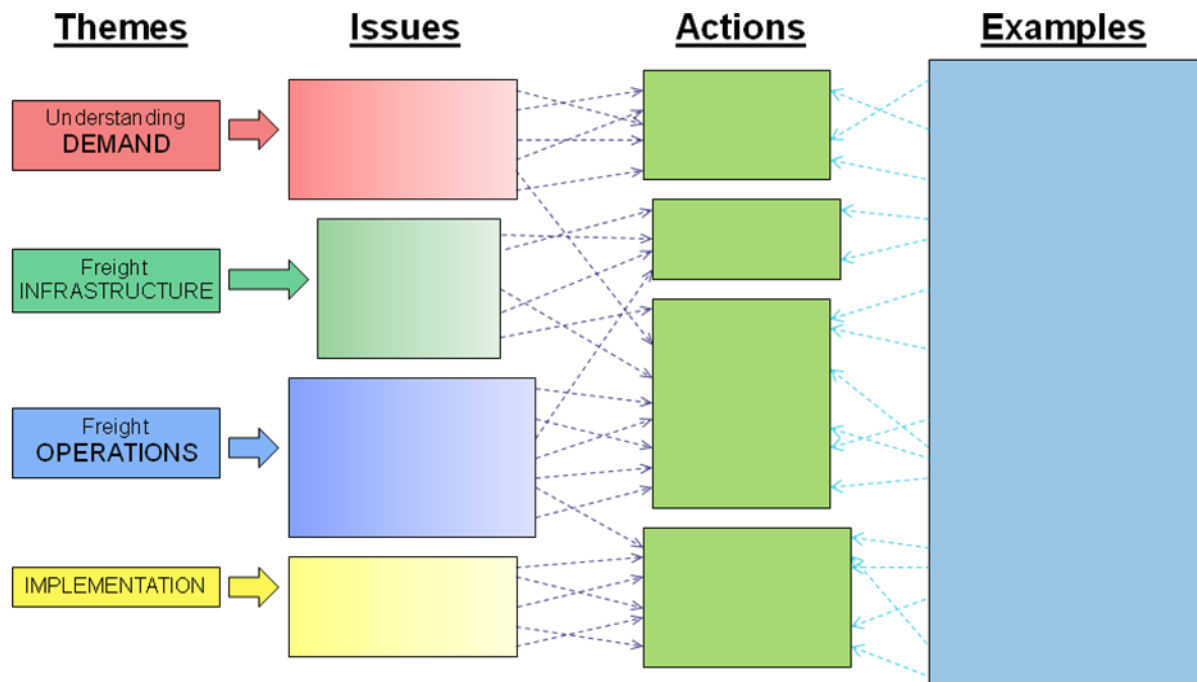
The remainder of the paper has two main sections: Section 2 reviews the results of the consultation and literature review carried out for this study, organized according to Issues and Actions. This is followed by a summary of findings and implications in Section 3. Acknowledgements and a list of references follow in Sections 5 and 6, respectively.

### **1.4 Definition of Urban Freight**

Urban freight, for the purposes of this study, is defined as the portion of freight transportation that takes place with origins and/or destinations within the GTHA and impacts facilities and infrastructure under local and regional jurisdictions. This includes road and rail freight (where the latter impacts roads at level crossings, or commuter rail in sharing of track), and intermodal activities where freight transfers between road and air or marine modes.

## **2. ISSUES AND ACTIONS**

The consultation and review performed in this study led to the development of a shortlist of issues surrounding freight movement in the GTHA. From this list, four overarching issues were identified, along with five categories of Action to address them. As shown in Figure 1, below, each of the Actions may address more than one issue (and vice versa), and many examples found in the literature are combinations of a number of improvement measures.



**Figure 1: Issues, Actions, Examples Relationship**

## 2.1 Issues

The four primary issues identified by this study were:

1. understanding demand;
2. freight infrastructure;
3. freight operations; and
4. implementation.

Each of these encompassed a number of more detailed issues, as discussed below with specific examples that were identified in the GTHA, derived primarily through consultation with industry stakeholders in group discussions and individual interviews, and supplemented by the literature review of best practices.

**2.1.1 Understanding Demand.** In order to understand freight demand and how it is changing, we first need to know what is being moved and, secondly, why it is being moved—the economic sectors driving this demand and other factors that influence it (such as labour force, logistics, and manufacturing / consumer purchasing trends). Through our consultation and best practices literature review, specific gaps in our knowledge and understanding of the demand in the GTHA were identified:

- Need for Critical Data Sharing in the Industry: Industry would benefit from sharing critical data amongst each other and with governments to aid in planning for all parties.
- Need for Feedback from Industry on Issues/Challenges: A medium for industry to regularly express issues and challenges to planning authorities positioned to address them would build communication and increase government understanding of industry needs.

**2.1.2 Freight Infrastructure.** Here we examine the supply side of goods movement to maintain and improve the efficiency of the freight system and its components as a seamless entity. This

issue deals firstly with the transportation network (multimodal and intermodal), including an inventory of existing facilities (including road classifications and tolls or other charges), location of and connectivity between intermodal terminals, external linkages, and what deficiencies have been noted with the infrastructure overall. Secondly, land is considered for both shippers and freight carriers (inventory with respect to policies and statements, relevant land uses, supply of industrial land near freight infrastructure and intermodal terminals). Through consultation and literature review, the following GTHA-specific infrastructure deficiencies were identified:

- **Traffic Congestion:** Traffic congestion and lack of roadway capacity is a challenge for urban freight in the GTHA, as it leads not just to increased travel times but more importantly to a lack of reliability, which causes additional costs throughout the industry.
- **Need for Infrastructure:** The GTHA road network needs alternative truck routes so that incident disruptions do not cause major delays.
- **Need for Multi-Modal Connectivity:** An increase in multi-modal opportunities would reduce heavy reliance on trucks for short- and long-distance urban freight trips. Some industries (i.e. agriculture) are affected by this issue more than others.

2.1.3 Freight Operations. The key challenge here is how to improve the efficiency of moving goods around, through short-term actions rather than more costly and time-consuming infrastructure changes. This can be broken down into:

- a) how to manage demand (such as through defining allowable hours of operation); and
- b) how to manage circulation (by measures such as regulations, actions, on street loading permissions/restrictions, loading bays or other public and/or private ideas).

Through our consultation and literature review, the following issues confronting operational efficiency in the GTHA were identified:

- **Governance and Regulatory Restrictions:** policies such as no-loading zones and night-time restrictions increase competition for roadway capacity between freight traffic and passenger traffic.
- **Land Use Conflicts:** Urban planning has generally been oriented towards residential growth and industry needs are often overlooked, resulting in incompatible abutting uses developing over time.
- **Conflicting Schedules:** Urban freight traffic and commuter traffic typically require use of the highways and urban roads at the same time, thus contributing to traffic congestion. Significantly worsening off-peak traffic conditions in the last 20 years lead to virtually no window for urban freight traffic to operate without delays.
- **Tight Profit Margins (Lack of Flexibility):** Due to the competitive nature of the urban freight industry, unforeseen delays (unrelated to recurrent traffic congestion) and cancellations cripple the operating budgets of the freight companies. As a result of the tight operating budgets, the high prices associated with using tolled facilities make them economically unattractive for trucks. Increasing land values in developing areas make land-intensive freight operations uneconomical to retain.
- **High Through Traffic in GTHA:** High volumes of trucks travel through the GTHA without a local stop, adding to the congestion in the GTHA but providing few if any benefits to the local economy.

2.1.4 Implementation. When it comes to implement an issue, there is a need to improve and coordinate the public and private decision-making processes, so as to accomplish results in both the short and long term. Specifically, this requires that decision makers listen to industry partners, that stakeholders learn each other's language, that the public are made aware of the process, that meaningful and usable data are collected, that an agreement is reached on how to

fund the implementation, and that intergovernmental coordination and cooperation are established. The consultation and literature review identified the following implementation-related deficiencies in the GTHA:

- **Need to Consider Integrated Urban Freight Strategies in Planning Process:** Urban freight should be considered in the early stages of planning. When it is an afterthought, lands that are suited for industry and freight uses (e.g. central and/or with good highway access) are often used for residential and commercial development. There is a need for more well-positioned transportation hubs.
- **Difficulties in Locating Offices / Headquarters / Depots:** With on-going development surrounding long-established transportation hubs, their locations become more and more inconvenient, and due to land zoning restrictions and difficulties in land acquisition, larger corporations have difficulties in relocating them, thus making urban freight movement more challenging. This results in freight centres moving out of the urban area which in turn impacts the manner and timing of urban freight movements.
- **Need for Education Outside of Industry:** Public awareness of the importance of urban freight is widely insufficient. As a result, public support for urban freight improvements is almost entirely non-existent. In addition, there is on-going and growing opposition to existing freight activity.
- **Governance Conflicts:** Inconsistencies in policy, regulation, knowledge and approach to freight between adjacent jurisdictions and different levels of government provide freight companies with challenges such as conflicting networks and routing regulations.
- **Need for Heightening of Political Will and Understanding to Investigate and Address Industry Issues:** Building understanding of urban freight at the political level will lead to increased study of the industry. Governments have insufficient information about urban freight issues and do not direct staff to pursue solutions. This results in an inefficient network and overall urban structure which hampers effective movement of freight among businesses within the GTHA.

## **2.2 Action Groups**

The issues identified above were addressed by Actions that were derived based on consultation and examples identified through the best practices review. These were then classified into five categories sharing some common characteristics, as follows:

1. ongoing consultation;
2. data collection, use and management;
3. access and land use;
4. traffic management;
5. operations

The relationships within and between the groups are discussed below to achieve an understanding of how everything is interrelated.

2.2.1 Ongoing consultation. Project selection, funding and implementation will require strong communications among all the players, and further will require that all parties have a good understanding of the positions and goals of the others. Actions suggested for the GTHA are:

### *Action 1.1: Develop Public Education Programmes.*

Increasing public education and awareness on the issues and needs of urban freight could potentially be achieved through collaboration and planning at the Urban Freight Forum for industry representatives. Topics for public education include relaying the role of urban freight in

the current quality of life standard, daily challenges faced by the industry, freight modes, time sensitivity and safety and security concerns.

*Action 1.2: Create a Private Sector Freight Forum.*

An open forum would enable private sector representatives to discuss freight issues, share data where possible, conceptualize solutions for day-to-day operational issues, and discuss project funding. The forum would act as a medium for examining best practices happening elsewhere and discussing their feasibility and potential implementation in the GTHA

*Action 1.3: Create a Committee Responsible for the Overall Freight Interests in the GTHA.*

This committee, comprised of government representatives from each level responsible for making the critical decisions and facilitating the implementation of identified urban freight network initiatives, would be charged with overseeing the best urban freight interests of the GTHA and ensuring due consideration in the municipal planning process, emulating some of the U.S. Metropolitan Planning Organization (MPO) concepts. This committee, similar to the Southern Ontario Gateway Council (SOGC) but with a more GTHA-oriented focus, could possibly assume responsibility for promoting the GTHA and freight benefits to outside markets.

It was agreed among the stakeholders that if the public understood the importance to the economy of freight and the needs of industry, issues regarding noise, truck traffic, railway crossings and general industrial activity could be more rationally discussed and more efficient outcomes would result.

The consultations also made it clear that industry and public sector approaches to freight transportation planning and problems were quite different in many ways. To address this, many other jurisdictions have established permanent consultation groups to provide a forum for industry to explain and discuss concerns, and find more efficient solutions, with the various levels of government involved. Across the GTHA the responsibility for rules and regulations affecting freight and the industries served is broken down into many levels of government and departments within governments, as well as geographically between adjacent municipalities and regions. If the public sector side of freight planning and management were to be co-ordinated among all the involved jurisdictions, the conditions for freight across the GTHA could be made more consistent, and impediments to industrial activity reduced.

2.2.2 Data collection, use and management. This group of Actions addresses the fundamental raw material from which good decisions can be made, that being information. Urban freight data serve to demonstrate the existence of an efficiency problem, to support the modelling of alternative solutions, and to document results. Recommended data-related Actions for the GTHA are described as follows:

*Action 2.1: Improved Freight Data Sharing.*

Critical freight-related data would be shared amongst industry and public representatives as they pertain to improving day-to-day freight operations. Examples of data that are candidates to be shared include real-time information (i.e. traffic anomalies, construction detours), and planning information (i.e. facility schedules, available truck routes, freight restrictions).

*Action 2.2: Establish a GTHA Freight-Related Data Collection Programme (including Commodity Flows).*

A survey of GTHA businesses to determine delivery patterns (i.e. typical delivery hours, delivery frequency, delivery routes, delivery vehicles) and goods carried would be conducted, with the aim to develop a system to house and maintain an ongoing survey programme.

Both the public and private sectors collect information, but whereas the private sector is focused on operations and hence real-time or short term information, the public sector takes a longer view reflecting their responsibility for physical road infrastructure. (The railways, ports and airports are different because they are either not public, or they control their own traffic to a great degree so the infrastructure manager already has the activity data needed to plan and operate the facilities.)

Even where the problem and improvement can be agreed on as obvious by the stakeholders, others outside the problem (members of the public or unrelated entities) can be affected by actions, such as the provision of dedicated delivery parking in a downtown area. Measures which affect the public realm can be expected to be scrutinized by the public, and having data to support the case will be beneficial. The need for good data is probably clearer for those projects having larger costs and scope, particularly when a strong business case is necessary to get investment from sources outside the immediate participants (already the case for the private sector, and increasingly for the public sector as well).

Data collection before and after a project implementation is also important to support the critical evaluation of success that can lead to further implementations, and potentially more support and more funding for greater investments. While good data on their own are not directly going to improve urban freight conditions, they assist in making the case for investments, and will be necessary to some degree for all improvements to the urban freight environment.

2.2.3 Access and land use. The link between land use (generating trips for freight) and transportation in general (providing the capacity by mode required) has been widely recognized for many years. Industrial land should have good access to major facilities supporting low-delay transport to the necessary destinations. However, the problem arises as to how best to allocate land, given elements for a transportation system that are already in place. Actions suggested for the GTHA are as follows:

*Action 3.1: Establish Freight Consolidation Centre(s).*

A freight consolidation centre is a facility where all freight destined to or originating from an urban area is consolidated for more efficient delivery. These centres are established through land use planning initiatives.

*Action 3.2: Improve Access to Intermodal Facilities.*

High-order road connections would be made to the freeway network for all air, rail and marine intermodal facilities.

*Action 3.3: Develop Freight Supportive Land Use Guidelines.*

The Freight Supportive Land Use Guidelines (FSLUG) are the collective product of a planning initiative to ensure that freight concerns are addressed in all urban planning exercises.

*Action 3.4: Establish GTHA Freight Villages.*

The 'freight villages' initiative calls for the development of guidelines to encourage clusters of logistics-intensive commercial and industrial activity near freight (including intermodal) facilities,



aiming to isolate freight operations and in turn reduce freight traffic by minimizing the need for off-site shipping. The important contributions to the local area are the safety advantages and improved commuting conditions associated with a separation of freight and commuter traffic.

*Action 3.5: Protecting and Planning Strategic Land-uses Adjacent to Airports, Ports and Intermodal Facilities.*

Retrofitting of existing airports, airport connections and immediately adjacent lands provides the means to facilitate improved industry access to airplane freight services.

This group of Actions takes a range of different approaches to the problem of preserving industrial land, providing good transportation access, and going beyond that to more outright optimisation of the freight movement by improving locations of origins and destinations for freight. All the identified Actions are related to some degree, and all offer savings in the number of trips for a given tonnage, in other words, making better use of vehicle and roadway capacity. The combination of a consolidation facility with an intermodal terminal is a good example of how these Actions can benefit each other; a direct connection between modes simply reduces the truck traffic that must navigate the public roads. The idea of freight villages could be viewed as a much larger scale evolution of industrial development beyond an intermodal facility with some co-located consolidation centres.

In order to have lands available and serviced to set up and maintain freight transport facilities, a longer range view needs to be taken at all levels of government, including concerning basic zoning, complementary and conflicting land uses and transportation access and linkages. Freight-supportive land use guidelines would set a basis for both long range planning and more immediate accessibility and servicing to aid local municipalities in supporting the development and sustaining of industrial and transportation activities. Suitable lands should be kept available for industrial and freight uses in the areas surrounding major mode-transfer facilities including ports, airports and rail yards. Since transportation is simply the movement of things from one piece of land to another, by working to keep logically-related land together, transport can be minimized.

2.2.4 Traffic Management. Even with the best land use planning and management, it is only practical also to address the way things are transported in terms of routes and the conditions along those routes. This Action group deals with the road traffic parts of the urban freight system, as those are the parts that offer flexibility and local management opportunities. Suggested Actions to consider for the GTHA are described below:

*Action 4.1: Create and Publish a Comprehensive Truck Routing Map.*

A comprehensive map, including truck routes, restricted areas, parking locations and, dangerous goods routes, would direct truck operators to coordinated truck routes across the GTHA. The map could be combined with an Intelligent Truck Traffic Management program to provide a real-time picture of trucking conditions. Once this base case is assembled, the next logical step is to produce a long term plan for how the network will grow and evolve in the future to provide consistent and reliable truck access across the entire GTHA.

*Action 4.2: Management of Traffic Congestion through Strategic Road Pricing.*

There may be an opportunity to manage traffic congestion on major thoroughfares through the use of road pricing. Different pricing models could be implemented (vehicle class, distance travelled, time of day, day of week, to achieve different outcomes.

*Action 4.3: Implement Intelligent Truck Traffic Management.*

This involves use of modern equipment (i.e. cameras at intersections and along corridors, communication devices) to relay real time traffic conditions to truck operators. The public and private sectors would need to work in harmony to make this concept work. For example, the local governments could work to install, operate and maintain the real time data collecting devices (i.e. cameras) while the private sector provides the communication devices for receiving the data, and makes travel route adjustments accordingly. This concept would require region-wide participation to achieve the desired outcome.

*Action 4.4: Develop Intelligent Lane Utilization Programs.*

Altering lane usage depending on traffic demands would increase efficiency of the existing infrastructure. One such example would be to alternate existing freeway HOV lanes between high-occupancy vehicles during peak commuting hours, and trucks during the off-peak periods. Another possibility might be reversible lanes where demands permit.

*Action 4.5: Truck Lanes on or Adjacent to Highways.*

Adding truck lanes to the existing highway is possible either by re-designating existing multi-purpose lanes, or by building adjacent truck-only facilities. An analysis should be carried out to determine whether the implementation of such lanes would actually prove practical and beneficial to urban freight flow.

*Action 4.6: Existing Utility Rights-of-Way for Trucks.*

The possibility of exclusive use of hydro corridors for urban freight purposes could provide an opportunity for more rapid freight service. Detailed demand information and extensive mapping would be needed to locate viable alternatives for larger routes. For smaller local-level connections, there may be opportunities that should be considered on a case by case basis.

*Action 4.7: Travel Demand Management for Commuters.*

Along with supporting expanded transit and active transportation infrastructure, marketing campaigns and programmes directed at providing options other than driving to commuters could be more strongly supported by the local freight industry – in particular, within their own organizations.

Assembling and regularly updating a single routing plan across all GTHA jurisdictions would establish a base for reference upon which future land use and demand forecasts could be tested, and provisions made. Traffic management in general can benefit from collection, analysis and dissemination of real-time information on conditions in the network. With this more complete information, better decisions could be made to save time, fuel and emissions. With appropriate data, modelling and monitoring, it would also be possible to adjust road prices to manage the demand for finite road space better, and permit strategic allocation of space where and when needed for the support of the GTHA economy. Approaching pricing from the angle of road management instead of revenue generation and effectively relaying this intent to the general public may well be a better way to gather support for the idea.

Improving the traffic conditions for trucks could also be achieved in many cases by providing dedicated lanes within existing alignments. Where roads have already been built-out to ultimate width, there is the potential to reserve lanes, either full-time or shared, for example, with existing HOV lanes. With good detailed data on both car and truck movements, it may be justifiable to implement restrictions on cars in certain areas and times to ease truck movements, just as trucks face restrictions to satisfy residential concerns. In corridors where there is space available, a more direct alternative is full time dedicated truck lanes in their own alignment.

There may also be opportunities in specific instances to make better use of existing reserved lands in the form of utility rights-of-way. The proximity of major utility corridors to industrial and transportation lands may aid in locating such opportunities.

Another way to improve travel conditions for trucking is to manage the demand placed on the existing infrastructure by private cars. Travel Demand Management (TDM) is a term encompassing a wide range of potential measures simply intended to reduce travel demand, by means as varied as improved transit including rapid transit, carpooling, telecommuting and flexible work hours.

2.2.5 Operations. While traffic management deals chiefly with the physical supply of capacity to provide freight movement services, this group of Actions deals more with managing and moderating the demand for services. The best overall opportunity to address any capacity problem is to approach it from both the demand and capacity sides, and take advantage of the best opportunities. Actions suggested for the GTHA are described as follows:

*Action 5.1: Increase Flexibility in Business Operating Hours.*

There are current operating hour restrictions in the GTHA that are candidates for reconsideration in the best interest of urban freight.

*Action 5.2: Create Tax Incentives for Off-Peak Deliveries.*

Tax incentives could be introduced for freight operators and/or consumers on the receiving end as a reward for engaging in off-peak delivery operations.

*Action 5.3: Designate Short-term Curbside Parking and Delivery Lanes.*

Adding more short-term curbside spaces or converting existing downtown circulation plans to include one-way streets with dedicated delivery lanes could facilitate rapid deliveries in urban settings. In more urban settings, time restrictions could be applied converting travel lanes to loading/unloading zones during specified times of day.

*Action 5.4: Identify Opportunities to Establish Package Drop-off Stations.*

Package drop-off stations would serve the inbound and outbound courier demands of individual consumers and small businesses.

*Action 5.5: Move Freight on Rapid Transit.*

One idea involves adding a car designated for freight packages to the existing commuter rail and/or subway vehicles, however loading and unloading such a car could adversely impact the passenger service which is typically designed to minimize station dwell times. A second idea, which is more consistent with some of the systems in place elsewhere, is to incorporate small freight-specific vehicles into existing transit line schedules.

*Action 5.6: Replicate Hospital System of “Just-in-Time” Deliveries with Off-site Receiving.*

Using this system, goods are received and consolidated off-site so that fewer, more timely and more efficient deliveries can be made to the location of use (a hospital, or group of hospitals). This minimizes demand on limited delivery and storage space at the point of use, as well as reducing truck trips. A similar system could be adopted for other time-sensitive goods.

Operating hours for trucks are a common topic on a variety of fronts, including public complaints on noise, timing windows at the other end of the trip (which may be in another country or continent), and regulations on operating hours for drivers. Allowing deliveries to occur in off peaks, including at night, will let shippers select the travel plan that best suits their needs. This

may be encouraged through incentives to businesses which may otherwise not wish to change their practices.

Where local deliveries and pick-ups occur, there may not be adequate space for the necessary vehicles, especially in dense urban areas. The popular response, to step-up enforcement, does not recognize the need for the freight. A simpler response, which is seeing success in other jurisdictions, is designation of delivery parking in strategic locations to minimize the interference with other road uses while providing practical ways for core-area buildings to obtain necessary services. Where practical, given road space and traffic demands, this could be extended to entire reserved lanes, for instance in mid-day off-peak periods only. Meanwhile, in lower density areas, an approach to reducing the impact of deliveries is not to make them in the conventional fashion to the ultimate destination, but rather to deliver them to one of a network of local neighbourhood package drop-off stations. The individual recipient can then pick up the parcel on their own schedule and the final delivery of the package may not generate a truck trip at all.

Another approach, transit-based freight, has had success in a few cases, where the conditions were aligned: freight demand for a route well-served by efficient transit, and ability to manage the freight without impacting the passengers the transit is primarily concerned with. Where the need and service do align, it could provide unique benefits to serve needs in areas where the road network is not sufficient, by letting the transit alignment provide an opening in the built-up urban area through which freight can flow. There are clear synergies with some other Actions; for example an LRT alignment could be used to move goods far more easily during the night hours when passenger flows are low—this is simply the reverse case of the common situation where passenger transit uses freight rail lines.

Off-site receiving has a resemblance to the consolidation centres concepts discussed in the Access and Land Use group of Actions, but it can also be viewed as a scaled-up version of the package stations idea. The essence of the idea is to rely on economy of scale not just for the purchase price, but for the shipping, receiving, internal processing, and final delivery.

All of these operations Actions seek to plan more carefully the actions of freight movement at the end of the journey to minimize unnecessary activity, without reducing the level of service, as the materials delivered still must arrive when and where needed

## 2.3 Action Profiles

Once the relationship between Issues and Actions had been established, each specific Action was profiled according to a series of categories that are described in Table 1 below. These describe the impact of the Action when applied elsewhere, its foreseen applicability to the circumstances of the GTHA, and impacts that may arise as a result of its implementation.

Section	What question is answered?	How is it Described?
Description	What is the Action?	A couple of paragraphs summarizing the idea behind the Action.
Action Components	Does the Action have a programme/study component, an infrastructure component, or both?	A brief description of the Action components.
Related Examples	Are there any related freight initiatives found to be in place at a national or international level?	A list and associated descriptions of some related examples.
Why it is applicable to the GTHA	What are the objectives of the identified Action and how do they	A brief paragraph describing why the Action is viewed as applicable

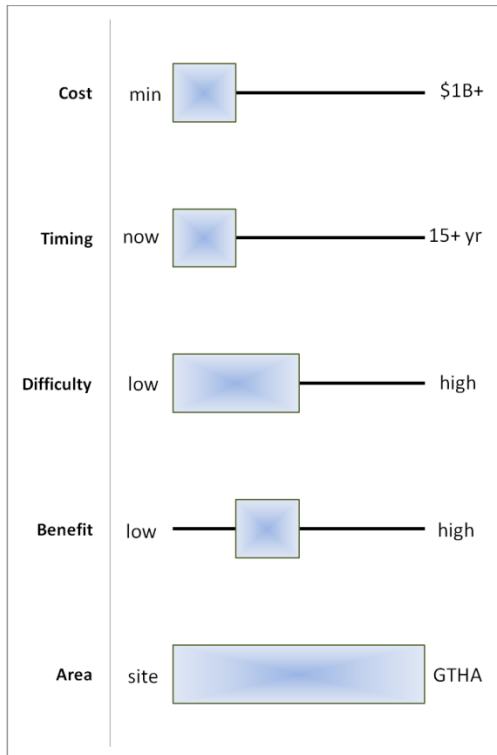
Section	What question is answered?	How is it Described?
	specifically address the issues faced in the GTHA? How was the Action brought forth as a possible solution for the GTHA?	to the GTHA.
How it is applicable to the GTHA	What are the specifics of the applicability of the identified Action? For example, which locations are candidates for the implementation of the Action (i.e. all OPs, Hamilton vs. Toronto Airport, etc.)?	A brief paragraph describing how the Action is viewed as applicable to the GTHA.
Potential Impacts	Of the GTHA urban freight issues raised by the stakeholders, which ones are addressed by the described Action?	A list of the impacts expected as a result of implementation of the Action
Implementation Steps and Considerations	What are the steps and considerations necessary to the implementation of the identified Action?	A high level list of anticipated steps and considerations required for the successful implementation of the identified Action.

**Table 1: Profiling a Specific Action**

Once profiled, the Actions were evaluated for an individual case by examining their performance in terms of five attributes, namely:

1. **Cost:** Describes the Action attributes that affect the potential cost to carry out the Action.
2. **Timing:** Describes the Action attributes that affect the timing of the implementation.
3. **Difficulty:** Addresses the variability of the difficulty in implementing the identified Action.
4. **Benefit:** describes the attributes which will affect the success of the Action.
5. **Area:** Describes the physical area(s) affected by the Action.

An example of how these attributes are used graphically to describe a specific Action is shown below in Figure 2. The intent here is to show conceptually the magnitude of the five attributes, appropriate to high-level consideration and comparison. The widths of the bars are intended to convey the range of possible magnitudes. Each Action subsequently must be analyzed in more detail and with greater specifics before it actually could be implemented.



**Figure 2: Example of Evaluating Action Attributes**

### 3. FINDINGS AND IMPLICATIONS

The GTHA Urban Freight Study was a broad effort delving into many aspects of urban freight from the details of current conditions in the various freight modes and how those data are collected, to trends and challenges raised by demographics, the economy, the nature of the modern supply chain and the views and driving forces behind the various parts of the freight industry. This section distils some key findings and directions from the study, which likely apply not just to the GTHA but to most urban areas.

#### 3.1 Urban Freight Planning is Not the Transportation Planning We're Used To

Through the consultation and best practices review it became clear that apart from the common thread of transportation, planning of urban freight is distinctly different from that of private cars and public transit in a number of ways, and without acknowledging these differences and learning to work with them, it will not be possible to cause meaningful change in the way freight is handled:

- **Ownership.** Whereas the Province, Metrolinx and the municipalities of the GTHA own roads and public transit services, freight is strictly a private need and venture. It often relies on public facilities (roads, ports, airports) and is subject to public regulation at various levels, but that is limited primarily to safety and licensing, and has little or no bearing on how freight is provided, or moved (mode or route selection).
- **Control.** Public bodies control roads and public transit, by definition. Freight is operated by multiple levels of private entities (by manufacturers, shippers, retailers and third party providers of transportation; and increasingly other services as well). This is all essentially transparent to the public sector, and secret as it is intrinsic to the competitiveness of the supply chains and the businesses which comprise them.

- **Planning.** Public agencies typically carry out planning on a 10 to 20 year timeframe, and this works for the 'cargo' of commuters which by and large does not change location, direction, or behaviour in significant ways in the short term. Private industry in contrast can and does make changes affecting freight movements on a daily or weekly basis. This means it is not practical to look at freight activity now and set in motion a detailed master plan to improve everything over even a relatively short 10 year period because long before completion the entire pattern will have changed.
- **Data.** Commuter and transit planning in the GTHA have the benefit of a state-of-the-practice data collection and management system in the Transportation Tomorrow Survey (TTS), which arguably provides all the supporting information that planning requires, and keeps it updated as needed. There is a distinct lack of anything comparable for urban freight, although the Ministry of Transportation of Ontario's *Commercial Vehicle Survey*, which addresses inter-regional heavy truck trips, is widely considered a North American model, and some parts of the GTHA (Peel and Durham) have conducted their own state-of-the-practice urban goods surveys.
- **Scope.** The public sector scope is local, regional, or in the Metrolinx case GTHA-wide, but the private sector is often cross-border or global. Thus, private sector decisions made somewhere else will impact conditions locally.

### 3.2 Key Messages for Urban Freight Planning

The differences (summarized above) between freight planning and the more traditional transportation planning that urban authorities have pursued for decades, along with the details collected through this study on the current conditions in the GTHA, lead to implications for achieving success in future freight planning, and these include:

- **Consultation** - Discussions with private sector stakeholders revealed that the freight planning and operations work on a faster schedule and shorter cycle, and include many factors not considered by local transportation planning departments, such as the need to reduce operational costs. There needs to be closer communication between the public and private sectors to facilitate cooperation where possible and mutually beneficial. It is also important to understand that the "last mile" urban freight component of an increasingly international and integrated supply chain is often relatively insignificant to the industry even though this may be the most apparent aspect of local freight movements in an urban area like the GTHA; and choices of mode within the GTHA are made as part of the entire chain, and may be influenced by both internal and external factors.
- **Data** - A review of the availability and quality of the freight-related data in the GTHA revealed the existence of many gaps, making a detailed comprehensive identification of urban freight bottlenecks beyond reach. Improvements in data collection will require considerable communication between the public and private sectors, and are viewed as vital to future success in managing urban freight and assessing initiatives occurring elsewhere for applicability in the GTHA.
- **Modes** - The four major modes of transportation involved in GTHA urban freight (air, marine, rail, and road), and the interfaces between them all have beneficial characteristics and certain types of goods and conditions that favour their selection. Trucks however are a critical element of virtually all urban freight movements as they are the only mode that can reach all origins and destinations in the GTHA, and they are the most practical and cost-efficient mode for the relatively short trips of urban freight.
- **Economy** - The recent trend and future expectations for the economy were addressed in the study as they pertain to urban freight. Of note is observation of the growing share of service sector jobs in the GTHA and, subsequently, the shrinking share of goods

producing jobs. This shift has influenced (and is expected to influence) freight demands in and around the GTHA.

- **Demographics and Land Use** - The population in the GTHA is expected to grow over the long-term and with growth freight will also increase. Industrial employment is focused around the major highway network, but service industry employment is more evenly distributed, both with their own freight demands. Growth in value of lands however tends to force freight and industrial uses to move as residential and commercial pressures increase, and this disrupts the maintenance of stable freight networks.
- **Society and Natural Environment** - Freight energy consumption has grown dramatically over recent decades, most strongly in trucking and in particular heavy trucks. Trucks are not as energy efficient as rail or marine modes, and they also create a disproportionately large part of GHG emissions compared with their share of energy use. Heavy trucks have in fact become less energy efficient in recent years, possibly due to the development of non-GHG emissions controls. Mode choice is clearly not only a matter of the effect on the natural environment, as many other issues must be considered.
- **Industry Trends** - Consultation with industry representatives and review of available literature and data resources led to a list of prominent trends and challenges. The *trends* pointed towards the international nature of freight and the effect on decision making, the increased use of technology, and the shifting of corporate strategies to minimizing inventories and centralizing production and distribution. The *challenges* pointed towards the public misunderstanding of the importance of freight, the ever-changing nature of freight and the need for regular infrastructure improvements, and the need to including freight in municipal, provincial, and federal planning

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