HAMILTON GOODS MOVEMENT STRATEGY (2024 - 2029)

December 2023

McMASTER INSTITUTE FOR TRANSPORTATION & LOGISTICS

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TABLE OF CONTENTS

TABLE OF FIGURES

Acknowledgements

Hamilton Economic Development would like to acknowledge our colleagues from Toronto Global and the Supply Chain, Onshoring, Resilience & Expansion (SCORE) Program for providing insight and funding by FEDDEV Ontario through the Provincial Track towards the Goods Movement Strategy.

The McMaster Institute for Transportation and Logistics would like to acknowledge the support of all stakeholders who have made the development of this strategy possible. The authors would like to thank Louis-Paul Tardif for his advice as the work has progressed and Deane Maynard for her efforts in organizing the stakeholder sessions. We would like to thank colleagues at the City of Hamilton who assisted and gave of their time and especially the Economic Development Team.

1 INTRODUCTION

1.0 INTRODUCTION

Hamilton's past, present and future economic prosperity has and will be heavily influenced by its geographic location and industries that rely on goods movement.

Hamilton's goods movement sector plays a key strategic role – not just to Hamilton, but to the economy of Southern Ontario – because of *what* is moved through Hamilton, and *where*, by connecting manufacturing, agrifood and commodities supply chains in Ontario to the world, with trade-enabling resources in the City and the region. Hamilton lies centrally in the heart of Canada's largest economic region.

Most Hamilton residents see trucks as they travel on city, regional and provincial roads, but probably do not fully appreciate the value these trucks bring to Hamilton, or where they're going. They can be delivering radiopharmaceuticals to Canada's two busiest cargo airports, food products for shipment overseas at Canada's busiest Great Lakes port, commodities to rail, or steel coils from one of Canada's two largest steel producers to automotive assembly or parts plants in Cambridge, Woodstock, or Guelph – or, increasingly, they can be delivering parcels to a professional working from home.

In fact, an efficient and resilient goods movement sector ranks among the main influencers of manufacturing investment location decisions.

In Canada and globally, the goods movement sector faces major change over the next 10-20 years, driven by emerging technologies, decarbonization policies, population changes and adaptations from a global pandemic. Hamilton has an opportunity to anticipate and capitalize on these changes by acting strategically over the next 5 years, and to do so in a manner that increasingly addresses global markets. Hamilton appears well-positioned to

thrive as a goods movement hub based on its many attributes, including the rare ability to offer every freight mode within its municipal boundary.

This report is intended to provide insights into Hamilton's goods movement sector, the key issues affecting its growth and competitiveness, its importance to the industries reliant on the sector – and finally, how Hamilton's Economic Development team can work with the sector to attract further investment, trade more, grow employment and build a prosperous future for residents.

Our Approach

Recognizing the economic development potential for goods movement, its relationship to other economic development strategies, as well as its implications for city planning, climate change and workforce development, we approached the development of this strategy in three primary ways:

- Summarizing Hamilton-specific information and provide analysis on the sector, including data collected, relevant to policies and trends, at other levels of government.
- Gathering direct feedback from decision makers and influencers in the sector and those impacted by the sector.
- Synthesizing key prior inputs such as Council Priorities, the Economic Development Action Plan [1], key sector strategies (Manufacturing [2], Foreign Direct Investment [3], Life Sciences [4]), Transportation Master Plan update [5] in addition to relevant Provincial and Federal strategies and other pivotal documents. MITL's extensive past research on goods movement in the region has offered guidance as well [6].

We have identified, in a framework, other areas of interest to the city related to goods movement but have focused action items on economic development opportunities for goods movement and related sectors, as referenced in other economic development strategies.

The development of this strategy has relied heavily on the analysis of the best available primary data sources that are available and relevant to the goods movement sector. The strategy represents perhaps the leading attempt to this point to assemble a compendium of goods movement-related data on Hamilton in one place. This compendium is contained under separate cover as an analytical appendix completed under the "Fluid Intelligence" partnership between the McMaster Institute for Transportation and Logistics (MITL) and the Hamilton-Oshawa Port Authority (HOPA). The compendium combines a rich presentation of analytical graphics with detailed bullets on important takeaways.

The goods movement compendium has relied on several data sources, with the most prominent being:

- 2019 Ontario Ministry of Transportation Commercial Vehicle Survey (released in 2022) including truck count data at available and relevant MTO transportation stations.
- American Transportation Research Institute (ATRI) GPS data for 2022 and 2023.
- Canadian Business Counts data from Statistics Canada.
- Specific contributions by HOPA and Vantage Group (operator of John C. Munro Hamilton International Airport).
- Canadian Freight Analysis Framework (CFAF) developed by the Federal government.
- Canada Border Services Agency (CBSA) Air Cargo Data (used to provide high-level summaries only).

Some visual components of the Hamilton goods movement compendium have been pulled forward into the main strategy document as part of the

narrative and are included throughout the discussion in Chapter 2. For the interested reader, Chapter 2 is not a substitute for richer detail available in the compendium for some freight themes.

Stakeholder engagement has been critically important in the development of the strategy. In acting on a municipal goods movement strategy, there is a complex stakeholder environment to navigate. Meanwhile, the entire system of supply chains on which local, regional and national economies depend is even more involved. Automotive supply chains, for example, are incredibly complex. Ultimately, all supply chains depend heavily on goods movement as a critical enabling mechanism.

Given the importance of stakeholder engagement, the McMaster team organized and hosted three on-line sessions that took place in June 2023. Across these sessions, 40 stakeholders attended and represented 37 different organizations. There was representation across all freight modes and levels of government and from a wide variety of organizations with a stake in the future of goods movement in Hamilton. A summary of the insights from the session is included in the Appendix. Linkages to insights from these engagement processes have been made throughout Chapter 2 and are influential in deriving the final set of action items in Chapter 3.

Acronyms are used often in the strategy. These have been spelled out in full the first time they are used. An alternative approach to understand an unknown acronym is to consult the table available on page 93.

To close this introduction, two key outputs of the overall strategy process are displayed at the conclusion of this introductory chapter. On the following page is a summary of Hamilton's value proposition considered from a goods movement perspective (Figure 1-1). On the page that follows is a summary of the overall strategy that has emerged from this process (Figure 1-2).

Figure 1-1: Hamilton's Goods Movement Value Proposition

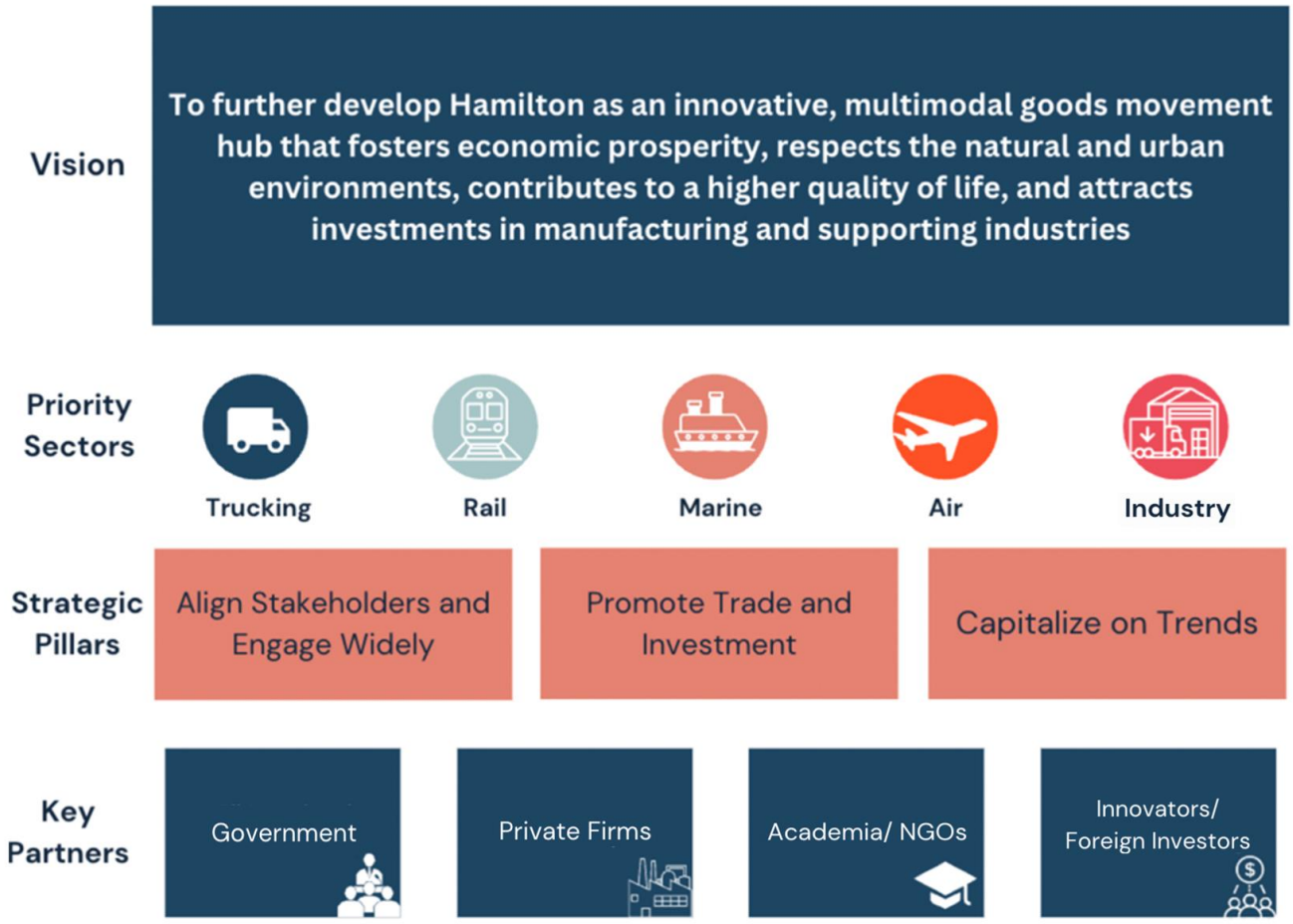

Figure 1-2: Summary of Strategy

2 CURRENT STATE ASSESSMENT

2.0 CURRENT STATE ASSESSMENT

2.1 Context

The Hamilton Goods movement sector includes all modes of transportation – road, rail, marine and air – as well as multimodal transfer facilities. All modes are necessary to keep the economy functioning. In addition to goods and freight carriers, the sector includes logistics, warehousing and distribution companies, technology developers, educators and researchers, transportation planning, services from financial and insurance providers, customs brokers, and a range of other supporting and emerging industries.

The public sector plays a major enabling role in the sector, through its ownership and influence over road infrastructure, the Hamilton-Oshawa Port Authority (HOPA) and the John C. Munro International Airport, operated by Vantage Group, under contract with the City of Hamilton. Rail companies operating throughout the region control their own rail infrastructure but are subject to federal regulation and oversight.

The goods movement sector is, has been, and will be strategic to Hamilton's economic prosperity. The sector is economically significant to the Hamilton economy and to the surrounding region in two ways:

- It is an **enabling sector** to manufacturing, agrifood and consumer logistics supply chains, and
- It is a major, **high wage employer** in its own right (see Table 2-1).

Strategically, the goods movement sector establishes Hamilton as a trade hub, connecting the Greater Toronto Hamilton Area (GTHA) and Southern Ontario to the US and the world.

As an enabling sector, an efficient and resilient transportation sector supports international trade in goods based on speed, cost and, increasingly carbon

footprint. This can induce a virtuous cycle which supports business expansion and further investment. Transportation costs are ultimately reflected in the cost of goods delivered to consumers locally, and in the geographic reach locally produced goods have in export markets (both internal – interprovincial – and external trade).

Figure 2-1: Hamilton's Strategic Location in a Macro-Sense

As a sector, goods movement can be segmented by transportation mode and the goods they carry, as well as by time sensitivity and volume/weight. Hamilton is also home to an emerging segment of transportation focused on communications and technology-enabled goods movement/planning.

In developing this strategy for Hamilton, consider that the goods movement sector coexists with passenger travel; the two segments support one another and occasionally come into conflict in competing for scarce resources.

Government policies at all levels must take these issues into consideration in developing long-term plans for growth. The recent pandemic accelerated changes already underway in the economy and society, leading more people to work from home, while also creating more demand for home delivery.

An efficient goods movement sector is essential to competitiveness of the industries it supports, and Hamilton's goods movement sector provides the industries reliant on goods movement with competitive advantage over competing locations.

Strategic Location

Hamilton is centrally located in Canada's economic heartland, near Canada's most important metropolitan area. Hamilton is well-located in relation to southern Ontario and the Greater Toronto Area (GTA), the US Midwest and the US Northeast as Figure 2-1 attests. The city is also centrally located within the binational Great Lakes-St. Lawrence Region. The economy of this region is more than twice the size of the entire Canadian economy [7]. Invest Hamilton notes that 142 million consumers reside within a day's drive of Hamilton and approximately $400 billion in merchandise trade travels across the border in Ontario every year, much of that flow near Hamilton.

Figure 2-2, which is good for reviewing in detail, has been reproduced from an earlier report by MITL [8] that was based on extensive stakeholder engagement. The two maps highlight Hamilton's central position in the Golden Horseshoe, some of the important transportation infrastructure, and also key bottlenecks as they were being perceived in the year before the pandemic. Many of the noted bottlenecks remain relevant today and are discussed as this chapter proceeds.

Figure 2-2: Goods Movement Features and Bottlenecks in Hamilton and Vicinity

Hamilton's location is intertwined with quality-of-life aspects that are important from many strategic perspectives. As the lower map in Figure 2-2 highlights, Hamilton residents have good simultaneous access to the amenities of Toronto and Niagara and what lies across the border. These and related elements are also highly beneficial for firms that choose to locate their operations in Hamilton.

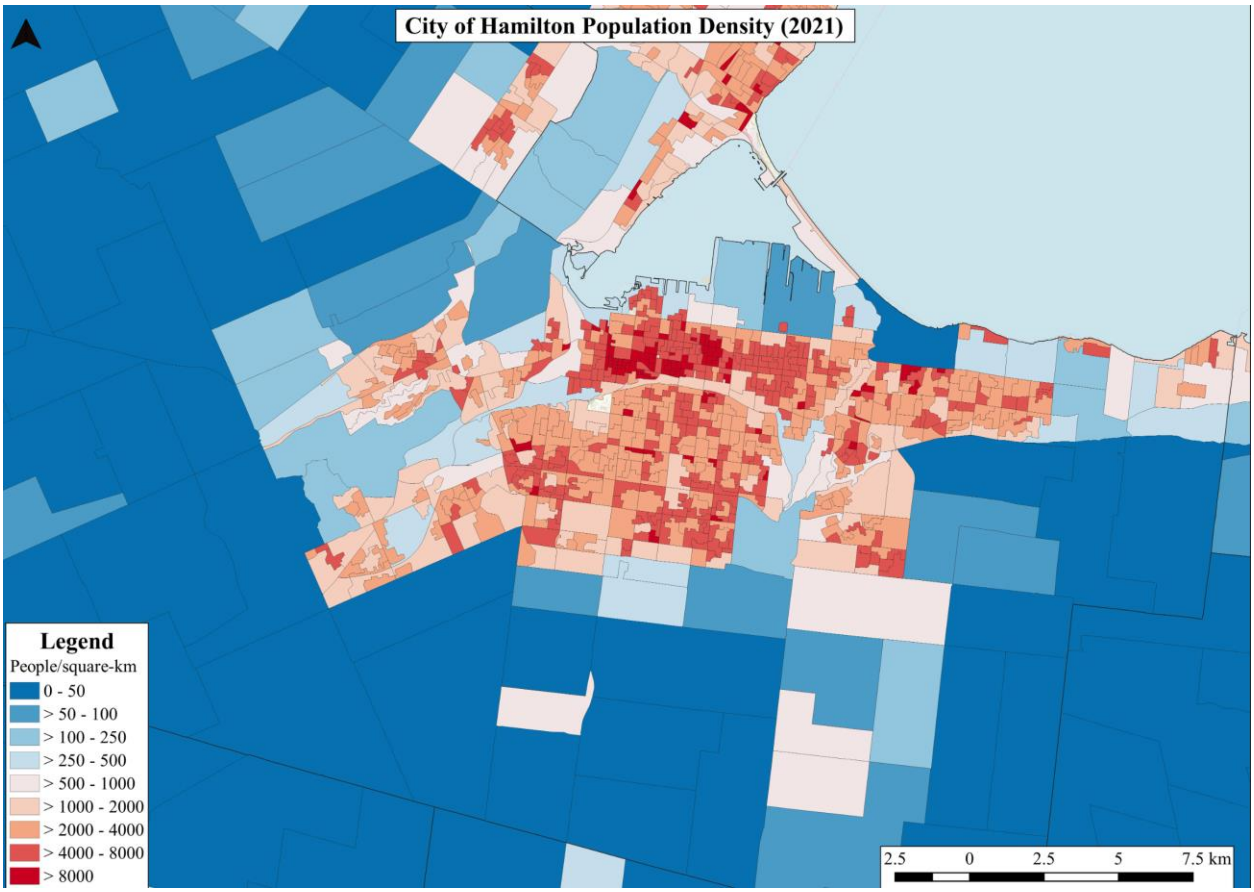

Figure 2-3: Population Density by Census Dissemination Area in the City of Hamilton

Another important aspect of context for Hamilton's goods movement strategy is population density (Figure 2-3)[1], as this has a significant impact on the environment in which the goods movement sector must operate. Hamilton's extensive rural areas generally have fewer than 50 people per sq-km. Peak densities in Hamilton are near the downtown area with several

[1] Thanks to Ali Shehabeldeen from MITL for the development of this map.

small census areas well over 8,000 people per sq-km as indicated on the map. There are a handful of small census areas nearing 50,000 people per sq-km[2]. It is important to note that even the most densely populated locations in Hamilton are not highly dense and these do not extend over a large area. This has implications for goods movement in Hamilton and means fewer pressures in the "last mile" of delivery compared to dense metropolitan centres.

Size, Impact and Wages of the Goods Movement Sector

Considering that the proper functioning of the goods movement sector is an essential lifeblood to daily life and the economy, it is difficult to put a true value on its role. With no flow of goods, society as we know it would soon ground to a halt and faster than we might imagine. In the automotive sector, February 2022 disruptions at the Ambassador Bridge in Windsor/Detroit over a one-week period caused some automotive production plants, with their finely tuned cross-border supply chains, to shut down entirely even though other border crossings remained open.

Table 2-1: Hourly Wage Rates: Selected Goods Movement Occupations

Occupation	Median Wage per hour ($)
Senior managers - construction, transportation, production and utilities	41.03
Production and transportation logistics coordinators	25.00
Transportation route and crew schedulers	26.14
Ground and water transport ticket agents, cargo service representatives and related clerks	19.50
Managers in transportation	54.33
Deck officers, water transport	29.00
Transport truck drivers	25.00
Water transport deck and engine room crew	29.71
Air transport ramp attendants	23.00
Railway and motor transport labourers	18.85

Given that the true value of the goods movement sector and supporting infrastructure is probably incalculable, we can at least estimate aspects of its

[2] As a comparison, Toronto has 1361 small census areas at over 8,000 people per sq-km, 69 small census areas at over 50,000 people per sq-km and 9 over 100,000.

size using employment levels and GDP as tools. For the former, human capital is critical for the goods movement sector in Hamilton to function but the number of people involved is relatively small given the large impact:

- The transportation and warehousing sectors (NAICS codes 48-49) for the Hamilton Census Metropolitan Area (CMA - which includes Burlington and Grimsby) is estimated at 17,075 employees based on the 2021 census. Note that this includes many occupations associated with people movement (e.g., public transit operation). Note also that the census is based on place of residence, so some of the 17,075 may work outside Hamilton and other people who work locally in this sector may reside outside Hamilton and are counted elsewhere.

- The trucking sector accounts for 4,890 of the 17,075 total transportation and warehousing employees and another 5,000 approximately of the total are involved with postal/courier operations. These are the largest employers in terms of the direct movement of goods across modes. The recent growth of Amazon in Hamilton adds significantly to the 17,075 total.

- It is the nature of goods movement that truckers who are driving in Hamilton at any given time may be from elsewhere and Hamilton drivers may well be working outside of Hamilton. For the City of Hamilton, as opposed to the CMA, the total will be significantly less than 4,890[3].

- Median hourly wages for selected goods movement occupations are reported in Table 2-1 as reported for Hamilton-Niagara region at the Government of Canada Job Bank.

[3] A rough estimate for the City of Hamilton (not the CMA) derived from the Canadian Business Counts data source arrived at a total of 4,482 in the truck transportation sector as of June 2022. This would be based on place of work, not place of residence.

- At 37,880 employees for the Hamilton CMA [4], the manufacturing sector certainly is much larger than the core goods movement sector in terms of employment and is very much involved in generating demand for the services of goods movement providers. Manufacturing relies heavily on the goods movement sector to function and to plan future expansion.

Each week, approximately 100,000 cargo-carrying truck trips interact with, or pass through, the City of Hamilton with cargoes valued at $3.8 billion.

Importance to the economy can also be assessed through GDP statistics. GDP data specifically for Hamilton was not available for this strategy. National statistics reveal that the transportation and warehouse sector accounts for 3.6% of Canada's total GDP [9] and truck transportation is estimated to account for 28% of the sector in GDP terms. Manufacturing accounted for 9.5% of national GDP in 2021.

A recent strike that shut down the Great Lakes - St. Lawrence Seaway offered another illustration of how the economy depends so heavily on goods movement. A 2023 economic impact report estimates that 22,471 direct jobs in Ontario are supported by the operation of the Seaway, with the total increasing to 67,154 jobs if indirect and induced impacts are included as well [10]. Although not specifically broken down in the study, the Port of Hamilton plays a central role in supporting those jobs.

[4] The recent Manufacturing Strategy [2] suggests that approximately 25,000 of these jobs reside in the City of Hamilton.

Central Ontario Region (including the GTA) accounts for the bulk of Hamilton's inter-city truck trips: 57% of trips inbound to Hamilton and 53% of trips outbound.

2.2 Road

Movement of goods by truck is the most prominent element of how roads and highways get used for the purposes of this strategy. But roads are very much a finite and shared infrastructure resource. People movements, whether by automobile, public transit or bicycle are highly dependent on road networks. Pedestrian movements are quite intertwined with the usage of roads and pedestrians are the most vulnerable users of roads. Whether dealing with middle miles, first or last miles or the "last yard", roads are very much part of the equation in delivering goods as inputs in the production process or as outputs reaching the doorsteps of end consumers. The relative complexity of road usage leads to an array of themes that must be explored to assess the current state.

The High Importance of Roads and Highways

The significance of the local road and highway network (and the regional road network beyond) cannot be overstated. Roads (arterials and highways) constitute the cornerstone of Hamilton's multi-modal capability. Clearly the trucking sector cannot operate without them, but the air cargo sector in Hamilton depends heavily on well-timed connections to key markets based on truck movements. Large tonnage flows of goods, both to and from the Port of Hamilton, rely on local and regional road and highway networks. Rail offers some direct connections to industrial sites but generally road connections to rail transload or intermodal facilities are paramount. Road networks also facilitate movements by passenger vehicles, active (walking and cycling) and public transit, all of which are interdependent with goods movement (especially in the central city and other areas of higher density).

Where are goods moving by truck?

Truck transportation is pivotal for goods movement and an understanding of movements that are tied to Hamilton is essential. Figure 2-4 (which excludes truck movements that are internal to the City of Hamilton) shows that most cargo-carrying truck trips that start or end in Hamilton are internal to Ontario. Trips to and from the Central Ontario Region (which includes the GTA) are especially prominent as is Southwestern Ontario. There is little direct trucking linkage to Northern or Eastern Ontario.

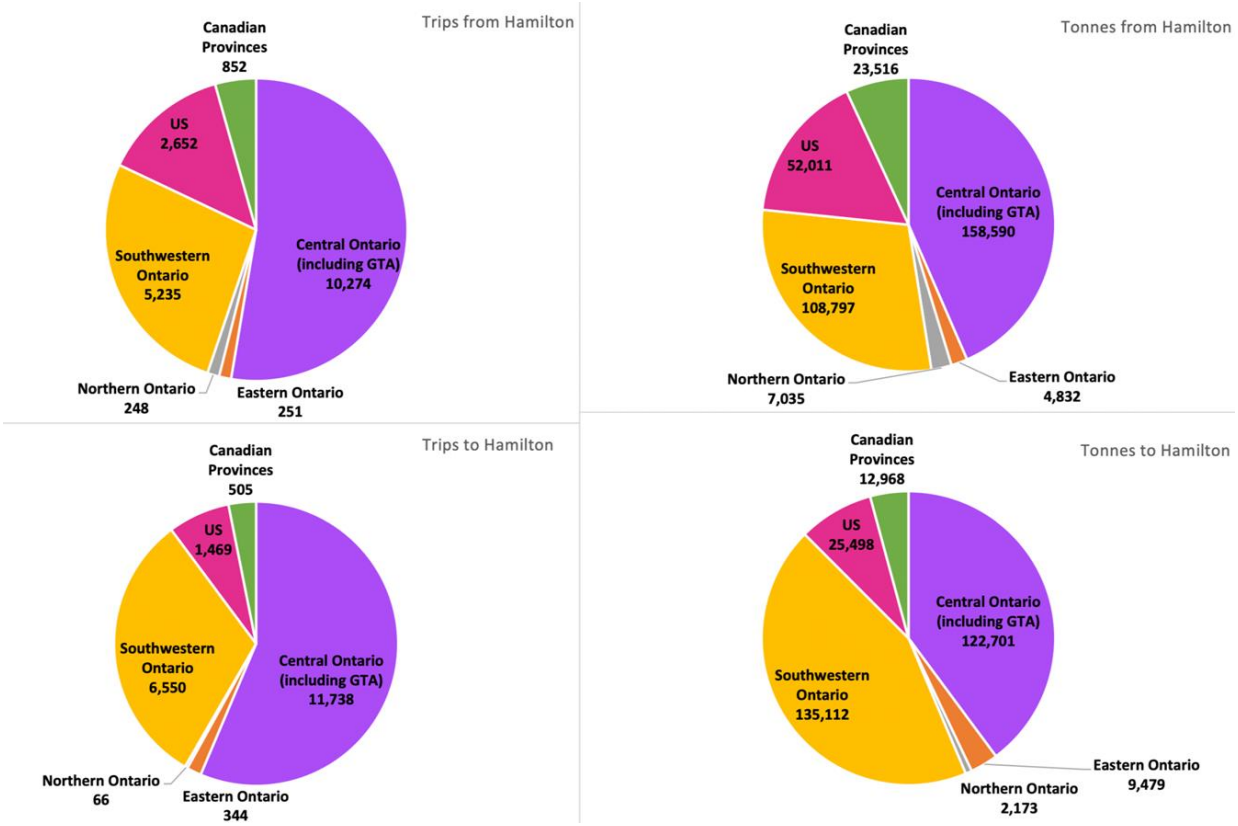

Figure 2-4: Hamilton's Weekly Truck Flows in and outside of Ontario (Source: CVS)

Note that Central Ontario Region accounts for a larger share of truck trips than truck tonnage. Note also that direct linkages to the US are more important for trips/tonnes *from* Hamilton (versus to Hamilton). Also apparent is that truck flows to and from the US are more significant to Hamilton than truck flows to other Canadian provinces.

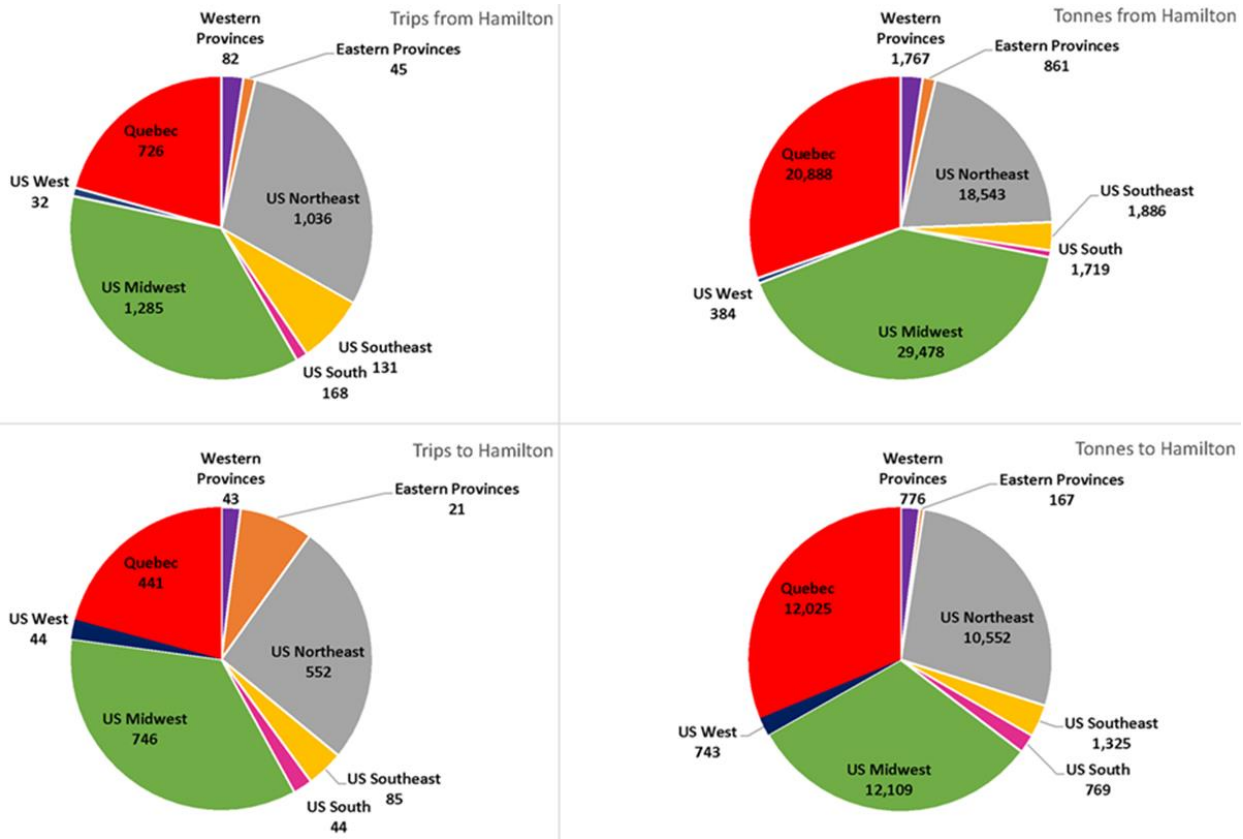

Figure 2-5: Hamilton's Weekly Truck Flows outside Ontario (Source: Derived from CVS)

Figure 2-5 excludes trips that are internal to Hamilton, but also excludes trips that are internal to Ontario. This view offers more detail into Hamilton's Canadian and US connections by truck. Within Canada, Hamilton connections by truck to/from Quebec dwarf connections to other provinces. Tonnage connections to Quebec are more important than trip connections indicating that truck loads tend to be relatively heavy. For US regions, the Midwest is significantly more prominent for Hamilton than the US Northeast. The nearby state of Ohio, which is important to Hamilton, is classified as Midwest. These charts also highlight the strong importance of truck-enabled trade with the United States.

A detailed comparison of the two trip pies in Figure 2-5, in terms of trip totals, would reveal that Hamilton generates many more non-Ontario trips than it receives (18% of weekly trips versus 10% of trips). This likely reflects that

freight hubs such as Peel Region often act as an intermediary distribution point for goods arriving from outside Ontario.

What goods are moving by truck?

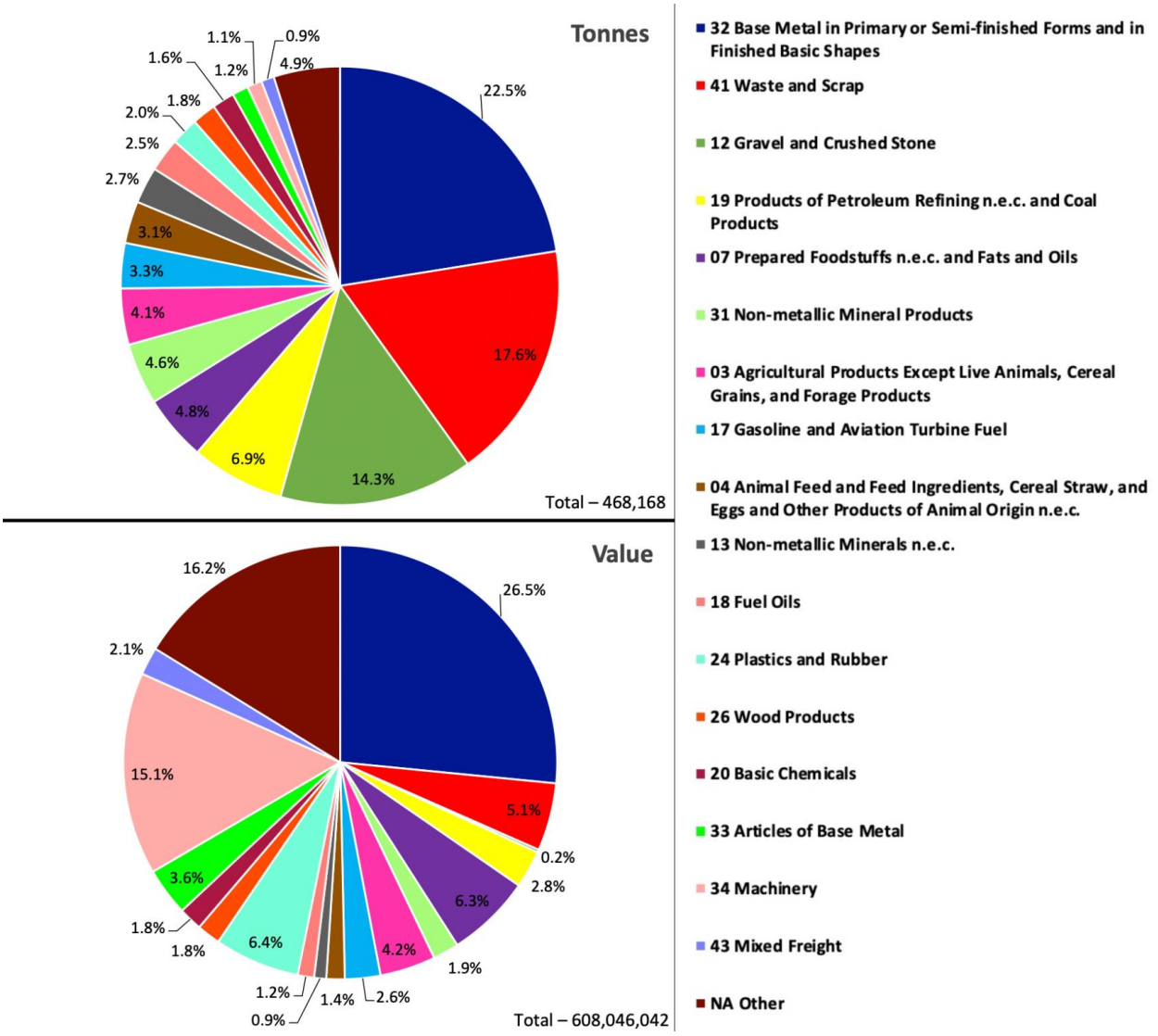

Figure 2-6: Outflowing Truck Cargo Tonnage and Value from City of Hamilton (Source: CVS)

The Ontario CVS offers good insight into what is carried on trucks. Figure 2-6 characterizes truck cargoes that originate in Hamilton and Figure 2-7 does so for cargoes that arrive in Hamilton. Both figures illustrate tonnage and value distributions for relevant commodities. For each pairing of pie charts,

commodities are sorted in the same order. The Fluid Intelligence Compendium additionally represents trips and tonne-km in a similar manner.

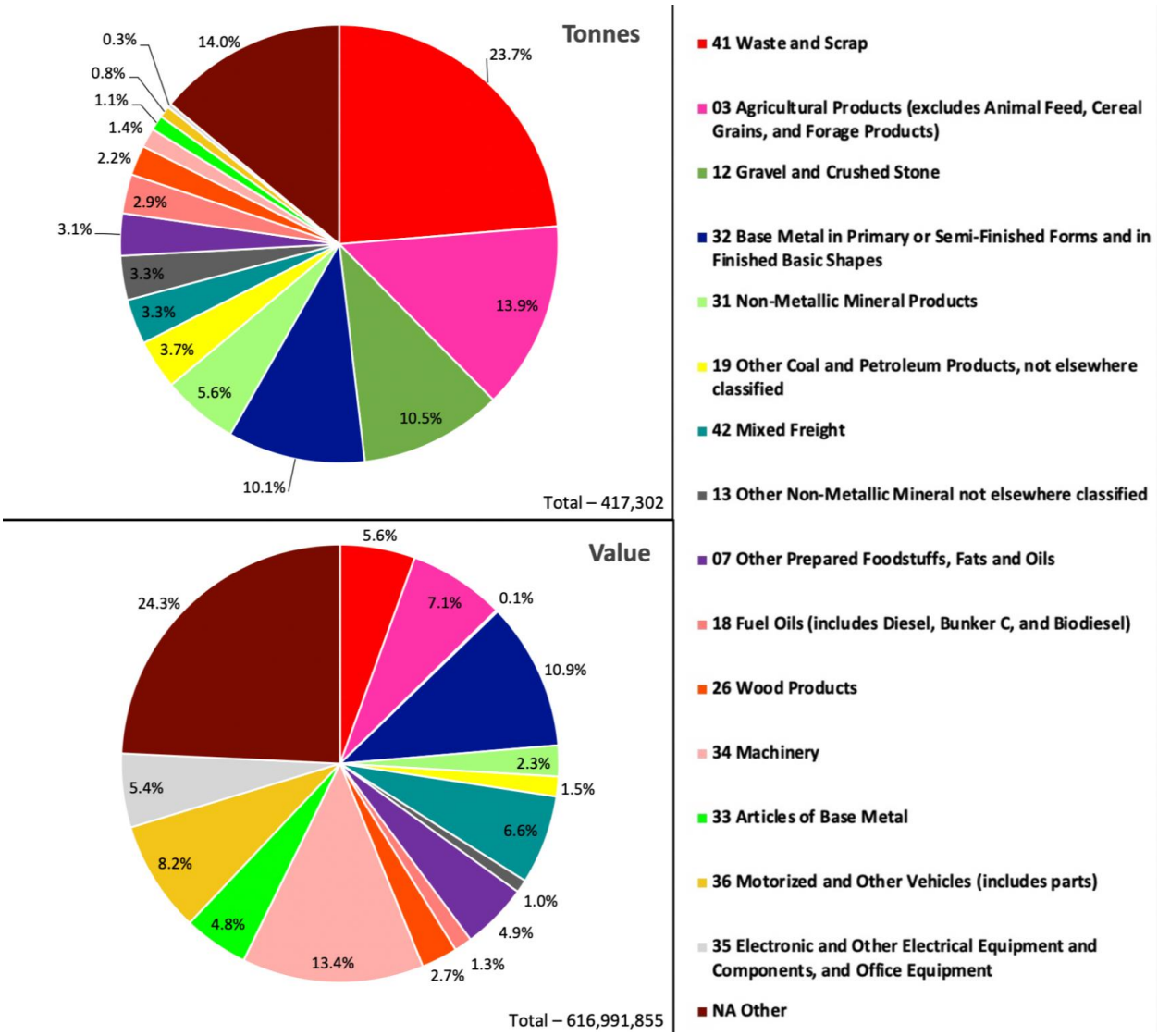

Figure 2-7: Inflowing Truck Cargo Tonnage and Value to City of Hamilton (Source: CVS)

A few observations stand out from the two figures (and others are possible):

- Heavy manufacturing stands out more for outflows moved by truck than inflows.
- For outflows, note that “Gravel and crushed stone” is very prominent in tonnage terms but barely visible in value terms.

- Outflows of "Machinery" are quite prominent in value terms but not tonnage terms.

On the QEW near Winona, approximately 13,500 east-west moving trucks may pass during a busy weekday.

Given the timing of the most recent CVS data collection, mostly in the pre-pandemic period, consumer goods movements are not highly apparent in these charts. The rise of Amazon in the region is likely to increase the prominence of such goods in future data collection.

When Do Trucks Operate?

For Hamilton freight movements, there are definite seasonal patterns each year and daily fluctuations within the course of each week. With the rise of agricultural commodities feeding into the Port of Hamilton over the past decade and before, autumn harvest has become a busy time for the Port and for the trucks that feed in the commodities. In weekly terms, there is a definite lull in activity on the weekends, especially Sunday. Trucking activity peaks between Tuesday and Thursday. Within the typical weekday, trucking firms allocate more activity between the AM and PM highway congestion peaks, with there being more urgency to avoid afternoon congestion. Mid-day tends to be the peak for truck volumes.

There are some interesting temporal patterns by truck type. Smaller single unit "straight trucks" are generally more locally oriented than trucks with trailers (that typically have 5 axles or more). Single unit trucks thus tend to be relatively more active during the day. Larger trucks are generally more active over the course of the 24-hour day. See Figure 2-8 for some evidence on these aspects and on truck volumes. The greater intensity of truck activity on the QEW relative to the Lincoln Alexander Parkway (LINC) can be seen but it is also clear that the LINC and Red Hill Valley Parkway (RHVP) have emerged as critical for truck movements in the region.

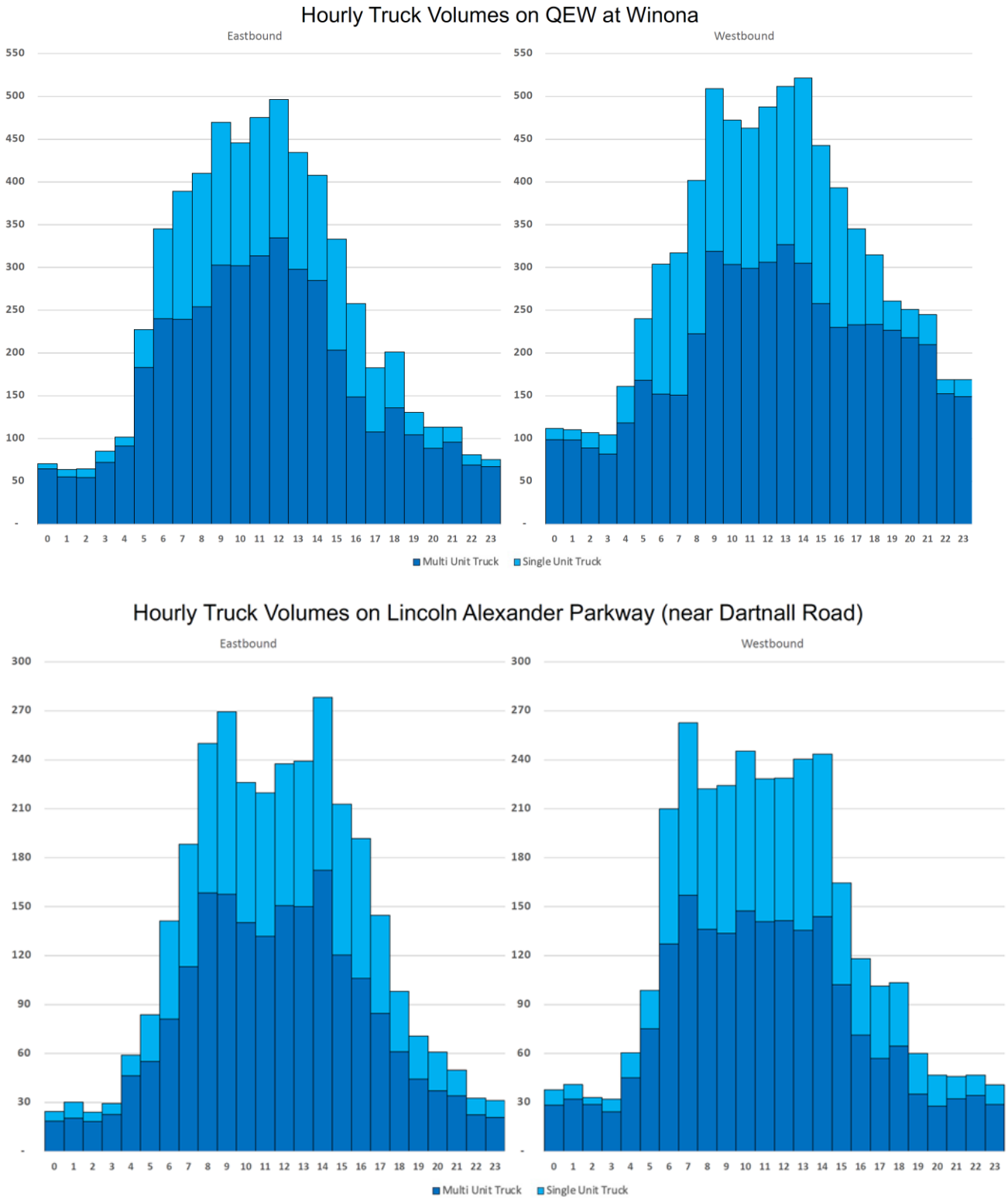

Figure 2-8: Hourly Truck Volumes at Key Hamilton Highway Locations

Intensity of Trucking Activity

Figure 2-9 offers a good sense of the relative intensity of trucking activity across the City of Hamilton. Another view is available in the Fluid Intelligence Compendium. The figure highlights that trucking activity is quite unevenly distributed and that the major highways, not surprisingly, are associated with a very high intensity of trucking activity. The heart of goods movement in the city is centred near the intersection of the QEW and the Red Hill Valley Parkway. To the west of this location lies much of Hamilton's heavy industry and the Port of Hamilton. These are associated with significant multimodal activities via trucking, marine and rail. To the east is a large, diversified trucking cluster and associated light industrial activities that take advantage of the proximity to the QEW. This east-west band of activity extends for approximately 15 to 20 km and accounts for the most intense goods movement activity in the city.

The QEW is associated with a lot of pass-thru activity but there is also a lot of direct interaction between heavy trucks and the local communities. A large shipper of goods in Hamilton estimated that their operations generate 500 truck trips per 24 hours, though most of these movements have good direct access to highways. Other areas (e.g., Ancaster, the West Mountain) experience a lot of pass-thru heavy truck activity related to major expressways, which generate background noise and emissions, but see less direct interaction with trucks on the streets.

Other trucking clusters are evident in Figure 2-9. The cluster associated with the Red Hill Business Park is very prominent along with the business parks in Ancaster and Dundas. There is a strong node of activity associated with the airport and truck activity linked to the new Amazon Fulfilment Centre, near the airport and Dickenson Road, shows up clearly.

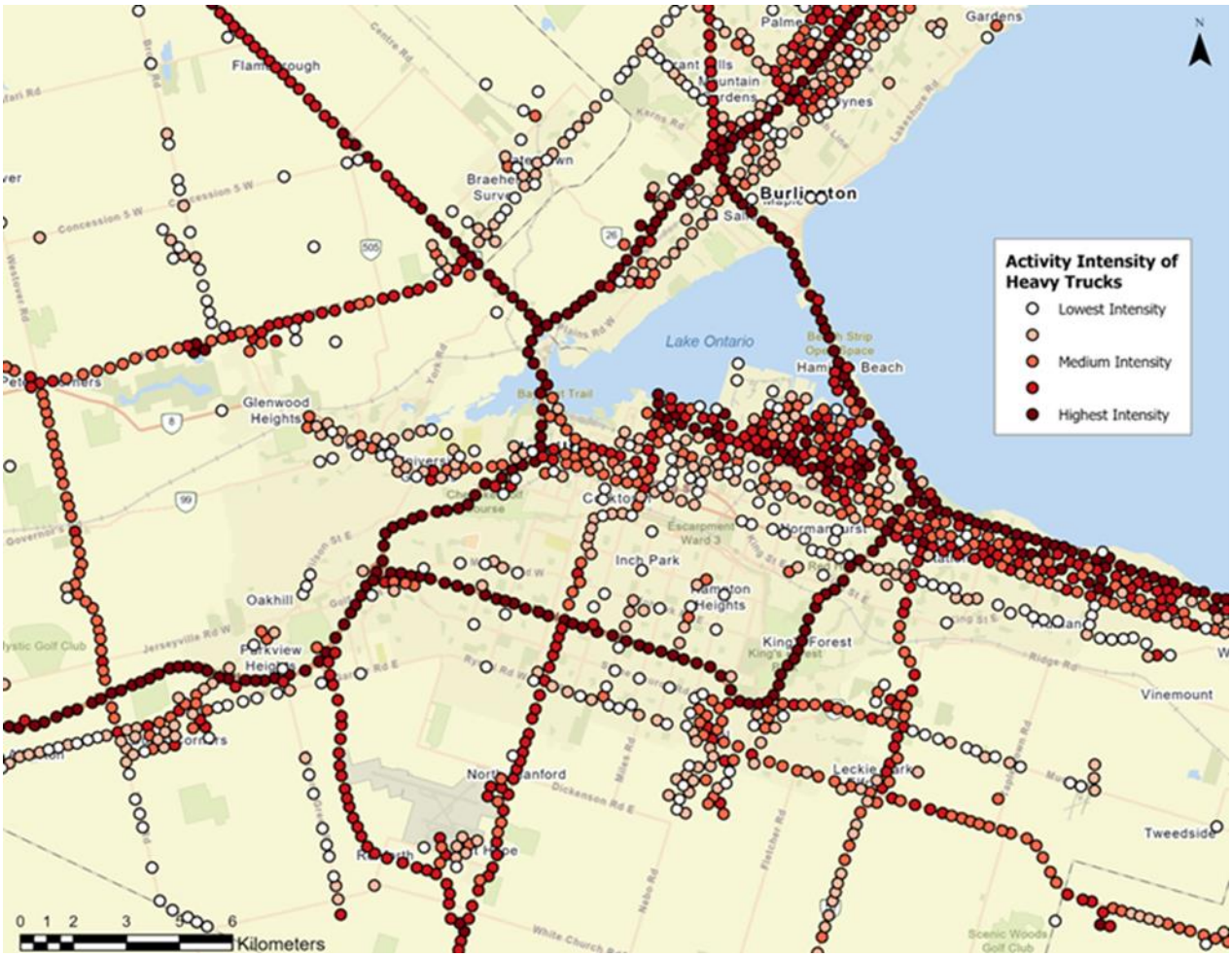

Figure 2-9: Intensity of Trucking Activity (Source: Derived from ATRI)

Truck Trip Details by Hamilton Wards and Regional Zones

Figure 2-10 considers truck trips associated with Hamilton and is derived from the Ontario CVS. Such trips may originate/terminate in Hamilton or pass through. Some of these trips may involve empty trucks. The graph represents a custom zonal system where Hamilton is represented in considerable detail (at the level of wards) while farther off geographies are captured in less detail. Trips per zone are captured as the sum of outflowing + inflowing trips. Trips per zone are also classified by the type of truck involved. Hamilton zones (wards) are specifically marked for easy identification. The truck types are mostly self-explanatory but "straight trucks" do not involve a trailer.

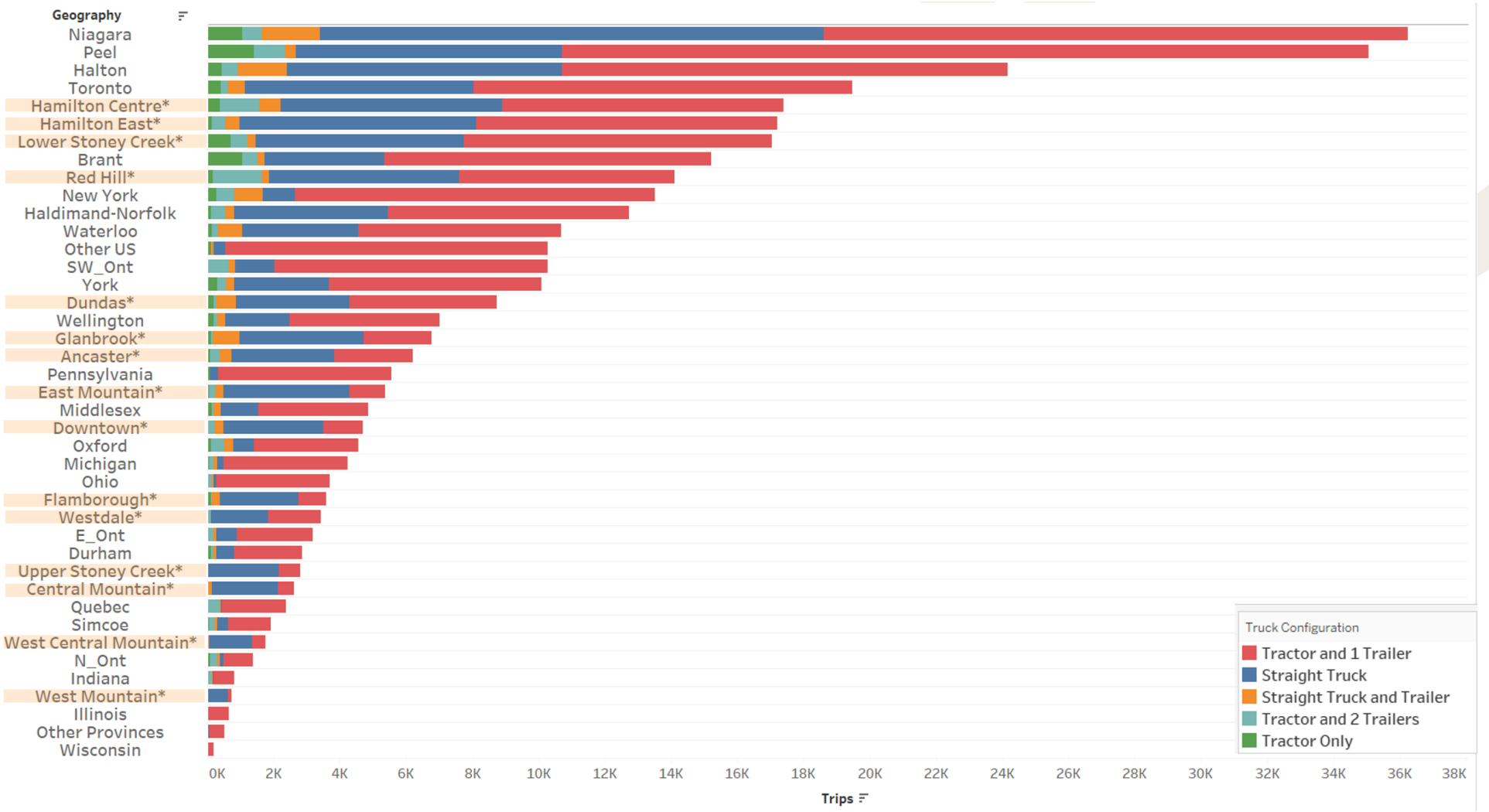

Figure 2-10: Hamilton-Linked Weekly Truck Trips by Truck Types Depending on Geographic Zone

Several observations can be made about Figure 2-10:

- The sum of the individual Hamilton zones leads to a very large trip total relative to any other zone in the graph.
- Peel and Niagara Regions are the most prominent "zones" outside Hamilton and interact similarly with Hamilton for total trips. Peel is a much larger freight hub, but Niagara is closer to Hamilton.
- Peel-Hamilton interactions are more likely to involve tractor and one trailer combinations, while Niagara-Hamilton is more likely straight trucks.
- Four wards in Hamilton stand out for being associated with a lot of truck trips and they are all quite close to QEW-RHVP. The West Mountain wards have the least direct interactions with trucks.
- When a truck in Hamilton is linked to a far-off jurisdiction (e.g., Illinois, Wisconsin) it will almost certainly be a tractor-trailer combination. For GTA and beyond, straight trucks are in the minority.
- Now and into the future, straight trucks would typically be allowed into the Hamilton central city whereas tractor/trailer combinations would not.
- Tractor trailer combinations seem quite prominent for most Hamilton zones, but small, delivery-oriented trucks are not well captured by the CVS.

Local and Regional Traffic Congestion

The ability of Hamilton to sustain generally lower levels and shorter durations of traffic congestion on its major highways and arterials is a significant component of its overall value proposition. It is an empirical fact that Hamilton, on average, is less congested than the GTA but there is a need to maintain this as an on-going perception. According to TomTom [11], which

comprehensively tracks urban road speeds around the world, Hamilton ranked as the 300th most congested metropolitan area in the world in 2022 in terms of the typical duration required to travel 10km. Toronto was more congested, ranking at 206 in the world while London, Ontario (which lacks urban expressways comparable to the Linc or RHVP) was interestingly ranked the most poorly of the three at 151. This brief comparison suggests a good empirical basis for Hamilton being viewed as relatively less congested.

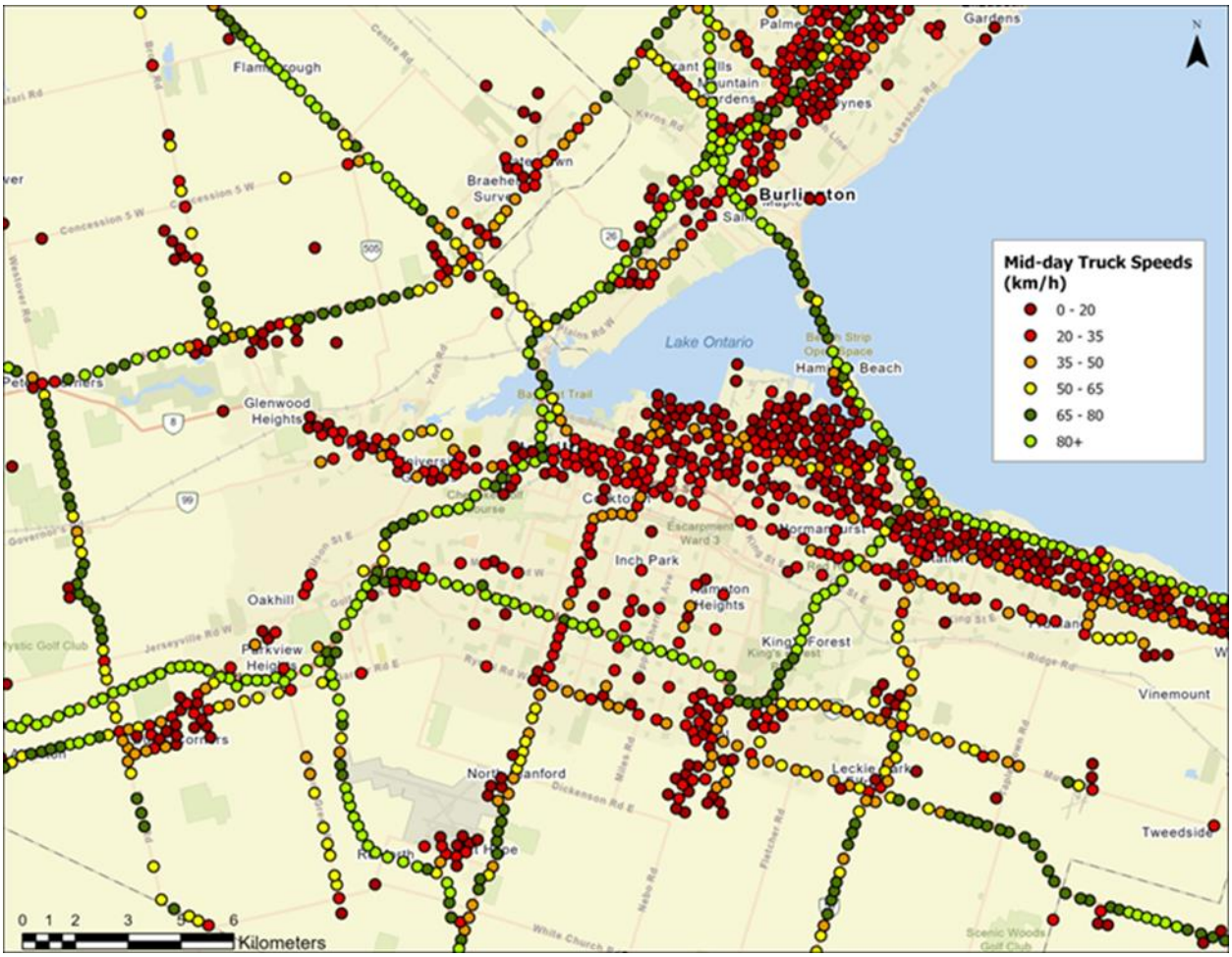

Figure 2-11: Mid-Day Truck Speeds (Source: Derived from ATRI)

Figure 2-11 uses GPS data and focuses specifically on truck speeds on weekdays for several hours in the middle of the day when truck volumes are at their highest. The results cover a period of six months including up to February 2023. The colour patterns on this map highlight the critical importance of highway infrastructure to keep trucks moving at a high rate of

speed. There is much more green than would be the case if Hamilton were a city of arterials. A few specific observations are possible from this map and another that is available in the data compendium:

- There is evidence of trucks operating at sub-optimal speeds of 50-65km/h on highways (e.g., Highway 6N between 403 and Clappison's Corners, Hwy 5 near Clappison's Corners, 403 Ancaster Hill, Highway 6S at Book Road).
- Burlington Street is typically in the 35-50 km/h range but slows notably west of Wentworth Street.
- Speeds are 20-35 km/h on Upper James Street near the LINC
- Speeds are relatively slow for getting to/from the Downtown (and this is more so the case on King Street)

Further outputs in relation to traffic congestion are available in the data compendium. Results are shown from 2022 for major highways in Hamilton and the overall GTHA. 2022 was a recovery year from the pandemic and featured lower levels of congestion than 2023. As a result, we have opted not to dwell here on the particulars of 2022 results. The compendium also highlights GTHA congestion results from 2014 and shows rather severe outcomes at a time when working at home was much less of an option.

In this section on congestion, it is critical to note that it is not just intra-Hamilton congestion that matters for Hamilton's goods movement sector. Figure 2-10, others prior, and outputs in the data compendium, highlight a strong dependence on regional interactions. As such, traffic congestion beyond the borders of Hamilton is a very important consideration. The performance of the QEW, for example, through Halton and Peel regions, very much impacts perceptions on the viability of Hamilton's location relative to the GTA. A recent MITL survey of goods movement-oriented firms in Niagara

region revealed that regional traffic congestion and the ability to access the GTA was actually viewed as more critical than local highway congestion [12].

The Hwy 407 toll road is also a regional topic of interest for Hamilton goods movement. The city's location relative to Hwy 407 was brought up as a useful aspect of its value proposition during stakeholder engagement. Hamilton offers good proximity, albeit not direct access, to the toll route for expedited travel to many regions of the GTA. For some freight contexts, it is becoming more common for shippers/carriers to justify paying the high per km rates for trucks. However, intra-Hamilton Hwy 403 bottlenecks cause difficulties simply to access Hwy 407 and may interfere with the perceived benefits of using Hwy 407, taking into account Hamilton's need to connect with the GTA.

Dependence on Provincial 400-series Infrastructure and Decision-making

The 400-series highways located within the boundaries of the City of Hamilton are a primary backbone of the city road network and yet there is no local control of these key thoroughfares. These are under the jurisdiction of the Ontario government but there is no active flow of data from the province as to how these major highways are being utilized by the goods movement sector or how they are performing. The MTO COMPASS system provides real-time feedback to drivers on driving times and conditions but associated compiled data are not widely available.

Hamilton's Transportation Master Plan Update notes that the future ability to increase capacity on the Linc or RHVP is dependent on capacity increases on provincial highways such as Hwy 403. There is the risk that a local desire to increase capacity may not coincide with a similar provincial desire or there may be significant differences in the timing of such improvements.

A potential solution to provincial highway data gaps is locally led monitoring and measurement efforts on the performance of this critical provincial infrastructure to provide a continual flow of information on important topics

such as truck volumes at varied locations. This flow of information could ultimately be leveraged for a variety of applications (e.g., changes in truck flows are associated with changes in the economy) but could also assist the provincial government. The suggested approach has some analogy with private sector firms that provide detailed data on Canadian National (CN) and CPKC rail operations but gather data components via monitoring from outside rail properties.

Airport Employment Growth District Development: Highway Access and Congestion Considerations

The Airport Employment Growth District (AEGD) is really one of the centerpieces of Hamilton's future industrial development. While other industrial areas and business parks are relatively well-situated near good highway infrastructure, the current situation with the AEGD will need to improve. Partly this is because the AEGD is somewhat "out of sight, out of mind" relative to many regional logistics clusters that are located on 400-series highways. Nevertheless, the Hwy 403 corridor running between Ancaster, Brantford and Woodstock is developing rapidly and is clearly a magnet for business investment. The AEGD links into this trend but also depends on important linkages to the GTA and Niagara. With this brief background in mind, a few observations seem pertinent:

- Hwy 403 eastbound, descending the escarpment, offers only two lanes of capacity and is easily congested. There is further congestion on the EB 403 approach to Hwy 6 and beyond, with dated interchange infrastructure at Highway 6N accounting for some of the problem.

- The development of the AEGD is hampered by a lack of high-quality road infrastructure to connect with the QEW for movements in the direction of Niagara. The most direct route to the Linc (which in turn offers access to the QEW) is via Upper James Street but the stretch between Rymal Road and the Linc is first and foremost a busy commercial strip that ideally

should not be heavily used by large trucks. This lack of viable alternatives puts additional pressure on the AEGD connection via Hwy 403.

- The City of Hamilton has noted that Dartnall Road, which is near the Red Hill Business Park and offers access to the LINC, will ultimately be extended to connect to the east-west running Dickenson Road. This does not offer a truly impactful solution but may offer some relief.

- The AEGD requires high-quality freeway infrastructure to extend directly to the airport. In 2021, MTO announced plans to expand Hwy 6 between Hwy 403 and Upper James Street to four median-separated lanes. The intersection of Book Road and Hwy 6 need to be controlled in a grade separated manner rather than with traffic lights. This will boost perceptions about the quality of infrastructure. The current means of intersection control at the site, which is located very close to Hwy 403, detracts from the perceived quality of the highway infrastructure that links to the airport. Stakeholder feedback has identified a need for this connection to Hwy 403 to have suitable lighting given that there is a lot of evening and early morning truck operations.

- The connection of the westbound Linc to WB 403 suffers from significant congestion, especially at PM peak, which causes traffic backups on both highways. At this location, traffic from the Linc merges with traffic from the WB 403 but this merged traffic is quickly funneled down to two lanes in a heavy traffic area. Ideally, if WB 403 is to be reduced to two lanes, it would take place several kilometres further west than is currently the case.

The Important Role of Public Transit

Multiple MITL stakeholder engagement efforts in recent years, related to goods movement and supply chain investigations, have revealed the important role of public transit in getting goods movement workers to their

place of employment. This element has also been noted in the current stakeholder process. Hamilton's AEGD has been noted as a particular concern as the location is remote from the main part of the city and working hours are often nocturnal/overnight.

Hamilton's transit network and service will undergo significant changes in the latter half of this decade with the introduction of light rail and the implementation of the ReEnvision HSR outcomes. It has been well understood that transit must offer reliable and frequent connections to key employment lands including Hamilton's freight clusters.

Life Sciences: A transport dependent, high value, low-weight sector

The life sciences sector exemplifies high-value, low-weight cargoes. The City of Hamilton has recently developed a comprehensive strategy to advance the local life sciences sector [4]. The strategy highlights Hamilton's high quality of life and strategic location as key city advantages in progressing the life sciences sector and both aspects are quite complementary as well to the progression of the goods movement sector. Both sectors benefit from the crucial role that John C. Munro Hamilton International Airport plays and the proximity of Hamilton to large markets within the region and beyond.

The life sciences strategy sees Hamilton as having unique infrastructure assets (related to the local history as a manufacturing centre) that could be converted or re-purposed for life sciences applications. The McMaster Innovation Park is identified as a key node for future life sciences development.

Whether leveraging legacy infrastructure or newer assets, the life sciences strategy indicates that key transportation corridors locally and outside City of Hamilton boundaries will need to perform well to help the sector thrive locally (and this was confirmed in the current engagement processes).

2.3 Marine

Cargo and Connections

In 2022, 571 vessels called on the Port of Hamilton and 9.9 million tonnes of cargo worth $2.8 billion were processed.

Hamilton hosts one of North America's leading inland marine ports and the foremost Canadian port on the Great Lakes [13]. The Port of Hamilton offers a multi-modal gateway to Southern Ontario, the US Midwest, and diverse ports of call on every populated continent. The Port is a gateway that can and does enable goods flows to bypass the heavily congested GTA, reduce the carbon footprint of goods movement and help reinforce the regional freight system to be more resilient to external shocks. These crucial attributes are even more relevant considering continuing regional population growth.

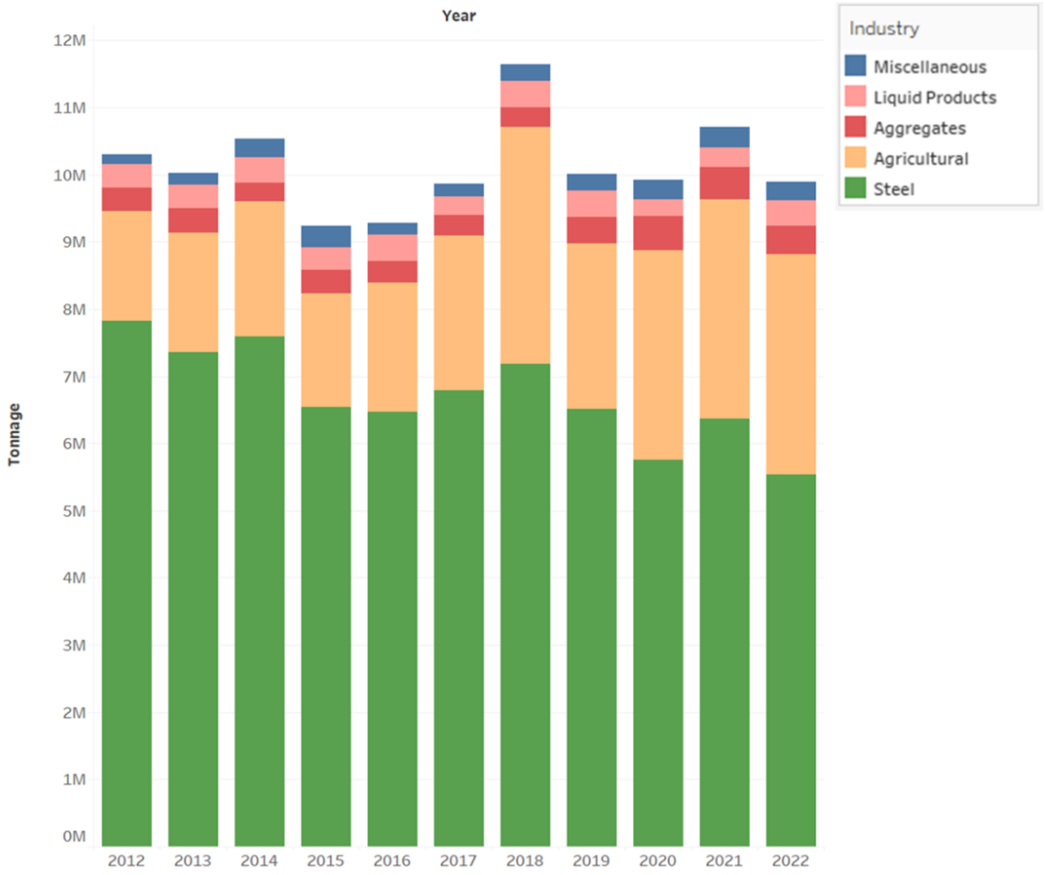

Figure 2-12: Port of Hamilton Tonnage by Main Industry of Commodities

Figure 2-12 offers important details on recent cargo flows via the Port of Hamilton. Annual cargo quantities have generally varied around 10 million tonnes in the past decade with a notable peak in 2018 during a time of US trade disputes with China. There has been a general pattern of gradually declining volumes related to the steel sector while increased agricultural flows are compensating quite well. Liquid products, aggregates and other miscellaneous cargoes have been relatively stable over the past decade. In general, cargoes have become more diversified [14].

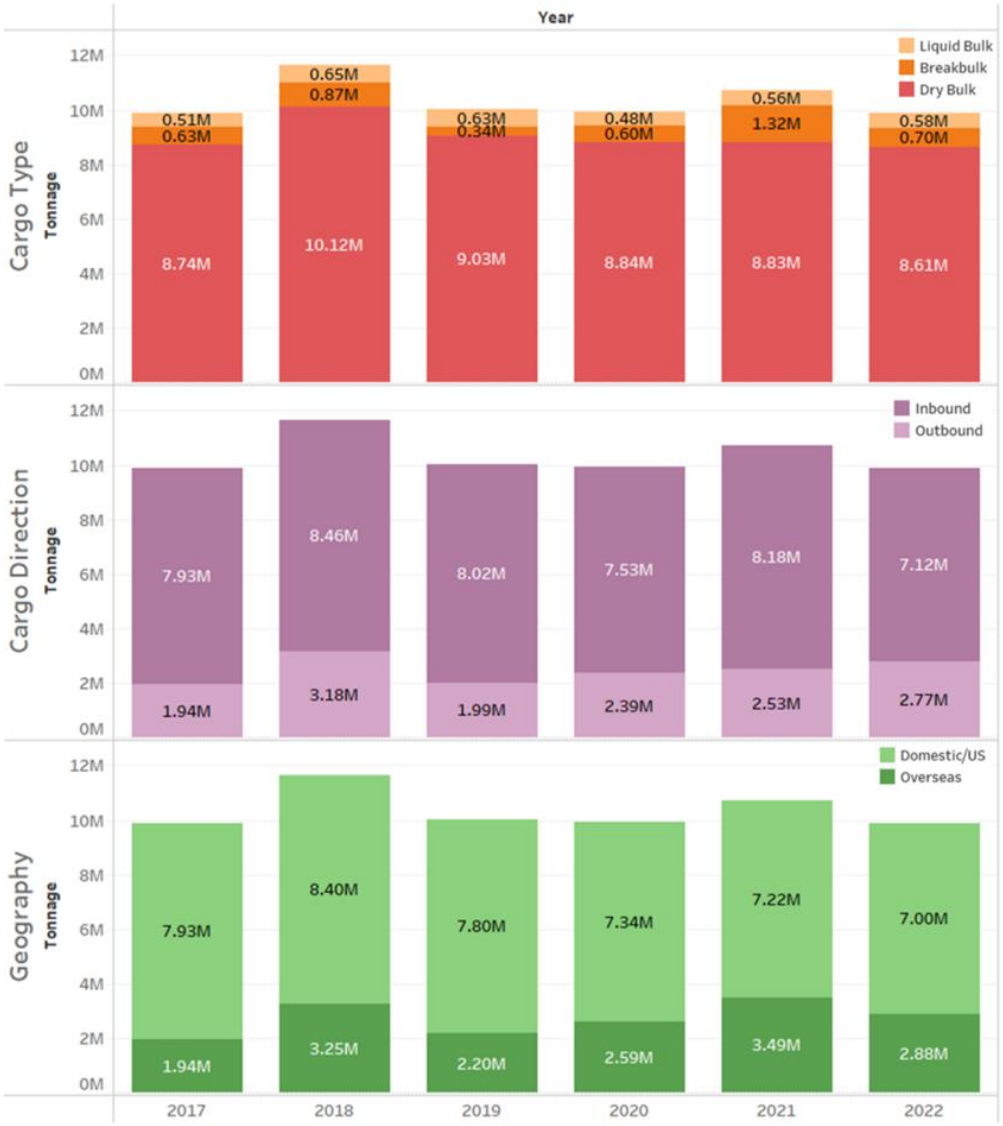

Figure 2-13: Port of Hamilton Tonnage Breakdowns (2017-2022)

Figure 2-13 breaks tonnage down using varied criteria. Cargo is highly oriented to dry bulk goods with breakbulk cargoes (e.g., project cargoes) often exceeding the liquid bulk totals. Secondly, much more cargo (72% in 2022) is moving inbound to the port and being unloaded compared to being loaded for outbound movement. Finally, most cargo movements are North American with about 29% being classified as overseas cargoes in 2022. Figure 2-14 below offers a more detailed breakdown of commodities that were processed through the Port of Hamilton in 2022. Well over half of the 9.9 million tonnes are due to ore, as an input to steelmaking, and agricultural grains that are quite export oriented.

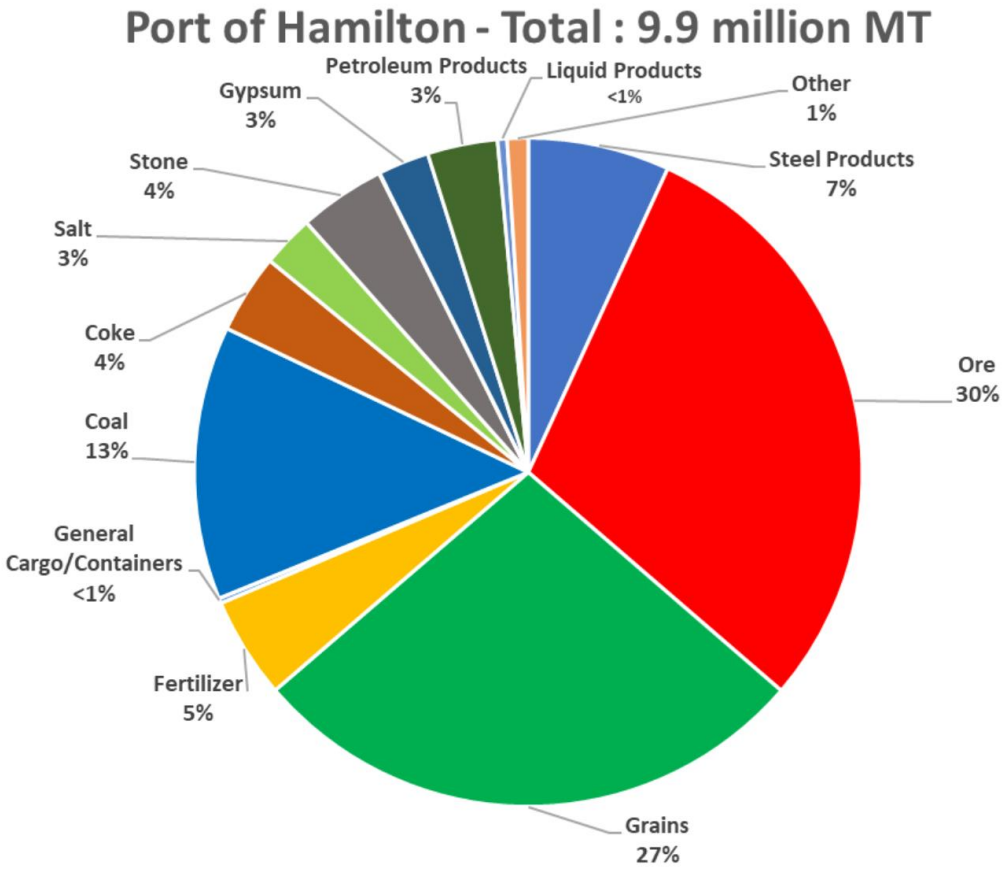

Figure 2-14: Port of Hamilton detailed tonnage breakdown (2022)

While a lot of tonnage is oriented to Canada and the US, the Port of Hamilton is quite internationalized in its cargo connections. A review of HOPA data

Diversified cargoes have more than doubled at the Port of Hamilton from 19% of tonnage in 2008 to 44% in 2022.

from the period 2014 to 2020 showed direct vessel movements to and from the port connected to **48** different countries around the world with representation from all continents except Antarctica. Figure 2-15 shows intricate connections to European countries. Outbound connections to the Port of Hamilton are more diversified than inbound connections from Hamilton. However, some of those fewer inbound country connections (e.g., Ireland) are associated with relatively high tonnages in the figure.

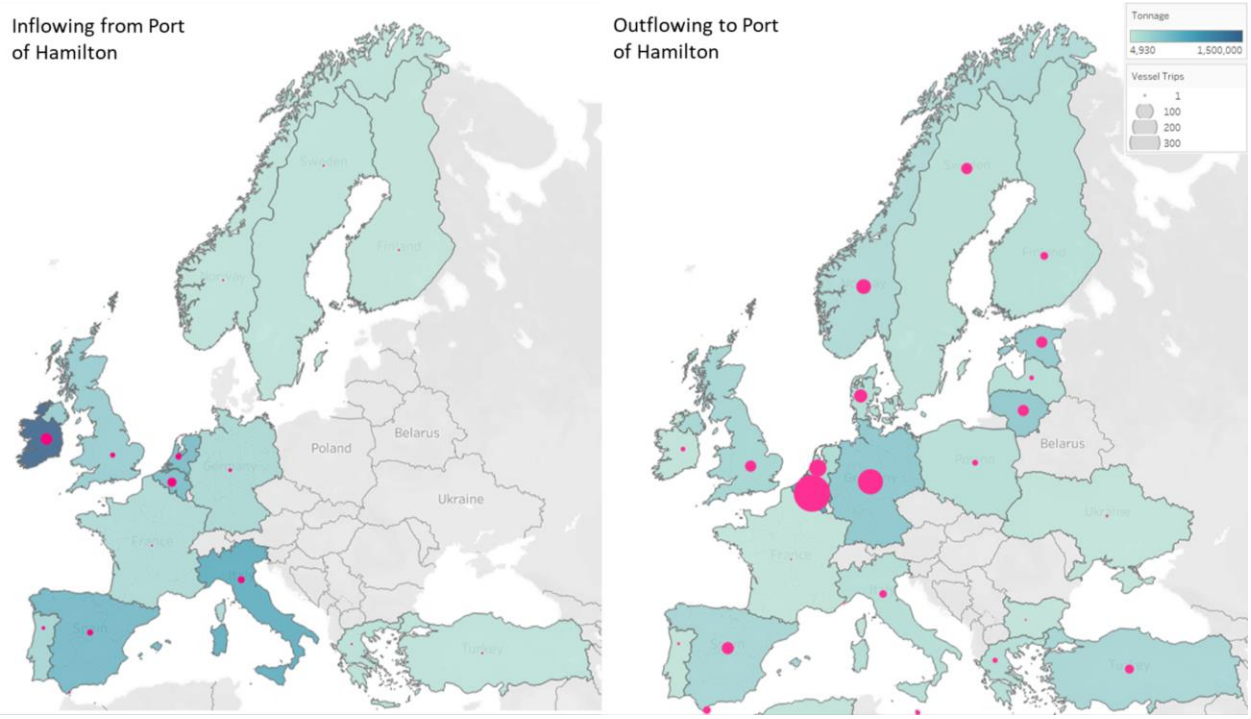

Figure 2-15: Port of Hamilton and its European Cargo Connections (2014-2020)

Short Sea Shipping

There has been considerable recent interest in further harnessing the multi-modal potential of the Port of Hamilton given its favourable strategic location,

dual service by rail and good access to the high-quality regional highway network. There is particular interest in further diversifying cargo flows and potentially moving toward higher value cargoes that may be containerized. Hamilton Container Terminal has been working closely with HOPA Ports to that end. HOPA has also been focused on leveraging technology and data to improve supply chains and better understand the potential for new services.

A recent Fluid Intelligence report on cross-border short sea shipping focused on truck cargoes originating and terminating within the Great Lakes region [15]. There are approximately 12,000 cross-border, cargo-carrying truck trips per week that travel lengthy distances between Southern Ontario and the immediate port vicinities of varied Great Lakes states. There could be a complementary role for marine in reducing demands on the cross-border trucking sector and reducing the effects of trucking externalities such as traffic congestion and harmful emissions. Containerization is seen as an enabling mechanism for marine to get more involved in these longer-distance movements within the Great Lakes region.

While there are barriers to overcome (e.g., regulatory, vessel mix, seasonal aspects [16]) for such a service to succeed, there is a sense nowadays that Great Lakes marine ought to play a more prominent role to strengthen the overall regional goods movement system. Feeder services could also be involved to move containers of international origin inland from the Ports of Halifax or Montreal. The Ontario government has recently released its first marine strategy [17], in support of a more prominent role for marine, and there is no doubt that the Port of Hamilton is central to that strategy.

2.4 Rail

Infrastructure and Commodity Flows Relevant to Hamilton

The rail mode plays a critical role in the freight system, especially for moving large quantities of cargo over medium and long distances. Rail is dominated in Canada by CN and CPKC, which both operate extensive networks that are North American in scale. With a recent acquisition, CPKC now connects Canada, the US and Mexico over one network.

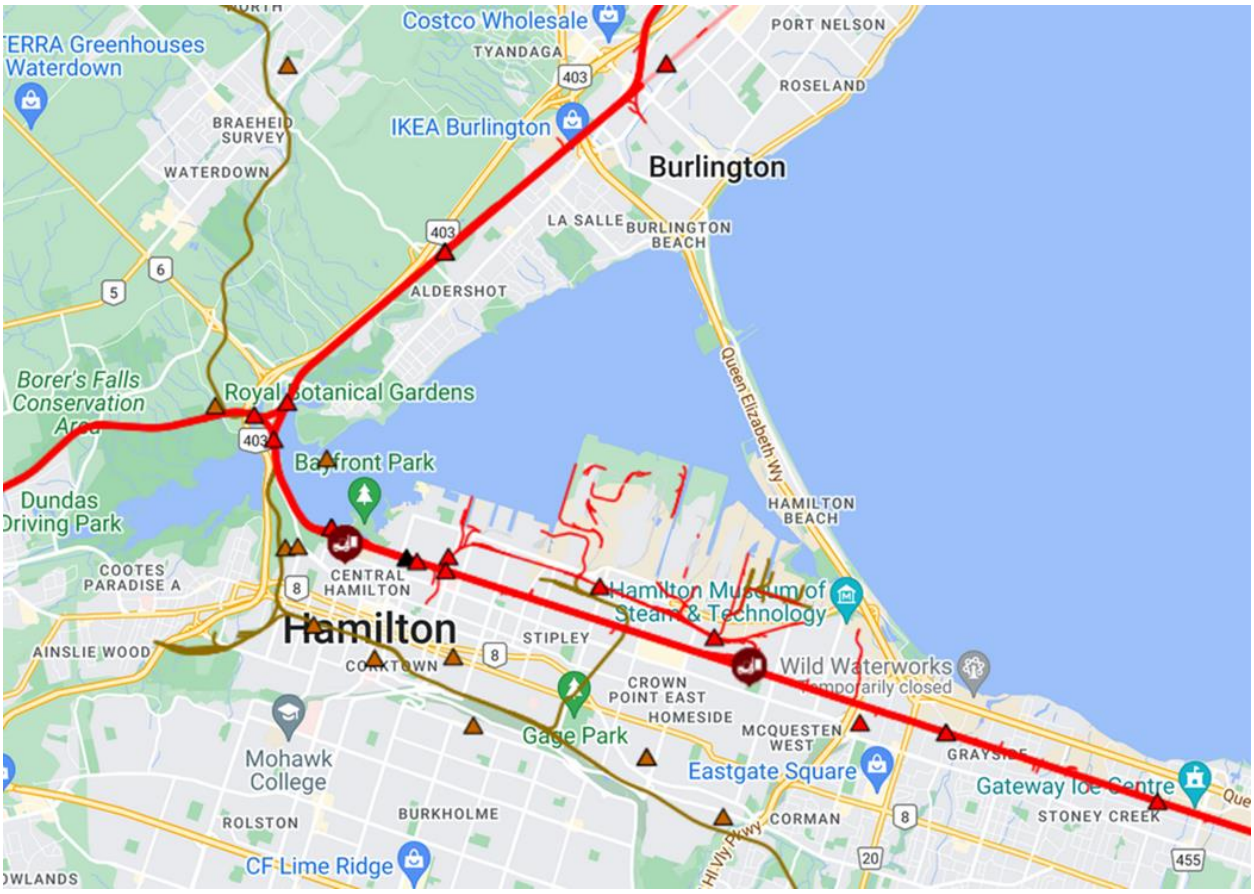

Figure 2-16: Rail Infrastructure in Hamilton (Source: CN Website)

Hamilton is dually served through CN and CPKC, which is an important consideration as noted in engagements. Hamilton's major rail facilities and infrastructure is oriented largely to the port lands and their vicinity (Figure 2-16). Two major CN facilities in Hamilton are the Stuart Street classification yard near the Bayfront and a Metal Distribution Centre on Parkdale Avenue.

For CPKC, the Transcare transload facility at Aberdeen Street and Longwood Road stands out and has been mentioned prominently in a past engagement with CPKC. The Transcare facility allows for efficient transfer of steel products between the rail and truck modes.

Hamilton hosts important rail infrastructure but there are other critical facilities in the GTA that serve a wide region including Hamilton. CN operates a large intermodal facility in Brampton and is building a new one in Milton to accommodate the increasing import flows of containerized consumer goods associated with regional population growth. Rail is often used to bring such goods relatively close to end consumers. CPKC has a similar facility in Vaughan. CN operates a massive rail car classification facility near the intersection of Hwy 400 and 407 and there are varied transload facilities around the region, including in Hamilton, that transfer commodities between rail and truck.

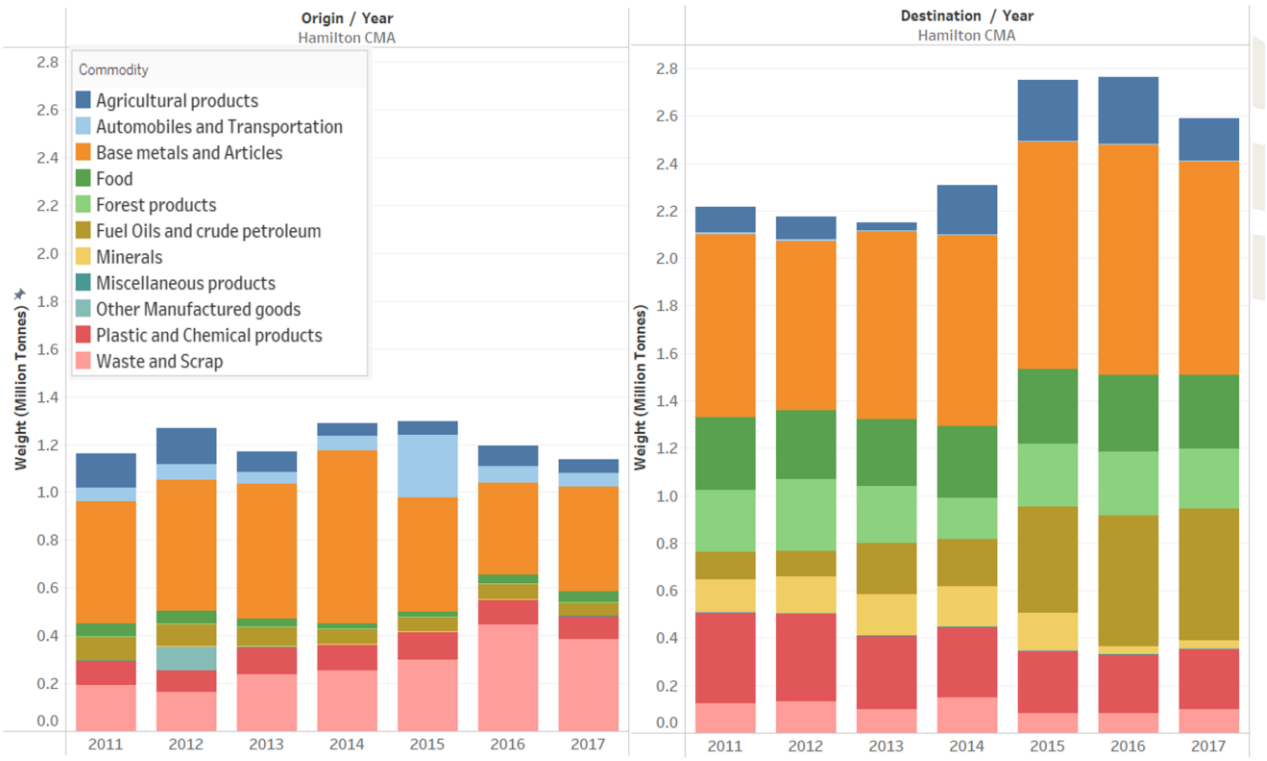

Figure 2-17: Rail Tonnage by Commodity in and out of the Hamilton CMA (Source: CFAF)

Both CN and CPKC are public companies and must disclose their financial information, but more detailed geographical or localized information about the goods that they move is scarce. The last time that such detailed information became available was for 2017 through the Canadian Freight Analysis Framework as is shown in Figure 2-17 for the Hamilton CMA (2011-2017). A reorganized version in Figure 2-18 emphasizes geographical connections rather than the specific years.

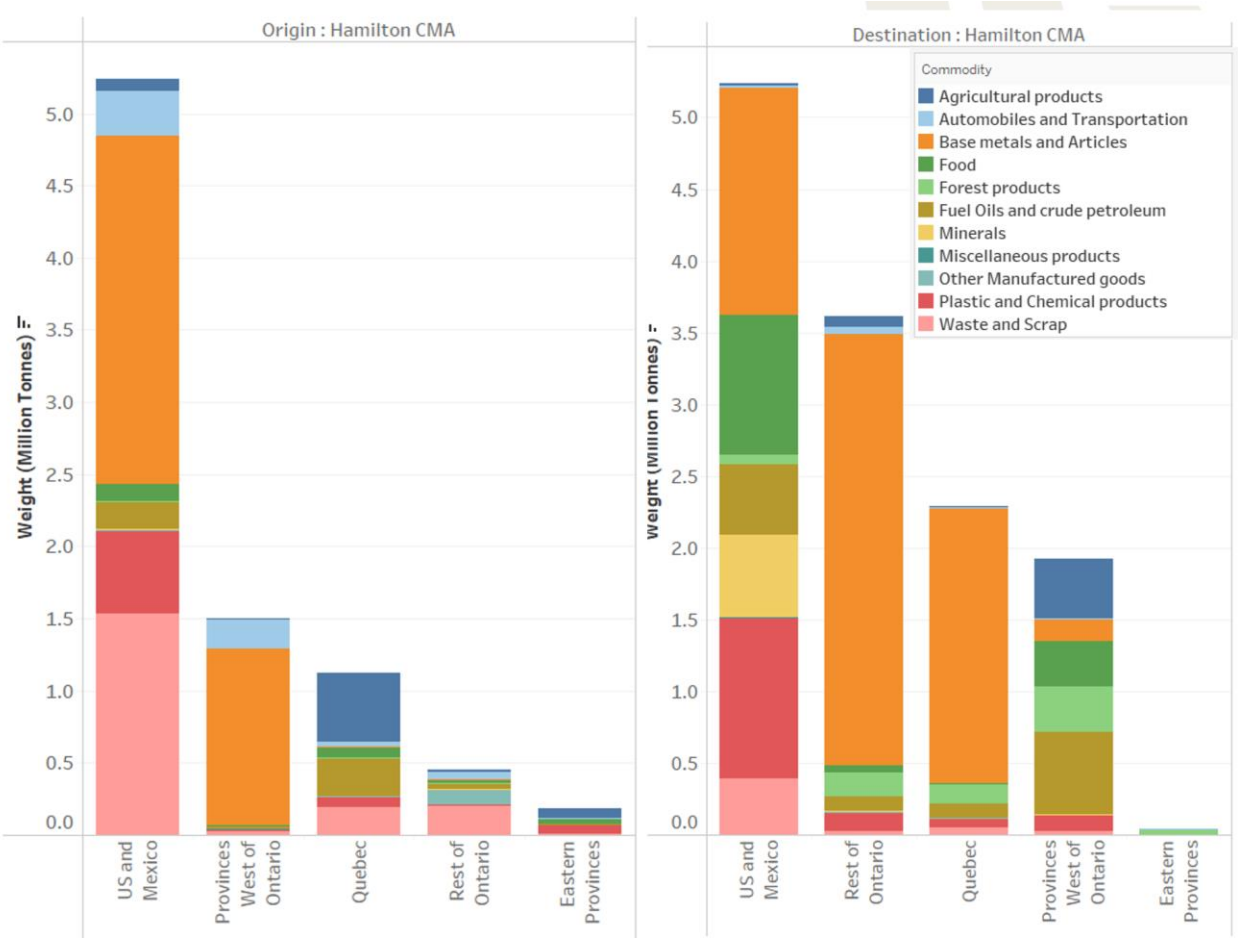

Figure 2-18: Geography of rail tonnage to/from Hamilton CMA by Commodity (2011-17)

A third figure (Figure 2-19) is set up in a similar manner except that it focuses on the value of goods rather than tonnages and it relates to one year (2017) rather than seven years. The main takeaways from the three figures, in relation to the Hamilton CMA, are that :

- Direct flows of tonnages to/from Hamilton are highly oriented to commodities as opposed to consumer-oriented goods and the volumes from year to year show some cyclical ebbs and flows depending on the wider economy.

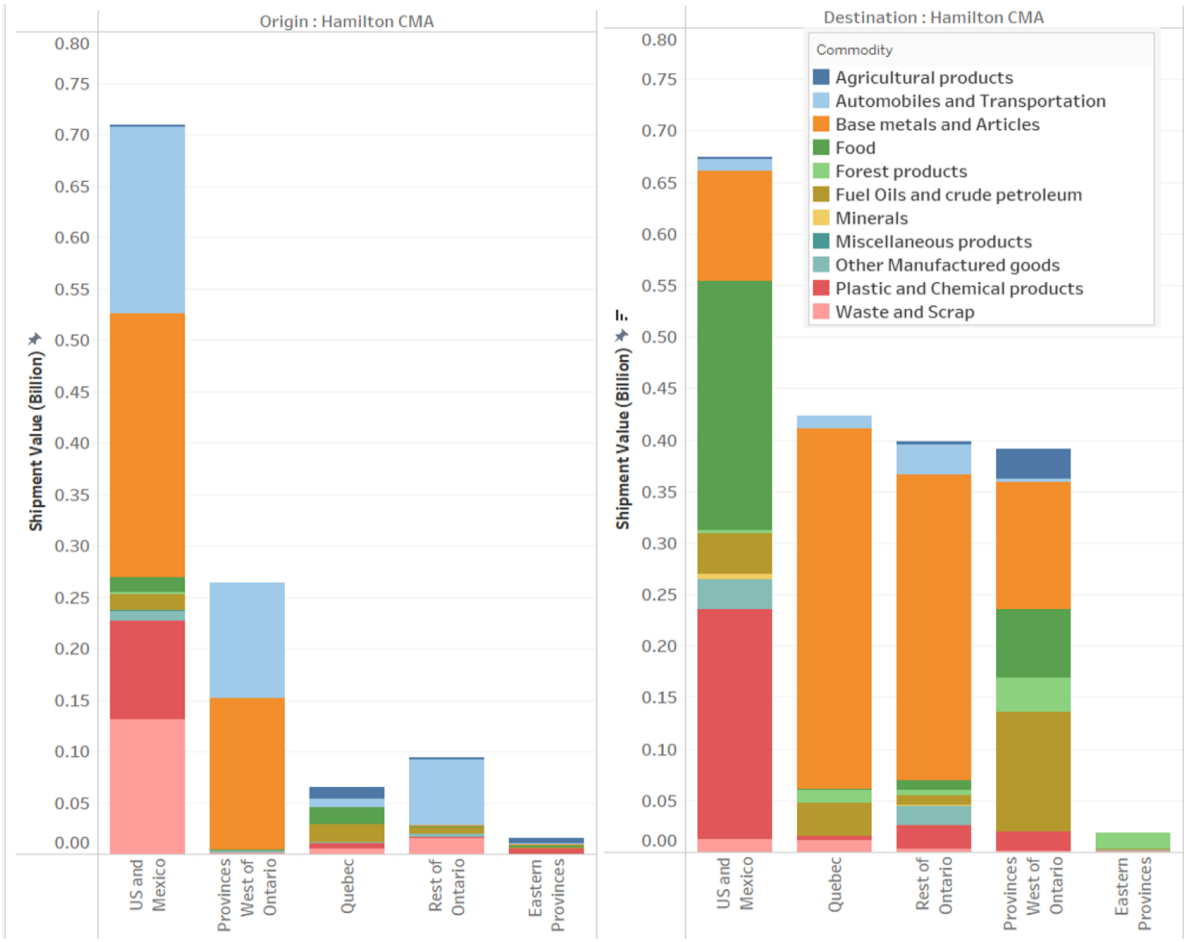

Figure 2-19: Geography of rail goods value to/from Hamilton CMA by Commodity (2017)

- Rail flow tonnages into Hamilton are far in excess of rail flow tonnages out of Hamilton and these "excess" inflows are due to tonnage flows from other Canadian provinces.
- There are notable flows of agricultural products to Quebec.
- Tonnage flows to/from western provinces are far more prevalent than to/from the Maritime provinces.

The number of rail cars transiting the Port of Hamilton has more than tripled since 2011 to over 9,000.

- The strongest geographical connection is with the US rather than other Canadian geographies and this connection appears relatively balanced between import and export tonnages.
- There are significant inflows of base metal-oriented cargoes by rail from other parts of Ontario and, to a lesser degree, from Quebec.

Rail Engagement

Stakeholder engagement is an important component of the strategy, and the rail sector is captured in this regard as well. MITL has met with both major rail firms in the past and has directly engaged with CN during this project. The following are the most important points that have emerged:

- Description by CN of more recent cargo flows to and from Hamilton confirm that the city continues to receive more cargo by rail than it sends out (as the prior figures indicate).
- The rail firms operate vast networks that are continental in scale. As such, there is perhaps more urgency to engage directly and consistently with customers associated with individual jurisdictions as opposed to many municipal entities.
- It has been noted in past consultations, by customers of rail, that a vast rail network can cut both ways. There have been instances of serious rail car shortages in Hamilton and elsewhere when the overall demand for rail cars is high. This is rail's equivalent of road traffic congestion although rail time delays can be much more severe in this respect. Goods cannot be moved by rail without available rail cars.

- CN states the capacity to handle larger cargo volumes to and from Hamilton, if these volumes can be locally generated. They note that direct linkages can be made to firms that invest in rail on their properties and also there are some direct brownfield rail opportunities in Hamilton.

- Rail tend to focus a lot on "proximity issues." There is some concern that new developments lead to new residents and ultimately new complaints about rail externalities such as noise. There is concern that such complaints could ultimately impinge on the flexibility of rail operations (e.g., reduced hours of operation). It was emphatically noted though that CN does not oppose important development such as affordable housing.

- On a related theme, some concerns are noted about sharing rail infrastructure with passenger/commuter rail but the comments were not particular to Hamilton.

- While rail firms have "Proximity teams" in place, many other issues are handled by ad hoc groups that are formed. It was acknowledged that CN might not be as "plugged into" Hamilton economic development planning and initiatives as it could be.

- For Hamilton rail contexts, it is critical for trucking to be able to get goods in and out of the city quickly and efficiently. Inefficiencies have the potential to limit the prospects for key rail and marine infrastructure.

- To the extent that containers arrive in Hamilton or are generated in Hamilton, they are trucked to CN's main intermodal facility in Brampton (with the Milton facility to open in the future).

Overall, rail firms appear ready to help accommodate Hamilton's development as a freight hub and also share in excitement about its multi-modal capabilities via the port lands and other key locations.

2.5 Air

John C. Munro Hamilton International Airport (YHM) is a critical goods movement asset for the City and the wider region and is a 24-hour anchor of the AEGD. It is the largest domestic overnight express cargo airport in Canada and the third largest cargo airport in the country. The operations of Cargojet are dominant on the domestic front, and growing internationally, while UPS and DHL utilize YHM as a gateway between southern Ontario and the world.

Air cargo tonnage through YHM has increased 115% since the bottom of the Great Recession in 2009.

Figure 2-20, based on data from Transport Canada, shows that there has been steady growth in air cargo at YHM since the Great Recession. The top chart in Figure 2-20 compares total tonnage relative to cargo flights. The number of flights is the sum of arriving and departing pure cargo flights. Total tonnage represents what is loaded/unloaded due to pure cargo flights plus any goods transported by passenger flights. No breakdown in this regard is available.

Pure cargo flights significantly declined from 2011 to 2019 likely reflecting the consolidation efforts of Cargojet. An increase in flights from 2019 reflects an e-commerce effect. Vantage Group, which operates the airport, tabulates flight landings and has captured a 46% increase since 2018 to 8,245 flight landings in 2022. Relatively high totals tracked for landings reflect flights that are not purely cargo versus the Statistics Canada focus on pure cargo flights.

The bottom chart of Figure 2-20 differentiates loaded from unloaded cargo. According to Statistics Canada, YHM handled nearly 160,000 tonnes of air cargo in 2022, associated with domestic, transborder and international sources, with a slight majority being loaded (as opposed to unloaded). The balance between loaded and unloaded cargo weights has improved in recent years, through a relative increase in unloaded cargo.

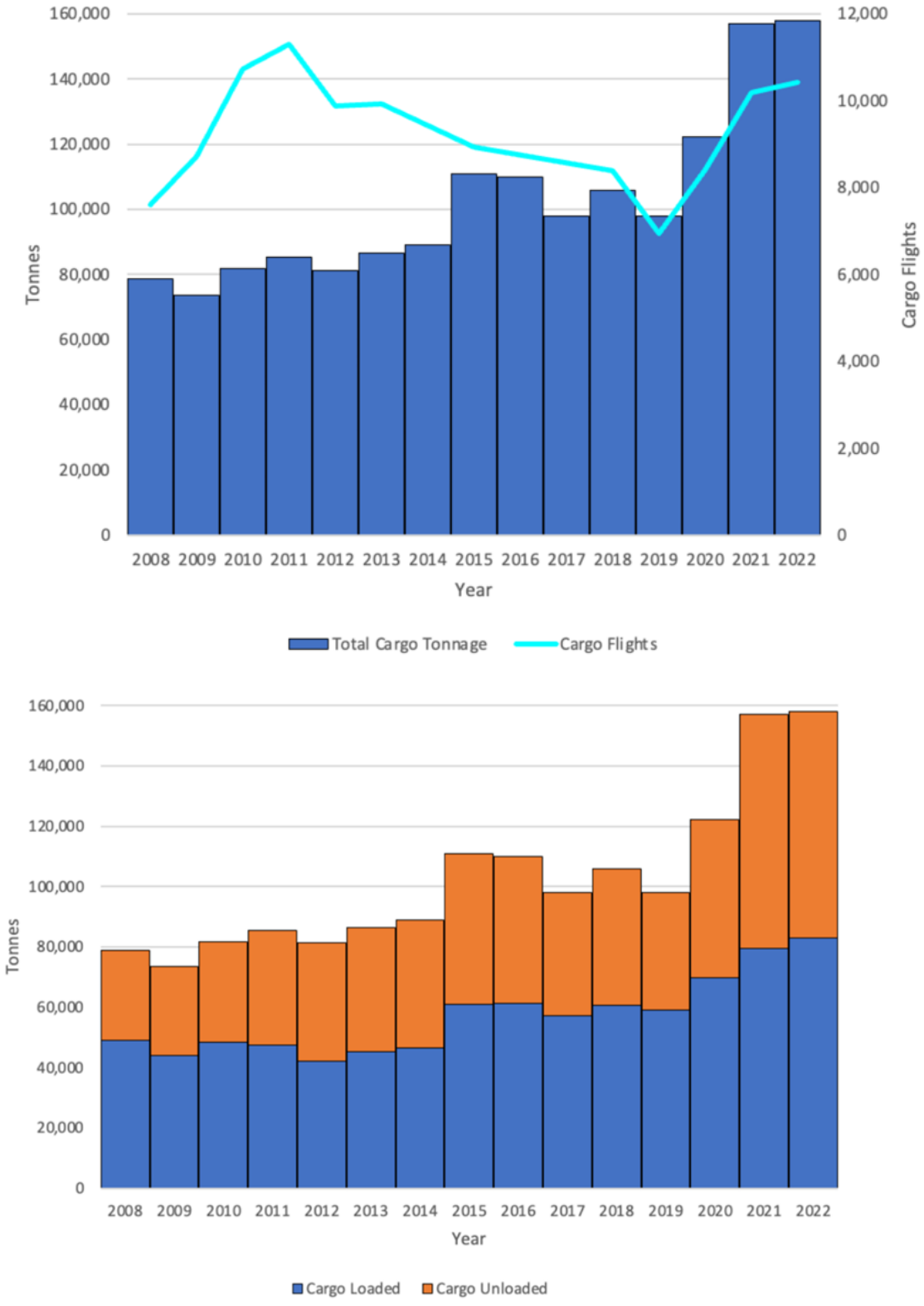

Figure 2-20: Breakdown of Air Cargo tonnage and cargo flights processed through YHM

Domestic and Transborder

A majority of cargo tonnage flowing through YHM can be classified as domestic or transborder (Canada-US). Breakdowns are not released by Statistics Canada for confidentiality reasons. In 2016 (the last year of release), 77.46 tonnes was domestic. Much of Cargojet's volume is derived from the movement of air cargo domestically. There are a series of Cargojet outbound flights that depart YHM, in the hours after midnight, toward other important Canadian cities. Inbound flights from these cities arrive in the pre-dawn hours, with cargoes being quickly loaded on trucks to avoid AM peak traffic congestion into the GTA. Amazon-branded "Prime Air" flights also operate daily, mostly between YHM and Vancouver. YHM is so significant to Hamilton's new Amazon Fulfilment Centre that the facility is named "YHM1" for internal Amazon purposes.

Canada-US activity associated with YHM is prominent. Much activity is associated with the final/first legs of UPS and DHL flights to/from major hubs in Louisville and Cincinnati. Cargojet operates many of those short flights to US hubs, especially in service of DHL. Castle Aviation is prominent as a cargo operator, using small aircraft, that moves cargo to and from the US Midwest.

Figure 2-21, which is based on Statistics Canada US-Canada trade data, focuses on the value of YHM air cargo that originates in the US in the period 2016-2020. Approximately, $3.3 billion of value is captured in the map and allocated among origin states and primary commodity codes. Note that value due to precious metals and jewelry cargoes ($6.66 billion) as excluded to focus on strong industrial themes that are apparent. The US Midwest stands out in this regard as a strong regional origin. There is an aerospace theme associated with the Pacific Northwest. Many air cargo shipments arriving in Hamilton are associated with pressing supply chain needs (e.g., auto parts). The significance of shipments, for what they actually mean for supply chains, may greatly exceed the documented value of goods as captured here.

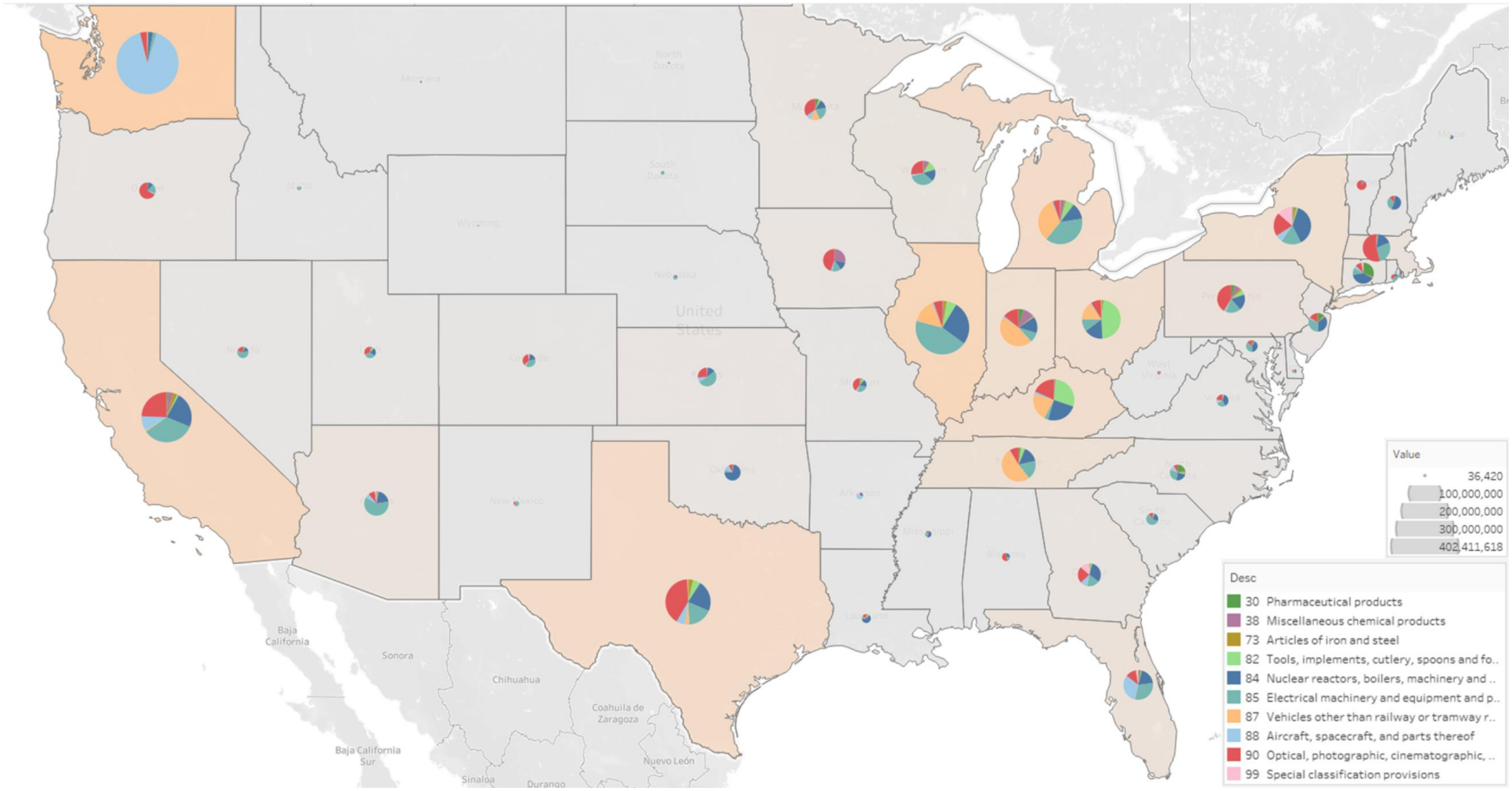

Figure 2-21: Value of Imported Air Cargo from US States clearing via YHM (2016-2020)

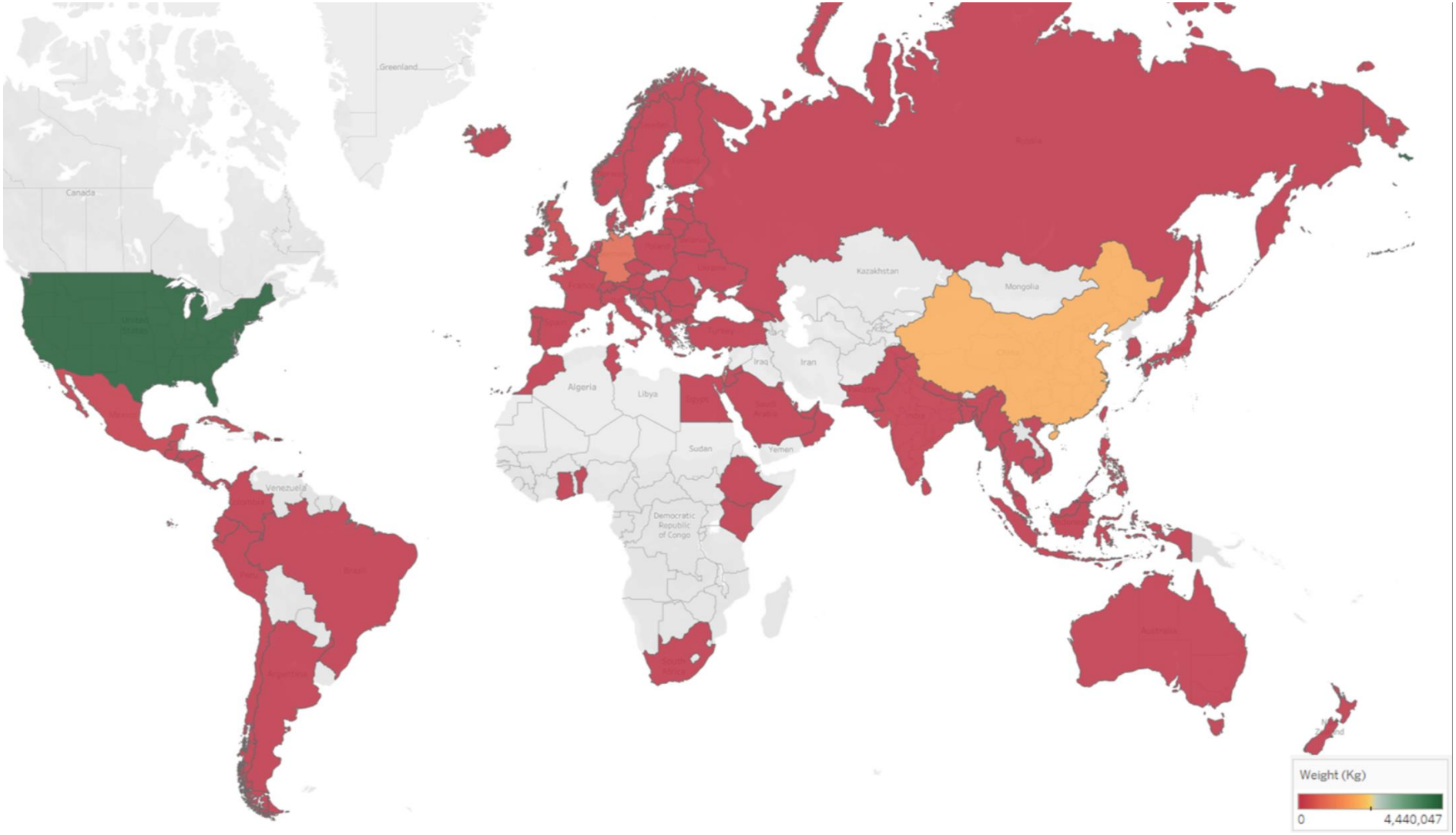

Figure 2-22: Origin countries for import shipments received at YHM – 12 months to Nov 22

International

Air cargo flows associated with YHM connect globally. In a recent 12-month sample, import data from the CBSA indicated that air cargo shipments were received at YHM from a total of 94 countries around the world. The diversity of those countries is apparent from Figure 2-22, which also give some sense of the weights involved. The US and China are leaders in that regard and Germany also stands out. About 75% of air cargo shipments imported into Canada via YHM originated in the United States and about 95% of shipments originated from the top ten countries of the 94.

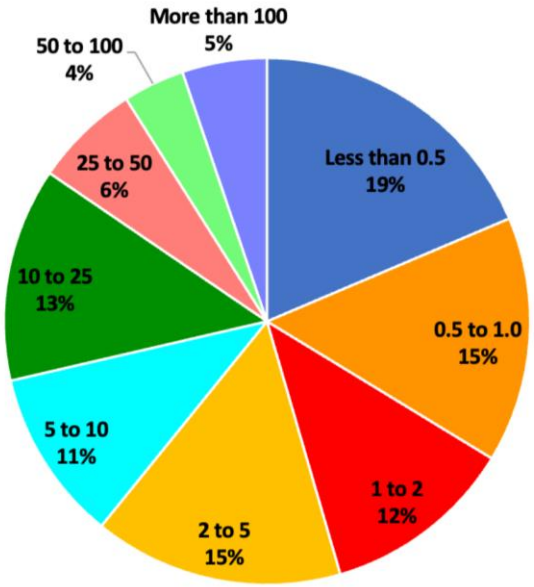

Figure 2-23: YHM Air Cargo Imports – Distribution of Shipment Weight (Kilograms)

Figure 2-23 is based on a CBSA air cargo import sample for YHM and gives a sense of the character of individual shipments. Air cargo originating in the US is included as well. About 33% of import shipments are a kilogram or less. Only 5% of shipments are more than 100kg but some of those are quite large and are better measured in tonnes.

2.6 Technological and Business/Social Trends

A key aspect of the current state, analyzed in this chapter, is that it evolves continuously. What unfolds in Hamilton will depend significantly on major business, social and technological trends that are unfolding in North America and around the world. "How will the current state look in ten years?" is a critical question. One of the best portayals and on-going efforts to assess trends that affect logistics (and thus goods movement to a large extent) is the DHL Logistics Trend Radar [18]. A static version is depicted in Figure 2-24.

Figure 2-24: The DHL Logistics Trend Radar

It is noteworthy that the approach integrates social and business trends with technology trends, acknowledging the interdependencies that are at play. High impact trends are closer to the central vertical axis and trends that will

have their impact sooner are closer to the core. Two high impact trends, as depicted in the figure, are Decarbonization and Autonomous vehicles. In both cases, the primary realization of the technologies is portrayed as closer to 10 years out. Both trends are highly relevant for the future of goods movement. The Trend Radar schematic also highlights the numerous factors and complexity that are at play in shaping the future and thus the inherent difficulties in forecasting.

E-Commerce and the Last Mile

The rise of e-commerce is one of the major trends of the past twenty years and has moved in parallel with the growth of Amazon. At this point, Canada has a much lower rate of e-commerce adoption than in Asia, for example, which could imply significant growth ahead. Carriers such as Cargojet explicitly note their dependence on growth in e-commerce to support their own growth. From a goods movement perspective, e-commerce increases the responsibility on the goods movement sector to get physical products directly to the end-consumer.

Stakeholder engagement for this strategy did not reveal particular concern with last mile stresses related to e-commerce delivery of goods. In Hamilton's suburban and outlying areas, e-commerce delivery generally is not causing significant disruption and is typically carried out by Canada Post, or other delivery entities using vans. Last mile issues with e-Commerce are most problematic in dense urban areas. Figure 2-3 gives insight into the central areas in Hamilton that are likely to cause the most problems in this regard going forward. With the progression of light rail and transit-oriented developments, there is a strong likelihood that population densities in central Hamilton will increase, perhaps more so after 2029. Complete Streets implementations, especially in denser areas, should take small commercial vehicle parking (delivery vehicles) into account. Other potential solutions that may find application are e-cargo bikes.

Decarbonization of Transport via Electrification

Decarbonization of transport is a megatrend of our times and it will apply equally strongly to the goods movement sector. Battery-driven transport is by far the leading zero emission vehicle (ZEV) option for light-duty and passenger vehicles but there has been more ambiguity to this point, and less progress, in relation to the medium and heavy-duty vehicles that are most associated with goods movement. Stakeholder engagement for this project indicated more interest in battery electric solutions in light-duty and some medium-duty applications. The McMaster Automotive Resource Centre was identified as a significant asset for Hamilton on the electrification front.

There was actually some evidence of a "wait and see" attitude during sessions. For heavy-duty and longer haul scenarios, influential stakeholders were of the view that hydrogen-based ZEV solutions appeared most promising at this point as this approach is more in keeping with current day logistics requirements. However, many manufacturers including Tesla, are working on battery-oriented heavy-duty solutions.

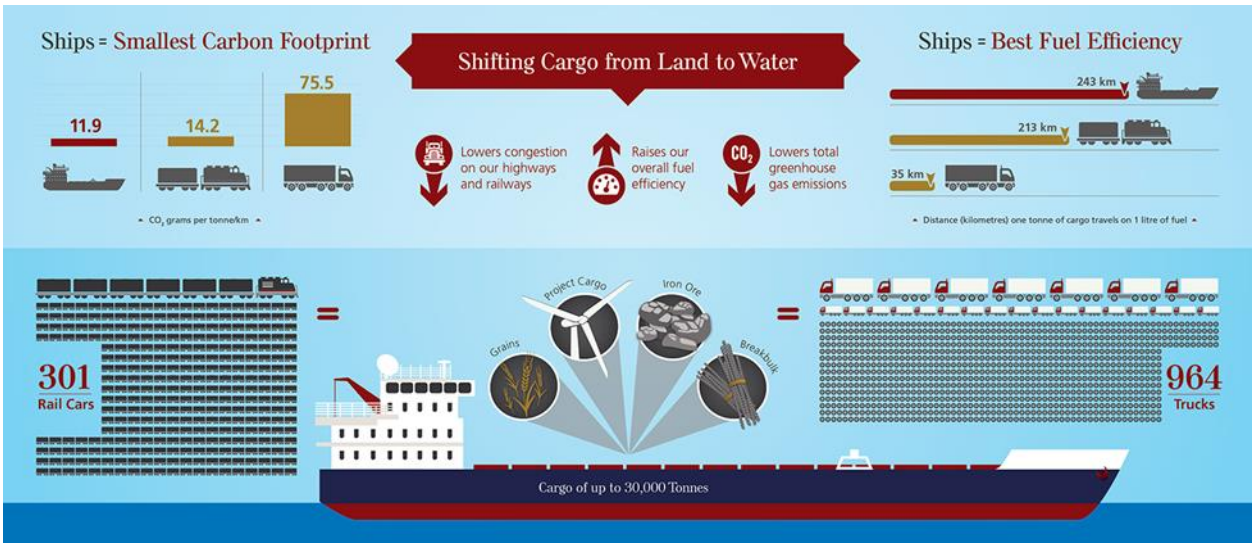

Figure 2-25: Decarbonization Potential from a Marine Perspective (Source: HOPA Ports)

As Figure 2-25 indicates, the choice of mode to move goods has a significant impact on the associated carbon footprint. Clearly, there are a range of

factors in addition to emissions that affect the freight modal choices that are made. The figure underscores the need to decarbonize trucking. Greenhouse gases are one form of harmful emissions from trucks but there are others such as nitrogen oxides that can be quite harmful to health.

The electrification of trucking may bring the issue of truck parking [19] more into focus in Southern Ontario. Trucks are constantly on the move, often in locations remote from home base, and there are limits on the length of driving shifts. Stakeholder feedback has suggested that truck parking (for rest) is a significant issue in Hamilton as well as in other jurisdictions. To the extent that it is evaluated locally in the future, it may make sense to do so in a manner that overlaps with assessing potential future charging requirements/facilities.

Permitting Long combination vehicles (LCVs) is another issue linked to decarbonization. These are truck and trailer combinations that can extend over 100 feet and which spread heavy loads over many axles. LCVs reduce emissions per tonne-km and make more efficient use of scarce driving resources. Ontario as a jurisdiction has had success in permitting the deployment of such vehicles on major Ontario highways under certain circumstances. For Hamilton, an issue of interest to trucking stakeholders is whether the Linc/RHVP could accommodate LCVs to better align, in this respect with the closely linked provincial highway network.

Finally, carbon free (or low carbon) zones is a complementary strategy to assist with decarbonization of supply chains. A city/municipality can define an area/geography where only ZEV or low-emission trucks/vans can venture. This has been mostly a European tactic to this point and could be seen as a strategy that progressive jurisdictions would pursue. It could be that if progression on decarbonization of trucking is seen by government as lagging, that approaches like this one would be seriously considered. Enforcement is a key aspect of such an approach and has been done elsewhere based on

license plate recognition tied to the emissions profile of the associated vehicle. In Ontario, enforcement along these lines would require a provincial role.

Note, in closing, that the City of Hamilton is a key partner in a significant NRCan project, conducted by MITL, which focuses on an in-depth study of the challenges and barriers involved in the decarbonization of medium- and heavy-duty trucking across Canada. This collaboration, which involves multiple partners, is set to continue through 2025.

2.7 Data Considerations

Statistics Canada Sources

In terms of geographically referenced Canadian data sources (which tend to come from Statistics Canada) the most relevant geography for the City of Hamilton (for many applications) is the census division of Hamilton (#3525). For several of the data elements that are covered in this strategy, data for census divisions such as Hamilton is not available, or it may be available through alternative geographies such as the Hamilton Census Metropolitan Area or Hamilton-Niagara Economic Region. Engagement with Statistics Canada on this topic may be warranted to look into increasing the specificity of information that is available and most relevant for Hamilton. In some cases, the use of census divisions may raise confidentiality concerns federally (e.g, if it were to deal with business dollar volumes). Aggregation of smaller census divisions could offer a solution in this regard.

Data to Inform Trade

The development of trade opportunities is an important mandate underlying this strategy. In general, stakeholder engagement suggests that there is more international movement of goods and more businesses are keen to

examine better and more efficient means of producing goods as well as moving goods.

MITL has had the opportunity to work extensively with Canada-US trade data and has seen that data on cross-border goods movement has the potential for far more detailed cross-border goods movement information than is available for any other intra-Ontario context. Such information is updated frequently but an important caveat is that no detail is offered at the sub-provincial level. Since Ontario is by far the largest province, this policy disproportionately restrains the potential for insights that might emerge about Ontario-based trade.

On a related note, trade statistics for the City of Hamilton are hampered by a reliance on reporting at the CMA level (as noted in the prior section). For example, recent data indicates that the Hamilton CMA is estimated to host 1,299 exporting establishments (based on Statistics Canada data - Table: 12-10-0138-01). The true total for the City of Hamilton is not made readily available. Reporting at the census division level would solve the problem.

Data to Inform Supply Chains

The Fluid Intelligence partnership between HOPA Ports and McMaster University seeks to leverage data and analytics to help improve the performance of regional supply chains. Fluid Intelligence offers an avenue for the City of Hamilton to leverage otherwise inaccessible data sources locally for better goods movement and other outcomes. As an example, the American Transportation Research Institute (ATRI) GPS data could only be used for this strategy based on the Fluid Intelligence partnership and a standing agreement with Transport Canada. Support from the City of Hamilton for the Fluid Intelligence initiative is welcome and needed. Municipal-level confirmation of value helps to assure that valuable data sources such as ATRI can remain available long into the future.

2.8 Key Takeaways

Our review of all associated City of Hamilton sector strategies has confirmed that goods movement capabilities in Hamilton and associated aspects like strategic location are foundational. When viewed from this perspective, the goods movement strategy itself is very significant. Bearing that in mind, the following are other important takeaways that have emerged from this assessment.

Traffic Congestion/Intensity Aspects

- Doing all that is possible to maintain the fluidity of highway movements in and around Hamilton is of paramount concern for the continuing economic development of the City of Hamilton. Fluidity is aligned with lower emissions as well. Stakeholders expressed concern about the cumulative effects of construction impacts or short-term closures that are not, in their view, planned and communicated as well as they could be.
- Given that lower traffic congestion is a key aspect of Hamilton's value proposition, there are bottlenecks of concern within the highway system where capacity is lacking but has the potential to be improved. Hwy 403 eastbound descending the escarpment is one of note as capacity is currently constrained to two lanes and the connection is very important to the future development of the AEGD.
- Traffic speed and truck intensity results suggest that Upper James Street between Rymal Road and the Linc offers a good example of relying too much on an important commercial arterial for the movement of heavy trucks.
- Stakeholders identified an interest in smart solutions to congestion that make the best use of current technologies. Freight carriers have an

interest in systems that can permit “on-the-fly” adjustments to how their trucks are deployed at any given time – particularly if an important congestion hotspot develops.

Port Lands Multi-Modal Development and Road Connections

Traditionally, the Port of Hamilton has been accessible from the east, west and south for heavy trucking. The western and southern approaches involve more inter-play with non-industrial land uses and with varied types of people movement, whereas the approach from the east is more oriented to freight-related activities. Through the recent truck route master plan update process, the City of Hamilton has moved to greatly reduce heavy trucking activity in the central city.

This change in emphasis places a heavier burden on port road connections from the east. Accordingly, the city could prioritize efforts to ensure that movements to and from western port lands via the QEW/RHVP/Nikola Tesla/Burlington Street take place as smoothly and seamlessly as possible. This could involve a multi-faceted approach that assures aspects such as ongoing high-quality road surfaces, optimal use of advanced traffic signaling technologies, data collection to assess performance and other approaches. Optimized access from the east will be influential in unlocking the full multi-modal potential of the port lands and will assist in avoiding heavy trucks being intertwined with upcoming LRT construction.

On a related topic, the Port receives many large and heavy loads in a typical year that require special permits and protected corridors to accommodate the movement of such shipments on roads. It is important for the City of Hamilton to have a good understanding of the routes that are involved for such movements and to ensure continual unimpeded access for dimensional cargo that connect to the highway system and/or offer access to adjacent municipalities.

Local Connections to Highways

- Section 2.2 on Road features an extensive discussion of the importance of highways and roads to the future development of the AEGD. The sub-section highlights that some highway infrastructure improvements are needed for the future.

- Analytical outcomes suggest that generally Hamilton's goods movement/logistics clusters offer trucks good access to major highways. The most intense activity is close to such highways. Good highway access has been noted previously [5] as an important element in reducing conflicts between the movement of trucks and other users of the roads. The dependence of the AEGD on Upper James Street illustrates an exception in this regard.

- Further analytical results suggest that the roads of Hamilton must accommodate a lot of trucks that are quite heavily loaded. Heavier cargoes are more punishing for road surfaces. Stakeholder feedback from major shippers and carriers indicates that the quality of local roads is quite important. High-quality roads can enhance Hamilton's reputation as a leading hub for goods movement. Parkdale Avenue, which has concrete sections, was noted to be quite robust.

Residential Intensification and Goods Movement

Currently, there is rapid residential intensification and some greenfield residential development taking place on the escarpment. The rapid development of Binbrook is a good example of the latter. Much new development is highly oriented to the automobile more so than to transit. This new, automobile-oriented population growth on the escarpment is already putting additional pressure on the finite available capacity to move vehicles on the primary escarpment routes (Hwy 403, RHVP). Thinking from a goods movement perspective, these mounting pressures are a concern for

future logistics activities on the escarpment, including the AEGD, which depend heavily on connections to the GTA and other locales. Light rail transit is an important component in helping to balance residential intensification in the central city relative to the escarpment.

Connections to the Midwest

- Data across modes (trucking, rail, marine, and air) reveal that Hamilton's trade connections to the US Midwest are very significant and perhaps offer the potential for even more cross-border trade, especially via the border crossings to Michigan.
- Relative to many other places in the GTHA, Hamilton is well-located to trade more with the US Midwest. The upcoming Gordie Howe Bridge effectively brings the US Midwest even closer to Hamilton.
- Short Sea shipping linked to the Port of Hamilton may be one attractive means to enhance such connections with the Midwest.
- In a related (domestic) note, analytical results suggest that Hamilton does not have much direct cargo movement to Eastern Ontario via truck. Direct marine connections to Oshawa facilitated by HOPA and which bypass the traffic congestion of the GTA, could be an interesting possibility to generate improved economic connection.

Connections to QEW and Niagara

- Current day stakeholders in Hamilton did not emphasize the need to develop the Mid-Peninsula corridor as a major new highway. This was also the case with the recent provincial transportation strategy for the Greater Golden Horseshoe [20]. In MITL's 2019 consultations [8], a Mid-Peninsula route was seen by some as an important element in adding resilience to the regional highway network and a more direct route to the Peace Bridge. See Figure 2-2 for an overview of other 2019 feedback.

- Regardless, there is a need for new road infrastructure to help connect a growing AEGD more directly to the QEW and points east toward Niagara and the border. This observation is supported by the trucking speed and intensity outcomes for Upper James Street mentioned above. The results underscore the case for a new link, that previously has been conceptualized, that could join the AEGD directly to the Upper Red Hill Valley Parkway.

Positioning for the Future

In an evolving technological and societal landscape, with the heightened effect of e-commerce, and the call to action related to climate change, there are changes in the way that goods are being moved. Trends need to be monitored to ensure the City is prepared and equipped to provide businesses with a better opportunity to operate efficiently and effectively. It is possible to capitalize on trends as well. For example, real-time analytics and smart city capabilities may assist with such monitoring and preparation.

In preparing for the future during a time of rapid change and interdependent trends, predictions can often be incorrect. As such, another approach is to focus on avoiding major strategic errors. For example, stakeholder engagement expressed concern about various land use issues (e.g., excess vertical development) that could negatively impact the day-to-day functioning of the AEGD, if not the flight path of planes. This is an outcome to be avoided.

There is an opportunity for Hamilton to position itself as the advocate of efficient and resilient multimodal goods movement, which is expected to grow in importance to industry and senior levels of government. The opportunity is based on Hamilton's unique position in all transportation modes and strong transportation & logistics orientation.

3 ACTION PLAN

3.0 ACTION PLAN

Over the following four pages, a proposed action plan arising from the development of this strategy is outlined and described. The plan is composed of 32 action items allocated across 11 thematic areas. The plan reflects the totality of the work that has gone into this strategy including collaborative efforts that have taken place involving a wide range of stakeholders with an interest in Hamilton's goods movement sector.

The items are numbered in accordance with the thematic areas. The role of Hamilton Economic Development in pursuing each action item is indicated along with identification of other groups involved. Other groups could involve departments within the City of Hamilton but outside of Hamilton Economic Development.

A final column indicates a timeline for the action to be completed:

- Short Term (ST) – less than 1 year
- Medium Term (MT) - 1-3 years
- Long Term (LT) - 3-5 years

Some action items are marked "ST-LT" indicating on-going efforts over the duration of the five-year period.

Number	Category	Action	City of Hamilton (EcDev) Role	Groups Involved	Timeline
1.1	**External Partnerships**	Support the establishment of a working group to action recommendations, ideas, and projects as well as collectively promote Hamilton as a choice location and leader in Goods Movement.	Support	IF-CITM, MITL, YHM, HOPA, HTC, Industry	MT
1.2		Further collaborate with regional partners and economic development organizations on supply-chain and trade-related programs and opportunities, including any extension to the Supply Chain Onshoring, Resilience, and Expansion (SCORE) Program, and the provincial track.	Support	Province, Feds, Toronto Global and Supply Chain, Onshoring, Resilience & Expansion Program (SCORE)	MT
2.1	**Marketing/Promotion**	Continue being the lead source and support for stakeholders and potential investors.	Lead	All	ST
2.2		Participate in industry events, programs, and presentations showcasing existing assets such as the port, airport, rail, and road networks, focusing on promoting opportunities that support businesses, including small to mid-size enterprises (SMEs).	Lead	Industry, Government, Other Partners	ST-LT
2.3		Enhance efforts to emphasize the city's assets and strengths in the transportation sector (multi-modal connectivity). Develop marketing materials tailored to each mode of transportation, showcasing its relevance to specific sectors. Address through "Invest Hamilton" website, presentation decks, videos.	Lead	Industry, Government, Other Partners	ST
2.4		Offer customized materials that showcase Hamilton's value proposition including cost competitiveness, strategic location, sector highlights, City assets, access to graduate schools and students, sustainability, and climate change efforts. Emphasize the city's distinct position as a burgeoning hub.	Lead	Industry, Government, Other Partners	ST
2.5		Promote Hamilton's Trade Activity via the investinhamilton.ca website and key marketing materials.	Lead	Industry, Government, Other Partners	ST

Number	Category	Action	City of Hamilton (EcDev) Role	Groups Involved	Timeline
3.1	**Aligning with city initiatives**	Ensure this strategy is inline with and supports the city's commitment to sustainable economic and ecological development, ensuring the creation of safe and vibrant neighborhoods.	Support	Various groups at city	LT
3.2		Broaden the Economic Development Office's involvement in select city working groups, concentrating on initiatives with significant potential impact on the movement of goods and people.	Support	Various groups at city	ST-LT
3.3		Ensure the fulfillment of objectives and goals outlined in the EDAP -"Moving Goods and People" and facilitate growth and success of business.	Lead	Various groups at city	ST
3.4		Continue efforts to sustain a comprehensive road network connecting Hamilton's industrial zones, ensuring the smooth, efficient, safe, and environmentally cognizant transportation of goods.	Lead	Varied Partners	LT
4.1	**Technology Integration**	Enhance cooperation and forge partnerships across various transportation providers to facilitate the integration of technology. Accelerate their preparedness for adopting these technologies.	Support	Industry, Government, OVIN, MITL,MTO, HOPA, YHM	MT
4.2		Review possibility of digital format of existing truck routes (that would ensure information is readily accessible to the public and users).	Lead	City Staff	MT
5.1	**Workforce/Skills**	Collaborate with essential partners, such as Workforce Planning Hamilton, Ontario Trucking Association and Hamilton Immigration Partnership Council to conduct a comprehensive assessment of the future skill requirements for transport companies in Hamilton. Assessment to include all modes of transport.	Support	Industry	ST
5.2		Work with academic institutions and apprenticeship programs to advocate for upskilling and reskilling opportunities, and program enhancements, ensuring that the labor pool possesses the necessary skillsets for in-demand jobs.	Support	Academia	ST
5.3		Support Industry Education Council with initiatives to emphasize potential for future career opportunities within the Goods Movement sector.	Support	Industry Education Council and other partners	ST

Number	Category	Action	City of Hamilton (EcDev) Role	Groups Involved	Timeline
6.1	**Investment/Trade**	Strengthen partnerships with existing industry clients and various government levels by participating in events to showcase Hamilton's brand and capabilities as a choice location for global businesses looking to enter the North American market. Attend international industry events such as: Multi-Modal-NEC (UK), Antwerp XL-Break Bulk, MRO Europe, Break Bulk Americas, Air Cargo-Europe/Americas, Ecom World. World Routes/Routes Americas.	Lead	Industry, Government, Other Partners	ST-LT
6.2		Attend and Encourage Trade-focused Events (TAP/EDC/Ontario Exports/Chambers/HOPA)	Lead		ST-LT
7.1	**Marine**	Work with HOPA and industry partners (e.g., Ports of Montreal/Cleveland) to build upon the expansion of containerized marine and rail services at the Port of Hamilton.	Support	HOPA Ports, Industry	ST-LT
7.2		Work with HOPA and industry partners to build upon the expansion of short sea shipping services at the Port of Hamilton (cross-border and feeder-based)	Support	HOPA Ports, Industry	LT
7.3		Work collaboratively with HOPA Ports for the purpose of collecting and sharing City of Hamilton transportation related data to enhance service offerings and improve supply chains in and around the Port of Hamilton and greater Hamilton area	Co-Lead with HOPA Ports	HOPA Ports, Industry	MT
8.1	**Air Cargo/Passenger**	Work with airport partners to enhance cargo operations and enhance passenger service.	Support	Varied Partners	ST-LT
8.2		Collaborate with airport, operators and businesses to optimize and establish eco-friendly enhancements and methods of operations for the efficient transportation of goods and people. Consider the role of technological innovations such e-VTOL and drones (and EVs, cargo bikes in other contexts)	Support	Varied Partners	LT

Number	Category	Action	City of Hamilton (EcDev) Role	Groups Involved	Timeline
9.1	**Surface Transport**	Ensure that policies, enforcement measures, and zoning regulations align with the development of a well-connected road network.	Support	City, Industry and other partners	LT
9.2		Evaluate technological platforms, improvements, and applications to provide real-time data and statistics for addressing congestion, pedestrian data, safety, and volume issues. Identify pinch points and problematic areas to focus on problem-solving efforts.	Support	Industry, Government, Other Partners	LT
9.3		Engage with client base on alternative "last mile" solutions (e.g., cargo bikes)	Lead	Industry	ST
9.4		Engage with the rail sector and identify possible collaborative local initiatives	Lead	CN, CPKC	MT
10.1	**Decarbonization and Electrification**	Highlight new technology, pilot projects, and progress toward a low-carbon economy within the Goods Movement Sector.	Support	Decarbonization Hub	LT
10.2		Support Efforts to evaluate Hamilton's energy supply, and relative to potential fleet charging needs, to identify and assess challenges pinpointed by stakeholders. Encourage the formulation of corresponding recommendations for enhancement.	Support	Decarbonization Hub, Alectra, Hydro One, Provincial and Federal Governments, Other Varied Parties	MT
10.3		Continue to support MITL's current federally-funded research project into decarbonization of medium- and heavy-duty truck	Support	MITL and other project stakeholders	ST
11.1	**Data**	Support and advocate for the progression of the “Fluid Intelligence” Initiative	Support	All	ST
11.2		Engagement with Statistics Canada and other data sources on potential data enhancements, trade data and measures of freight/cargo relative to Hamilton	Support	Fluid Intelligence, Academia	MT

APPENDIX: STAKEHOLDER ENGAGEMENT RESULTS

APPENDIX

Introduction

These engagement efforts build on a strong recent history of regional consultations by MITL in relation to supply chains and the movement of freight. See Ferguson and Pilla [8] as an example of these efforts in Hamilton-Niagara. Also, MITL engaged with national freight stakeholders in 2017 and the broad themes on barriers to goods movement to emerge were as follows:

- infrastructure demand outstripping supply,
- physical distribution headwinds impeding commerce,
- urgent regulatory encumbrances,
- information and data management complexities [21].

These outcomes are interesting to bear in mind but the current views of Hamilton Goods Movement stakeholders as of mid-2023 are captured below.

2023 Stakeholder Engagement Results

This appendix offers a summary of themes that emerged from three virtual stakeholder sessions that were held in support of the strategy development in June 2023. 40 stakeholders from 37 organizations participated in the course of the sessions. Figure 0-1 below offers a breakdown of individual participants based on their organization type. The largest category of participants was “Carriers”, or entities in the business of moving goods for third parties by road, rail or air. This category included some logistics providers. No marine carriers per se participated. “Shippers” are typically firms that generate goods to be moved. “Hubs” are critical freight nodes along the lines of airports, ports and terminals. The “Other” category contained mostly associations, advocacy groups and other miscellaneous organizations.

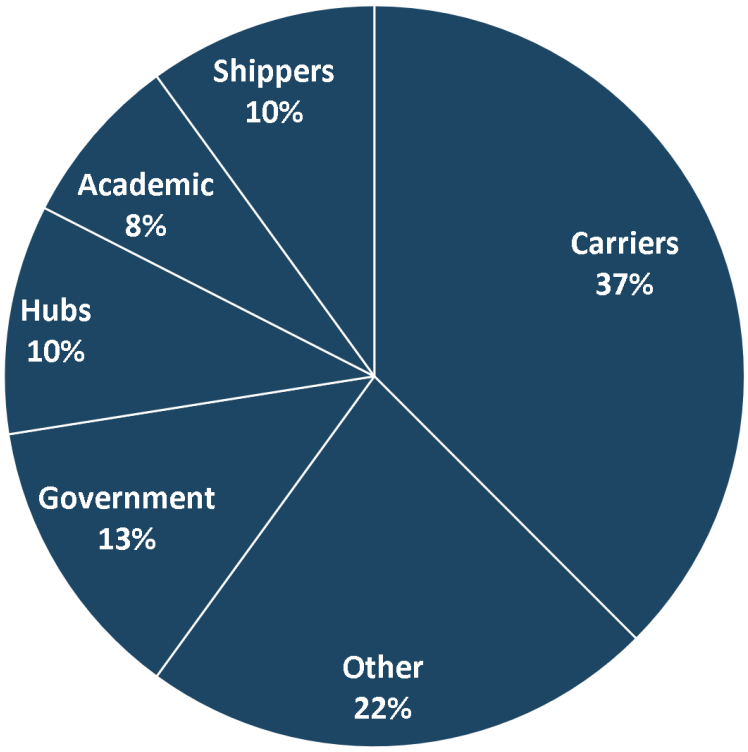

Figure 0-1: Breakdown of 40 Participants by Organization Type

It should be noted that rail stakeholders were not able to attend any of the three sessions. Ultimately, a special virtual session was organized with CN rail that took place at the end of August 2023. Some of the key insights from that session are outlined in a section below.

This summary captures the points that were raised in June and do not account for any recent changes in the situation. These points in some cases reflect personal opinions that may not align with the direction of the strategy.

Questions Posed in Sessions

The six questions below were used to direct the sessions. The first three essentially reflect a goods movement SWOT analysis for Hamilton. Questions 5 and 6 were posed without City of Hamilton personnel present. Responses from those questions have essentially been incorporated within the SWOT results that are reported below. Question 4, related to value proposition, did not yield too much in the way of significant insights that had not already been

covered. Nevertheless, a few points are noted in the appropriate section below.

1. With regard to the current situation, can you highlight the most important strengths and/or weaknesses that you feel are influential for Hamilton's goods movement sector?
2. What challenges/threats concern you about the progression of Hamilton's goods movement sector given its critical economic role?
3. What opportunities would you emphasize to enhance the progression of goods movement and the local/regional economy ?
4. If you were developing a value proposition for Hamilton to assist the progression of the goods movement sector, what key aspects would you highlight to get the attention of important outside parties?
5. Please elaborate on pain points (not just Hamilton-specific – e.g., regional connectivity) related to goods movement that impact your organization or which impact relevant organizations for which you are a stakeholder.
6. Given the entirety of what has been discussed, are there any other comments that you would like to make for our consideration in developing the strategy?

Strengths

1. Hamilton has a more extensive major highway network than other cities its size in Ontario. This permits some extra flexibility for truck movements in the event of delays or incidents.
2. The fact that Hamilton's International Airport operates 24 hours a day is central to its prominence as an air cargo hub. There was stated evidence

that Hamilton was chosen as an air hub with this reason being a major contributing factor.

3. As MITL's 2009 report outlined (as noted in the session), Hamilton has strong foundational aspects along basic factors of geography, transportation, and locational context.

4. Much industry activity in Hamilton benefits from excellent proximity to the QEW through Nikola Tesla Boulevard.

5. Close proximity to the GTA is a significant strength, and from the industrial land perspective, Hamilton remains very cost competitive with the GTA market. A centralized location between the GTA and the border at Buffalo was another element noted. Even a lot of US-to-US cargo passes through the Hamilton area.

6. The McMaster Automotive Resource Centre is an important node for pursuing opportunities related to vehicle electrification and the decarbonization of travel.

7. There is a good diversity of trucking companies that do business in Hamilton and thus Hamilton is seen as an important trucking node by stakeholders.

8. Good communication and facilitation from Hamilton Economic Development was stated to be an important asset.

9. Airport capabilities in serving domestic overnight freight.

10. The fact that Hamilton is dual served by both CN and CP is an important attribute which enhances Hamilton's value proposition for rail and transloading.

11. Hamilton has good proximity to the Hwy 407 toll road. There is feedback that increasingly using this route is more cost-effective in many

cases than to deal with some of the knock-on effects of road congestion that is slowing truck movements.

Weaknesses

1. There need to be contingency plans in place for situations that arise that could have been foreseen. An example was given of a day-long resurfacing of an overpass on Burlington Street. Lineups extended out onto the QEW as far as Fruitland Road but there did not seem to be any measures to compensate (e.g., revised traffic light cycles). For certain companies, these types of instances can impact an entire day of goods movement.
2. The poor surface quality of certain key arterials is an issue for freight movement, and it is acknowledged that truck movements themselves cause much wear and tear. For example, it is possible to get extended weight permits within city boundaries for specific local roads and this may increase permissible payloads by up to 20,000 pounds. This may partly explain the poor condition of, for example, Barton Street towards Stoney Creek.
3. There are concerns expressed about the quality of public transit service (in terms of being a robust all-day system) to locales in the city that are important to the goods movement sector. Two examples mentioned are the airport and industrial sections of Stoney Creek.
4. Housing shortages affect Hamilton and it was indicated that single-detached dwellings are in short supply (perhaps in terms of affordability though not explicitly noted). The goods movement sector depends on its labour force as well as other sectors of the economy and this labour force needs to be housed.

5. For certain types of goods that are highly time sensitive (e.g., oncology medications or other medical contexts) inter-city highway congestion consistently makes it challenging to meet delivery deadlines, including departing from Hamilton.

6. It was stated that Hamilton lacks **active** rail spurs.

7. Regional traffic congestion (in Hamilton and beyond and especially to the GTA) is a major problem. It is common for trucks moving between Hamilton (e.g., the airport) and Toronto to be seriously slowed by traffic.

8. Highway construction projects tend to further compound problems associated with traffic delays and the work often occurs at peak hours for goods movement as distinct from peak passenger commuting.

9. The airport is located in a relatively remote rural area (in relation to Pearson airport).

10. Lands in the airport vicinity are not easily developable and availability is scarce as it is protected for other important uses. But there is a need to continually progress the facilities that will lead to future growth.

11. There is a need for regional critical infrastructure to be diversified across modes so that the freight system has a chance to cope in the event of, for example, labour strife that affects a mode. Businesses lose a lot of money in periods where the system seizes up.

12. An opinion was stated that new restrictions on central city truck routes has not been as well-communicated as it could have been. More can be done to inform trucking companies before trucks are turned away from restricted areas.

13. Delays of up to two years with required approvals have been experienced by firms seeking to open service platforms (e.g., truck

mechanical servicing) in the Hamilton area. More clarity and visibility is helpful for competing in this regard with other jurisdictions.

14. Some localized road conditions (Strathearne was noted) are sufficiently poor that they cause the condition of trucks to deteriorate through severe wear and tear.

15. It was stated that traffic backlogs form in industrial areas due to a lack of advanced green traffic signals.

16. It was indicated that more investment will be needed to ensure big enough aprons at Hamilton International Airport to accommodate the larger planes that are becoming more prevalent.

17. The new truck route master plan restricts trucks into the core and it will no longer be possible to bring in 53-foot trailers. It was speculated that it will be hard for big trucks to help develop the core and that loads will have to be broken into two.

18. There is a major regional problem (with Hamilton included) relative to the US with empty backhauls. Many trucks that pass at any given time are travelling empty.

19. It was stated that there is a lack of real-time capability to support rapid insights on traffic and logistics.

20. One implication of frequent construction in locales important to truck movement is that controls on construction zones can hold up overweight permitting processes.

21. The current Hwy 403 and Hwy 6 North interchange was seen as a big issue in terms of its need to be redone.

Opportunities

1. It was estimated that about 700,000 containers travel towards the Hamilton Region every year from key Brampton facilities. A short sea service connecting Montreal, Halifax and Hamilton could tap into that flow of containers without passing them through the GTA. Container-handling capabilities at the Port of Hamilton need to be further improved (although recent progress has been made on that front through Hamilton Container Terminal).

2. Regarding the potential for more containerized cargo on the waterways, the addition of CBSA dedicated inbound container processing capability in Hamilton, which is not currently available, is seen by key stakeholders as part of the solution.

3. If containerized (high-value) goods increasingly move through Hamilton at facilities in the port lands, this will bring some important goods closer to the businesses that need them and may be a positive impetus for new business to locate in Hamilton that might otherwise opt for Peel region.

4. HSR is bringing forward a transit growth plan in 2024 which will outline the transition to a redesigned transit network. The aim is to finalize improvements by 2031 which should match the final implementation of the LRT. One of the objectives will be improved connectivity of the system to workplaces and employment centres.

5. From an industrial real estate perspective, Hamilton has seemingly progressed ten years in the last three years but there remains a lot of room for growth in Hamilton (fuelled partly by being cost-competitive) and this was predicted to play out regardless of what the macro economy does.

6. There may be an opportunity to pursue new and innovative solutions that can address the problem of metropolitan traffic congestion, taking into account that it is an entire ecosystem of people and goods that need to

move. Are there ways to use technology or make better use of infrastructure or pick up new solutions from other jurisdictions around the world?

7. There may be an opportunity to re-surface key industrial arterials less frequently but with a higher-quality product. Currently, resurfacing of heavy industrial routes may be done year after year and there is disruption associated with that. It was noted that Parkdale Avenue, which was described as having a concrete base, has stood up better over time to the demands of heavy trucking.

8. Drone delivery was advocated as a real opportunity. There is work taking place with Transport Canada on compliance strategies. There are aspects of Hamilton's geography and corridors that align well with the future capabilities of drones.

9. Further significant opportunities were expected in the agri-food sector for HOPA (though further details were not provided).

10. There is potential for Long Combination Vehicles to be accepted on the Linc/Red Hill to bring those expressways into alignment with the 400-series highways (where they are accepted under certain conditions).

11. Strategies that are used in developing large multi-tenant logistics parks in the US may be effective in fully developing the multi-modal potential of the port lands vicinity.

12. There are several older industrial buildings in Hamilton that had rail spurs (at points in the past) and these can be brought back at varying costs on a case-by-case basis.

13. Developing multi-modal makes it easier for Hamilton firms to compete in the wider regions and it also offers an opportunity to avoid traffic

congestion created by truck traffic that passes through the region but does not otherwise interact with Hamilton.

14. Marine offers the best option for incoming westbound cargo to bypass the congested Greater Toronto Area and to utilize Hamilton as an important hub for subsequent distribution. Marine is the only surface mode that can feasibly bypass the GTA in this way.

15. Ideally, a Hamilton-specific solution would offer a means to communicate real-time intelligence about barriers to truck movements (e.g., collisions, shutdowns) to permit on-the-fly diversion of trucks. At present, evidence was heard that carriers use mass e-mails/text messages to internally communicate such information.

16. Improved multi-modal operating by long-distance carriers could lead to more last-mile opportunities for regional carriers and can also assist with the empty backhaul problem which historically has been more of a problem for Canadian than US trucking firms.

17. CBSA approval for container inspection at Hamilton is an example of something that the City cannot solve on its own, but any capabilities/assistance in relation to navigating bureaucratic processes other governments/jurisdictions may prove beneficial for the City.

18. Quick answers on aspects like availability of skilled labour in Hamilton can help with this City being chosen as a location to operate. In relation to industrial space, highlighting what exists or excess capacities can be very important for companies that are looking to come into the region.

19. There may be an opportunity to develop a pre-clearance multi-modal hub to assist with cross-border activity. Examples from the US indicate that if a hub is served by 20 to 60 trains a day that it can attract a billion dollars in distribution centre investment. Such a facility in the region

(along main rail corridors) would assist in taking longer-distance movements off 400 series highways.

20. A lot of produce that arrives from the US into Ontario is railed to Chicago and then trucked from there. This is an opportunity to remove these and other long-distance truck movements from the road.

21. Night-time operation of automated vehicles between significant freight facilities is likely to arrive sooner than is generally thought. There is an opportunity for key Hamilton hubs such as the airport to be active on this front.

22. Developing an Improved understanding of importing and exporting activity in Hamilton can help goods movement service providers to cater to customer needs.

23. Really highlighting the airport and its capabilities offers significant value-added for the goods movement sector.

24. The integration of data and analytics is an important theme for the progression of Hamilton in the future.

25. More attention should be paid to the topic of truck parking facilities and their enhancement.

26. Strengthening Hamilton's multimodal core can help the City to become more competitive extra-regionally and our extra-regional traffic will not need to compete so much with freight traffic that is passing through.

27. There is a need to develop a capability to inform quickly of local problems on roads to permit diversions.

28. Lessons can be learned from off-peak delivery pilots that have taken place in recent years.

29. There is an opportunity to get past any negativity associated with the recent truck route master planning process and communicate strongly that trucking is highly important to Hamilton's future.

30. There is an opportunity to benefit from weights and dimensions (oversize permitting) given that the province is looking at an automated permitting system and Hamilton is poised to benefit given oversized cargoes at the Port.

31. There is a need to protect corridors for regional movements of oversize loads.

32. There may be an opportunity to develop smart solutions as opposed to massive new infrastructure (e.g., a mid-pen highway)

33. There may be an opportunity to schedule or plan construction to better align with the timing of goods movement.

34. There is a need to plan and design in a way that properly takes commercial vehicle movements into account. These types of vehicles are not typically top-of-mind in complete streets implementations.

35. It is important to highlight the role of the goods movement sector in Hamilton in moving a diversity of goods with their unique contexts (e.g, life sciences)

36. Opportunity to highlight progress of the goods movement sector in being "clean and green." For example, how is sustainable aviation fuel supported? Electrification through battery technology or hydrogen or through other cleaner fuel options is important to consider.

37. It was expressed that many big trucking players in the US are really starting to build out the hydrogen network because this is what they foresee as a solution for the future. For Hamilton, securing a reliable

hydrogen supply is going to be critical so it is important to engage with producers.

38. It was noted that there are more and more requests for rail access and thus an opportunity to re-activate spur lines.

Threats/Challenges

1. Repeated concern was mentioned about future impacts of residential development near and around key freight facilities such as the Hamilton International Airport. A comparison was made with Pearson airport where significant residential populations arrived in the decades after the airport was already there, leading ultimately to restrictions on night departures and arrivals.

2. Concern was expressed about the fluidity of future traffic flow through the King and Main Corridors given the upcoming prominence of light rail transit and the potential for population growth in the city centre. While heavy trucks are being limited in their central city movements, there will be times when heavy trucks need to be in central areas and also lighter trucks (which are permitted) will need to flow well. There was also stated concern about an over-emphasis on developing too many streets as complete streets. Further concern was expressed about the movement of people in the sense that the LRT and complete street solutions might not cater to needs as well as the automobile could. Roads play the important role of accommodating delivery vehicles moving much needed goods to local establishments such as hospitals, restaurants and offices. It was suggested that these concerns are shared by many in the Hamilton business community.

3. Manufacturers may choose from among different jurisdictions for where they set up production. Anecdotal information was shared of a Canadian

trailer manufacturer who has chosen to produce in Ohio and who stated that Ontario would not be considered in the future for its production. Ohio was credited with having a more business-friendly environment and with it being possible to erect a plant within a year. The perception was that this would not happen in Ontario.

4. The truck driver shortage was identified as an ongoing concern. Large firms in the area may use a mixture of prepaid and collect carriers. It was noted that there is a lot of turnover, with drivers jumping from one company to another and the environment is highly competitive. The introduction of e-logs is viewed as enhancing safety but can cause more challenges on the logistics side. This firm focuses on maintaining continual truck throughput and the driver situation challenges that.

5. There are concerns about the speed of execution in terms of working through the processes, involving multiple levels of governments/agencies, to get important new infrastructure built. "The gestation period to get … from concept and idea to finished product is just way too long and people lose interest."

6. Evidence was shared that there may be untapped demand from multinationals to rail goods into Hamilton port lands, but they are choosing other options due to a lack of completed transload capacity to transfer goods to truck.

7. There is a threat of "rushing things too much" with trucking electrification. The time span of the subject strategic plan will not be enough for longer haul trucking and the path to electrification. There is a need for better understanding, especially given that reality may differ from perceptions or intentions. It was noted that half of all California heavy-duty trucks are to be zero-emission by 2035 and this causes concern with some parties here in Ontario.

8. There are a variety of questions about electrification that need to be better understood. Issues include: vehicle and other costs, reliability, technology, maintenance and whether the roads need to get better to accommodate these new types of trucks. Can the electrical grid support the electrification of goods movement fleets including trucks?

9. There may be potential accommodation issues with 60-foot trailers in Hamilton (e.g., wider turning radius) if they are approved.

10. Concerns expressed by some trucking stakeholders about Hamilton's perceived messaging on trucks. The impression is given that trucks will be often penalized via enforcement of truck routes.

11. Stated that there is too much focus, especially in relation to trucking, on issues of the downtown and vicinity. It is suggested that this is a distraction, to some extent, and that there is a much wider city to focus on as well.

12. Certain types of development outside but near airport properties are increasingly becoming an issue in Canadian cities. Instrument approach procedures that allow aircraft to land during bad weather are being impacted.

13. The on-going tension between trucks, communities and passenger vehicles is a challenge and solutions in this regard are likely to come slowly and incrementally.

14. Planning for an incident such as the Burlington Skyway partial closure on the QEW in 2014. What could be done to alleviate associated pressure?

15. There is concern about on-going disruptions due to major transportation system construction. It is not just LRT but also re-configuration of the Hwy 5 and 6 intersection and periodic truck route

resurfacing. Other concerns include the re-configuration of Main Street and the trend from one-way to two-way streets.

16. There is a need to ensure that airport infrastructure can support an increase in cargo movement (e.g., apron areas, buildings etc).

17. In general, change is continuous, and for this reason the ability of stakeholders in the system to adapt is very important and part of coping with adaptation is working together.

18. Concerns were expressed about "modal shift" being engineered by government rather than being determined by the market.

19. Concerns were expressed about "Driver Inc." – This problem is much more widespread than Hamilton but dishonest employers are often asking inexperienced drivers to incorporate their own trucking firm. Many are recent migrants who are pursuing permanent residence status. This could partly explain regional increases in collisions involving trucks.

20. Concern was expressed about pushes for airport lands, that have been zoned for industrial use, to be re-zoned to other uses.

Aspects of Value Proposition Mentioned

1. The efforts of EcDev on DC credits are enabling the expansion of warehousing and logistics in the region and helping to bring new firms.
2. The positive efforts of Hamilton Economic Development to assist and add value were mentioned multiple times as an asset.
3. Proximity to institutes of higher learning to conduct research and implementation studies (among other benefits) is a big strength. There

are going to be a lot of applications of autonomous vehicles and drones in the upcoming years and institutes of higher learning will be able to help.

4. Hosting events such as the Southwestern Ontario Real Estate Forum (Hamilton should consider for the future) helps to draw attention to Hamilton's infrastructure and good "bones".
5. The combination of modes in the same place.
6. Access to the border and major markets.

Rail Session with CN

Insights in relation to the rail sector in Hamilton are mostly informed through stakeholder engagement processes. MITL has engaged with both CN and CPKC in recent years and a special session was held with CN (August 2023) in relation to the development of this strategy.

1. For both CN and CPKC, perceptions about Hamilton operations are very much focused on port lands and areas near the port lands and CN has transload activity associated with their Stuart Street Yard, which is west of the Port of Hamilton. This is also a staging/classification facility.
2. CPKC has also been quite focused on their Transcare intermodal facility that serves the steel sector.
3. CN notes that multimodal capability between rail, marine and truck is a big strength.
4. There is concern with "encroachment" from new residential properties nearby and note that rail is noisy.
5. There are some conflicts in the region especially with GO passenger rail. Freight trains are slower, take longer to accelerate, have wider operating

windows and run on a more flexible schedule. GO runs on a higher frequency fixed schedule. Passenger rail actually consumes quite a bit of capacity and almost creates blackout periods for freight. Population densities are increasing for Hamilton and this will only increase demands on the rail network.

6. CN Transload capabilities in Hamilton mean that product can be brought quite deeply inland by rail but the last mile has to be by truck and associated trucks need good access and fluidity into the port area. There is a need to protect corridors that have been dedicated to freight.
7. Hamilton is strong in terms of having developable or convertible land that can be served directly by rail. But maintaining a good flow of trucks in and out of these prime industrial sites is going to be key in the future.
8. Hamilton is viewed by CN as an integral part of its broader North American network but there is a significant local component to that as well.
9. The pandemic caused more people in Canada to stay at home more often and for longer. This apparently helped generate more complaints about rail from people who live close to rail infrastructure.

Acronyms Used in the Strategy

AEGD – Airport Employment Growth District

ATRI – American Transportation Research Institute

CBSA – Canada Border Services Agency

CMA – Census Metropolitan Area

CN – Canadian National Railway

CPKC – Formerly CP, the new railway is the result of the merger between Canadian Pacific and Kansas City Southern railways. The new entity is referred to as "CPKC."

CVS – Ontario Commercial Vehicle Survey

EDAP – Economic Development Action Plan

GPS – Global Positioning System

GTA – Greater Toronto Area

GTHA – Greater Toronto Hamilton Area

HOPA – Hamilton-Oshawa Port Authority

IF-CITM – Innovation Factory - Centre for Integrated Transportation and Mobility

LINC – Lincoln Alexander Parkway

NAICS – North American Industry Classification System

MITL – McMaster Institute for Transportation and Logistics

MTO – Ontario Ministry of Transportation

QEW – Queen Elizabeth Way

RHVP – Red Hill Valley Parkway

YHM – Airport code for John C. Munro Hamilton International Airport

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