**Halifax Regional Municipality**

# Regional Goods Movement Opportunity Scoping Study
# Literature Review and Case Studies Appendix

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# 1 LITERATURE REVIEW

Current research on urban goods movements can be divided into two broad categories. One stream focuses primarily on freight movements, which include a broad range of industrial and large volume international, interregional and interurban freight flows. The other focuses on "last mile"[1] issues related to delivery for local consumption by businesses and consumers.

In part this dichotomy reflects differing transportation characteristics related to economies of scale:

> *Commercial vehicle movement is very different from personal movement in many respects. Urban commercial movement is also different from commercial movement over larger areas, such as states, provinces, nations and even international areas. Rail, ship, barge, aircraft and pipeline transport are inefficient over the smaller scale of urban areas, hence urban commercial movement is almost exclusively road-based. There are instances of other modes – walking, cycling, barge, rail and even of specialized aircraft – in the movement of goods and services within urban regions, but these are unusual and very small relative to the total.*
>
> *Additionally, a large component of commercial movements within urban areas is made with light commercial vehicles (LCVs), including four-tire, two-axle vehicles such as pick-up trucks and vans and even passenger cars. Interurban transport makes load consolidation more economic, and the larger volumes of goods moving between larger areas also increases the importance of heavy commercial vehicles such as tractor-trailer combinations over longer distances. Further, the service sector constitutes a large proportion of the urban economy, in large part serving the population in the urban area where it is located. It is clear that a complete consideration of urban commercial movement requires consideration beyond just freight movements, expanding to include service deliveries with the urban area.*[2]

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[1] "The last mile (or miles) represents the final haul of a shipment to its end receiver, be it a shop, a business, a facility, or a home (in the case of home deliveries). Cities also experience first mile(s), as one-third of urban truck traffic is goods pickups. (In this report, both first-mile and last-mile trips will be referred to collectively as the "last mile.")" Synthesis of Freight Research in Urban Transportation Planning National Cooperative Freight Research Program (NCFRP) Report 23 Genevieve Giuliano, Thomas O'Brien, Laetitia Dablanc and Kevin Holliday; Transportation Research Board Washington D.C. 2013 p. 23.

[2] Review of Urban Commodity Movement Demand Modelling Approaches KJ Stefan, Transportation Department, City of Calgary and JD Hunt, Department of Civil Engineering, University of Calgary 2004 p. 2.

## 1.1 Freight Planning in the U.S.

In the U.S., goods movement planning has focused primarily on large scale international, interregional and interurban freight flows.[3] Federal legislation requires states and Metropolitan Planning Organizations (MPO's) to provide reasonable opportunity for the public and interested parties, including "freight shippers" and "providers of freight transportation services" to participate in developing plans and programs. However, jurisdiction over freight movements remains fragmented:[4]

- Federal agencies engage in system planning, collect taxes and fees, and invest in infrastructure, as well as regulate safety, economic competition, and environmental impacts.
- Special authorities own and operate ports and intermodal facilities.
- Local governments invest in infrastructure, manage traffic, and regulate the location and operation of freight facilities.

In addition to its role in facilitating the development, operation, and maintenance of the federal highway system, the FHWA has some specific freight-related responsibilities through its Office of Freight Operations. These include certification of vehicle size and weight standards, freight research, advanced technology operational tests, funding of freight infrastructure, and freight-related professional training and development.

As part of its freight research program, FHWA has collaborated with the Bureau of Transportation Statistics to develop the Freight Analysis Framework, which provides a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation. Starting with data from the 2012 Commodity Flow Survey (CFS)[5] and international trade data from the Census Bureau, FAF incorporates data from agriculture,

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https://www.calgary.ca/Transportation/TP/Documents/forecasting/review_of_urban_commodity_movement.pdf?noredirect=1

[3] As an example, a recent TRB report on goods movement issues uses the terms "freight" and "goods movement" interchangeably. Guidebook for Understanding Urban Goods Movement NCFRP Report 14, Suzann S. Rhodes, Mark Berndt, Paul Bingham, Joe Bryan, Thomas Cherrett, Peter Plumeau and Roberta Weisbrod; Transportation Research Board Washington D.C. 2012 p. 2.

[4] NCFRP 23 p. 62.

[5] The Commodity Flow Survey is a nation-wide shipper survey conducted every five years by the Bureau of Transportation Statistics and the Census Bureau.

extraction, utility, construction, service, and other sectors.[6] FHWA has also commissioned research to identify freight bottlenecks on the U.S. system, and collaborates with the American Transportation Research Institute (ATRI) to produce an annual report documenting major freight bottlenecks based on ATRI-developed analysis methods, customized software tools and terabytes of data from trucking operations to produce a congestion severity ranking for each location.[7]

FHWA also designated a National Highway Network and Primary Highway Freight System to guide federal investments under MAP-21. Under the new FAST Act, a new network designated the National Highway Freight Network will be defined to include the Primary Highway Freight System (PHFS), other Interstate portions not on the PHFS, Critical Rural Freight Corridors (CRFCs), Critical Urban Freight Corridors (CUFCs).[8]

Three policy trends relevant to urban freight have been identified:[9]

- A growing disparity in federal surface transportation funding supply and demand. The primary source of federal funds for transportation programs is the fuel tax. Revenues from the fuel tax continue to decline due to increases in vehicle fuel efficiency, and no alternative source of revenue has been identified. The major freight bottlenecks are located in large metropolitan areas, particularly those that serve as gateways or intermodal nodes for the nation's commerce. These bottleneck problems are perceived as "national," in that they are related to interstate commerce and economic productivity, and they are seen as being a federal responsibility. In an environment of funding scarcity, freight bottleneck problems are just one of many problems competing for funds.
- The lack of a national freight policy or program. In the absence of well-defined funding programs, most funds are distributed on the basis of "earmarks" i.e. specific clauses attached to legislation based on negotiations among elected representatives in the House and Senate:

[6] "Freight Analysis Framework" FHWA http://www.ops.fhwa.dot.gov/Freight/freight_analysis/faf/index.htm
[7] "ATRI Releases Annual List of Top Truck Freight Congestion Locations" American Transportation Research Institute Nov 18, 2015 http://atri-online.org/2015/11/18/4712/
[8] National Highway Freight Network FHWA http://ops.fhwa.dot.gov/freight/infrastructure/nfn/index.htm
[9] NCFRP 23 pp. 64-65.

*There are therefore not only no guidelines for state and local governments seeking to solve their freight problems, but instead a strong incentive to use earmarks to promote local agendas. Thus while the absence of federal leadership has allowed for rich and varied experimentation in addressing urban freight problems, it has also precluded the consideration of national priorities or a consistent national public policy.* [10]

The new FAST Act seeks to address this issue. Within 2 years of enactment, the FAST Act requires DOT to establish (and publish on its website) a national freight strategic plan. DOT will develop (and update) the plan in consultation with State DOTs, MPOs, and other appropriate public and private transportation stakeholders.[11]

- Devolution of authority in surface transport to lower levels of government. This has made it particularly challenging to accommodate expansion of freight transportation facilities serving international or interregional trade, because the benefits are widely distributed but potential congestion and environmental impacts are felt locally:

  *Fragmentation is … challenging in the case of freight policy because freight famously "has no borders." The global dynamics that drive freight flows are largely beyond the control of any one government. The lack of authority over these flows, combined with the external costs they impose, create especially serious problems for local governments, whose citizens are incurring the external costs.*[12]

## 1.2 Environmental Issues

Trucks are a significant source of air emissions in metropolitan areas. Trade hubs may also experience significant emissions due to other modes as well, including marine vessels, rail locomotives and aviation activity. Concern over the global warming impact of $CO_2$ emissions has further focused attention on air emissions from freight transportation.

Strategies to mitigate environmental impacts include:

- Reduction of emissions through more stringent emission standards for trucks.

[10] Ibid., p. 65.
[11] Fixing America's Surface Transportation Act or "FAST Act" Freight Planning and Policy Provisions http://www.fhwa.dot.gov/fastact/factsheets/fpppfs.cfm
[12] Ibid., p. 67.

- Use of alternative fuels.
- Switching to low or zero emission vehicles (hybrid or electric) for urban deliveries.
- Mode shift to lower emissions options, particularly from truck to rail. This can include the use of on-dock rail yards at port terminals to eliminate truck trips to rail intermodal yards, or use of rail shuttles to transfer port-related activities to less densely populated areas.

In the U.S., the Environmental Protection Agency sets standards under the Clean Air Act for cities' ambient air quality for six principal pollutants, which are called "criteria" pollutants.[13] Regulations require that areas in violation of standards ("nonattainment areas") improve air quality and reach the standards by specific dates. This poses additional challenges for metropolitan regions which are found to be "in nonattainment", because the regional transportation plan must demonstrate how air quality will be brought into compliance with the standards required by the Clean Air Act in order to qualify for federal funding programs.

## 1.3 Land Use

There are two major changes in goods distribution which have had major impacts on urban freight: decentralization and consolidation.

- Decentralization of distribution activities outside the urban core has occurred in response to growing land requirements and lower land prices. In some regions this has led to "logistics sprawl" and resulted in an increased number of truck trips to circulate and deliver goods within the region.[14]
- The availability of large parcels of land and low land prices in suburban or exurban areas has allowed firms to consolidate warehouse and distribution activities into very large buildings to take advantage of economies of scale.
- A study published in 2010 found that from 1995 to 2006 growth in the North American warehousing sector was driven primarily by growth in the very large distribution centre, or mega-DC (employing more than 100 workers in facilities greater than 500,000 square

[13] "Criteria pollutants" include particle pollution (often referred to as particulate matter), photochemical oxidants and ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. US Environmental Protection Agency https://www.epa.gov/criteria-air-pollutants

[14] Freight Transport, A Key for the New Urban Economy Laetitia Dablanc The International Bank for Reconstruction and Development / The World Bank Washington DC 2009 p. 44.

feet).[15] These large facilities enabled reductions in distribution costs due to economies of scale including:

- Reduced management costs (fewer managers per employee).
- Larger warehouses are also able to handle the high volumes of traffic required to make 24-hour operations economically feasible. In turn, operating around-the-clock allows management to better schedule truck loading and offloading and reduce driver wait times. Extending the hours of operation also allows deliveries to be scheduled around times of typical highway congestion or to match port or rail operating schedules.
- Increasingly sophisticated technology enables processing of large amounts of data to facilitate optimization of warehousing and distribution activities.
- In North America, "last mile" pressures for urban deliveries were mitigated by the migration of retail activity from city centres to suburban shopping malls. However, over the last 15 years the retail industry has been transformed due to a number of developments including:
- Growth in e-commerce.
- "Big box" developments such as "Power Centers" and "Mega centers" have mushroomed in most suburban communities and have become the main channels for low-end shopping.
- High-end shopping has been increasingly captured by suburban commercial developments inspired by urban environments. High-end shopping has become more experiential and has evolved as a genuine entertainment activity in the past decade.[16]

A recent article noted that in the U.S. CoStar Group, a provider of commercial real estate information, indicated that the number of malls with vacancy rates greater than 40 percent - which generally means the mall is in "a death spiral" - has increased from less than 0.5 percent in 2006 to 3.4 percent in 2014. And according to real estate research and consulting firm Green

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[15] Andreoli, D, Goodchild, A. and Vitasek, K. (2010), '*The rise of mega distribution centers and the impact on logistical uncertainty*', Transportation Letters: The International Journal of Transportation Research. https://depts.washington.edu/pcls/documents/research/Goodchild_RiseOfMegaDCs.pdf

[16] Retrofitting Suburban Shopping Malls A Step Towards Metropolitan Sustainability Jonathan Denis-Jacob May 6, 2011
http://www.geographyjobs.ca/articles/retrofitting_suburban_shopping_malls_a_step_towards_metropolitan_sustainability.html

Street Advisors, “Since 2010, more than 24 enclosed shopping malls have closed, and 60 more are on the brink of closure … About 15% of U.S. malls will fail or be converted into non-retail space within the next 10 years.”[17]

With the rising importance of ecommerce, firms are redesigning their distribution networks to enable multi-channel marketing that integrates operation of their on-line and “bricks and mortar” stores. Stores are now serving as fulfillment centers, and retailers are also setting up local depots in large urban areas to “either cross-dock items shipped from larger e-fulfillment centers or to ship certain ‘fast moving’ products direct to customers.” Further up the distribution chain, as e-commerce volumes grow, so will the need for more logistics space. According to the industrial real estate firm Prologis, “e-commerce users require 3x the logistics space, or more, as compared with brick-and- mortar” due to a variety of factors, including the need to carry a broader variety of merchandise, the need to carry greater levels of buffer stock, the allocation of space for returns processing, and the fact that individual order picking, packing and shipping direct to consumers requires more space than store distribution.[18]

The trend of increasing direct deliveries to customers, along with rising population density in city centres, may exacerbate “last mile” problems in the future.

## 1.4 Gateway and Trade Hub Issues

The most prominent goods movement issues in North America have arisen in metropolitan regions serving as gateways or hubs for international trade. These include major port cities such as Los Angeles and Long Beach on the U.S. West Coast, New York and New Jersey on the U.S. East Coast, and Chicago which is a major hub for North American railway traffic.

Within Canada, these issues have been addressed at the federal level under the National Policy Framework for Strategic Gateways and Trade Corridors, with the objective of advancing the competitiveness of the Canadian economy through improvements to nationally significant transportation infrastructure.[19]

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[17] The Demise of Malls and Traditional Distribution Adrian Gonzalez Supply chain 247 http://www.supplychain247.com/article/the_demise_of_malls_and_traditional_distribution/legacy_supply_chain_services

[18] Ibid.

[19] National Policy Framework for Strategic Gateways and Trade Corridors http://www.canadasgateways.gc.ca/media/documents/en/NationalPolicyFramework.pdf

The Gateway approach was pioneered in BC's Lower Mainland by the Greater Vancouver Gateway Council (GVGC). The GVGC was formed in 1994, and in 1995 adopted the "Gateway" concept as a marketing and advocacy tool for improving the competitiveness of the Lower Mainland transportation system as a route for trade between Asia and North America. The GVGC has been very successful in lobbying for government funding for freight-related transportation improvements, and the Gateway concept was adopted by Transport Canada as a framework for policy development in Central Canada (the Ontario-Quebec Continental Gateway) and the Maritimes (Atlantic Canada Gateway and Corridor).

The Halifax Gateway Council, established in 2004, was modelled after the Greater Vancouver Gateway Council. It produced a Strategic Plan and Economic Impact Study in 2005. It also developed a program of work which it carried out over the next few years. It was quickly realized that Halifax's issues differed from those of Vancouver, which was concerned with congestion and an infrastructure deficit. Halifax had excess capacity in its system and sought to increase volume. Projects included the feasibility of an air cargo facility at Halifax International Airport and a regional distribution centre for the Atlantic region liquor boards. It also pursued an initiative to grow and enhance the gateway's fledgling container transload business and a section of Burnside Industrial Park devoted to logistics.

In addition to typical urban freight issues, trade hubs experience unique problems related to the scale of activity associated with freight flows:

> *Trade hubs share the same "last-mile" issues addressed in previous sections such as truck and van delivery and access issues, evening and weekend vehicle movements, and incompatible land uses. However, trade hubs are further defined by the scale and scope of operations that take place within them, particularly in the port, warehousing, and distribution sectors. A combination of rising trade volumes, demand for larger facilities, and the cost of land has pushed distribution centers and warehouses to the periphery of metropolitan areas. These facilities generate freight-related activity that may pass through the urban core on its way from ports and airports to markets outside the region.*[20]

[20] NCFRP 23, p. 49

The importance of trade hubs has increased due to technological innovations in transportation which have reduced transport costs and facilitated rapid increases in trade volumes. These have included containerization of cargo, and rapid growth in vessel size, with a consequent reduction in unit costs for container movements.

> *… these larger ships depend upon a vast network of roads, railways, warehouses, distribution centers, and transfer facilities to move goods across entire continents. Mega-ships encourage the growth of mega-ports, which not only receive goods for local markets, but serve as global gateways and transshipment centers for goods destined for markets all over the world.*[21]

Trade hubs generate substantial local economic activity. An Economic Impact Study conducted for Port Metro Vancouver in 2012 found that on-going operations at the Port of Vancouver support 38,200 direct jobs representing 35,300 direct person years and contribute $3.5 billion in gross domestic product (GDP).[22] A similar study completed for the Port of Halifax estimated that in 2013 direct and spinoff (indirect and induced) impacts of port - related activities include $1.661 billion in economic output, $744 million in GDP and 11,820 full-time equivalent (FTE) jobs.[23]

In the Canadian context, trade hubs provide a critical service for exporters by providing competitive access to international markets.

However, due to the highly developed state of North American transportation networks, trade hubs must compete with other gateways for substantial portions of their traffic. The competitiveness of trade gateways is dependent on a variety of factors, including:

- Location (distance from major freight origins/destinations by ocean transport).
- The local population base, which provides a market for imported commodities.
- The availability of export loads to balance inbound cargo flows.

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[21] NCFRP 23, p. 50.
[22] 2012 Port Metro Vancouver Economic Impact Study – Final Report Intervistas Consulting Inc. May 31, 2013 http://www.portvancouver.com/wp-content/uploads/2015/03/2012-port-metro-vancouver-economic-impact-study3.pdf
[23] Port of Halifax Economic Impact Report Chris Lowe Group. Port of Halifax January 2015 p. 4 http://portofhalifax.ca/wp-content/uploads/2015/02/HPA-Economic-Impact-Report.pdf

- Cost and service quality of inland transportation.
- Availability of value-added services (warehousing, etc.).

This poses a challenge for local transportation planning.

> *The large trade volumes that confer a special status upon trade nodes also carry heavy social costs that include vehicle operations, congestion, increased accidents, environmental costs (including air and noise pollution), and increased infrastructure development and maintenance costs.*[24]

These impacts are particularly severe for cities with port facilities in close proximity to downtown areas. Container terminal operations generate large volumes of truck and rail traffic which can cause traffic congestion at both the local (i.e. in the vicinity of the terminal) and regional levels (for example through delays to vehicular traffic at level crossings). Growth in port traffic volumes and the need to expand marine facilities to accommodate ever-larger vessels, and increasing population densities in the urban core, heighten the conflicts. There are a range of options which have been employed in port cities around the world to mitigate impacts, including streamlining of port-related transportation operations, infrastructure investments to mitigate congestion, and relocation of port facilities outside of the urban core. The case studies which follow will highlight examples of approaches to planning and implementing these solutions.

## 1.5 "Last Mile" Urban Delivery Issues

Last-mile/first-mile strategies address local deliveries and pick-ups to or from businesses or residences.[25] This approach to goods movement is most prominent in Europe, where high population density and infrastructure limitations often result in traffic congestion and environmental problems. In North America, these issues are also prominent in the most densely populated cities such as New York and San Francisco.

A recent study[26] categorized these trips as follows:

- Inter-establishment movements (IEM) or classical freight distribution flows in urban areas. They represent about 40% of the total.[27]

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[24] NCFRP 23 p. 51.
[25] NCFRP Report 23, p. 23.
[26] New trends on urban goods movement: modelling and simulation of e-commerce distribution Jesus Gonzalez Feliu, Christian Ambrosini, Jean-Louis Routhier p.2.
https://www.openstarts.units.it/dspace/bitstream/10077/6114/1/D_Feliu%20et%20al.%20-%20ET2012.50.06.pdf

- End-consumer movements (ECM) commonly identified with shopping trips. In the last decade, other flows have been included in this category, like those derived from home deliveries, reception points or other B2C[28] and C2C[29] movements. Their share is about 50% of the total.
- Urban management movements (UMM), related to public infrastructure maintenance, building works, waste management and other urban space management functions. They represent about 8% of the total.
- Postal and express parcel delivery services represent 1% of the total.
- Other flows (less than 1% of the total).

Note that this definition includes shopping trips by consumers using private vehicles as goods movement trips.

Problems related to "Last Mile" issues are primarily related to traffic congestion and environmental impacts (noise and emissions) caused by commercial vehicle movements and parking. Potential strategies to mitigate these problems include:[30]

- Freight Forums: Formalized consultation processes with the freight industry, often called "Freight Forums," constitute one of the most successful strategies to deal with last-mile delivery issues. The urban distribution of goods is organized by private stakeholders (producers, carriers, retailers, and final consumers) operating in an environment, the urban space, which is under close scrutiny from public authorities. Therefore, partnerships among stakeholders can lead to a better understanding of the constraints of each party and allow the development of concerted actions. Consultation processes in urban freight provide unique collaborative opportunities for private companies that otherwise would not be willing to work together.[31]

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[27] For purposes of the research, traffic volume was measured as kilometres driven by a Private Car Unit, defined as follows: 1 private car = 1 PCU; 1 light goods vehicle = 1.5 PCU; 1 lorry = 2 PCU; 1 articulated vehicle = 2.5 PCU.
[28] B2C indicates Business to Consumer distribution channels.
[29] C2C indicates Consumer to Consumer, and includes transactions facilitated by companies such as Craigslist, eBay, and other classified and auction based sites which allow for greater interaction between consumers.
[30] NCFRP 23 p. 7.
[31] NCFRP 23 p. 24.

- Labelling or other certification programs for firms that demonstrate environmentally responsible behavior are recognized. Certification is an incentive offered by local governments to promote greener deliveries. These schemes are often organized following a negotiation between the municipality and representatives of the freight industry. Certification confers privileges, such as extended delivery hours or the use of designated loading/unloading facilities. It may also provide operators with a competitive advantage in bidding for contracts as customers become more focused on sustainable supply chains.
- Traffic, access and parking regulations. These can include route specific or area-wide truck bans, or be based on time windows, or vehicle characteristics.
- Off-peak deliveries to ease traffic congestion during peak daytime hours.
- Efficient loading/unloading areas. These dedicated areas are much needed in dense city cores where a huge variety of street users compete for very limited space, and where patterns were not designed for today's trucks. Insufficient delivery spaces shift delivery operations to traffic lanes or sidewalks and lead to congestion and potentially hazardous situations for other street users. Additionally, the design and location of loading/unloading areas in many cities are often inadequate. Potential strategies to mitigate these problems include improvement of delivery bay design and locations; limitation of the stopping time for delivery; and sharing of delivery spaces with parking.
- Zoning and building requirements for off-street deliveries, which can reduce congestion by reducing on-street deliveries.
- Consolidation of shipments or "City Logistics" through initiatives such as urban logistics spaces and urban consolidation centers (UCCs). Urban logistics spaces include small terminals located in dense urban areas providing logistics services to neighborhood businesses and residents. UCCs are a kind of city logistics that provides a specific service of bundled and coordinated deliveries, often requiring public subsidies. Such consolidation schemes aim at reducing the number of delivery vehicles and the distances they travel and increasing each vehicle's load factor. On a smaller scale, urban logistics spaces also include pick-up points, drop boxes, and relay points for small package shipments.

# 2 SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (SCAG) CASE STUDY

Founded in 1965, the Southern California Association of Governments (SCAG) is a Joint Powers Authority under California state law, established as an association of local governments and agencies that voluntarily convene as a forum to address regional issues. The SCAG region encompasses six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura) and 191 cities in an area covering more than 38,000 square miles with a population of 18.8 million.

It is estimated that 34% of the region's employment (almost 3 million jobs) and $253 billion of the region's economic output is related to goods movement. The SCAG region includes the Ports of Los Angeles and Long Beach, ranked first and second respectively among North American container ports. The two ports handled a total of 15.4 million TEU's in 2015.[32] The Port of Los Angeles is an independent, self-supporting department of the City of Los Angeles. The Port of Long Beach is overseen by a five-member Board of Harbor Commissioners. Commissioners are nominated by the Mayor and confirmed by City Council. The Harbor Commission is one of six commissions mandated by the City of Long Beach Charter. While the port technically is a city department (the Harbor Department), the city charter and the relationship with the state give it semi-autonomy.

Goods Movement planning in Southern California has been devoted almost entirely to the objective of accommodating growth in trade through the two Ports while reducing emissions to comply with federal and State regulations and overcome public resistance to the expansion of Port and related facilities and infrastructure. These efforts have made the region the most advanced in the U.S. in freight planning and programming.

## 2.1 Freight Planning

As noted above, accommodating trade growth through the Ports of Los Angeles and Long Beach has been the primary focus of goods movement planning in Southern California. Under federal law, SCAG is designated as a Metropolitan Planning Organization (MPO) and under state law as a Regional Transportation Planning Agency and a Council of Governments. SCAG has the responsibility for developing the Regional Transportation Plan in compliance with

[32] American Association of Port Authorities http://aapa.files.cms-plus.com/Statistics/NAFTA%20CONTAINER%20PORT%20RANKING%202015%20revised.pdf

federal requirements in order to qualify for federal funding. The agency develops long-range regional transportation plans including sustainable communities' strategy and growth forecast components, regional transportation improvement programs, regional housing needs allocations and a portion of the South Coast Air Quality management plans.

The most recent update of the Regional Transportation Plan was approved in April 2016.[33] It identifies $70.7 billion in goods movement projects from 2012 to 2040 and encompasses the following:[34]

| SCAG Goods Movement Projects 2012 - 2040 | |
|---|---|
| **Project Type** | **$ Billions** |
| A. Roadway Access To Major Goods Movement Facilities | $14.0 |
| B. Freight Corridor System | $21.3 |
| C. Zero-Emission Technology | $3.0 |
| D. Off Dock And Near Dock Intermodal Yard Projects | $2.0 |
| E. Mainline Rail | $3.4 |
| F. On-Dock Rail | $1.1 |
| G. Rail Access Improvements To Port Of Long Beach & Port Of Los Angeles | $1.1 |
| H. Rail-Highway Grade Separations | $4.8 |
| I. Bottleneck Relief Projects | $5.0 |
| J. Future Initiative That Could Serve Goods Movement | $15.0 |
| Total | $70.7 |

## 2.2 Congestion Mitigation and Environmental Issues

### 2.2.1 Congestion Mitigation

Southern California has been a leader among U.S. gateway regions in projects to reduce congestion and air emissions from port activity. Notable examples include:

- PierPass is a program developed by the marine terminal operators at the Ports of Los Angeles and Long Beach to reduce congestion due to truck traffic at the ports. It was a response to California Assembly Bill (AB) 2650, which sought to reduce vehicle emissions and highway congestion by reducing truck queuing at marine terminal gates and distributing truck traffic over a greater period of time throughout the day. The

[33] 2016 2040 Regional Transportation Plan/Sustainable Communities Strategy Appendix Transportation System Goods Movement Adopted April 2016 Southern California Association of Governments April 2016 http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_GoodsMovement.pdf
[34] Ibid. p. 73.

legislation permitted terminals to adopt either gate appointments or off-peak operating hours as a means of avoiding fines for truck queues.[35]

In April 2004, the West Coast Terminal Operators Discussion Group filed plans for collection of a fee for container moves performed during the day with the Federal Maritime Commission, the agency responsible for regulating international ocean shipping in the U.S. In 2005, PierPass launched the OffPeak program, which charged a Traffic Mitigation Fee (TMF) for daytime pickups at the port terminals to finance the operation of extended gate operations. The TMF wase initially set at $40 per TEU (20-foot equivalent unit) or $80 for all containers larger than a 20-foot unit. Since 2011, PierPass has imposed annual increases in the TMF. Effective August 8 2016, fees will rise to $70.49 per TEU (twenty-foot equivalent unit) or $140.98 per forty-foot container.

- The Alameda Corridor, a 20-mile rail corridor linking the Ports of Los Angeles and Long Beach to major BNSF and UP rail yards in downtown Los Angeles. It consists of a series of bridges, underpasses, overpasses, and a Mid-Corridor Trench that carries freight trains in an open trench 10 miles long, 33 feet deep, and 50 feet wide between State Route 91 in Carson and 25th Street in Los Angeles. The Alameda Corridor consolidated four low-speed branch rail lines, eliminating conflicts at more than 200 at-grade crossings, providing a high-speed freight expressway, and minimizing the impact on communities.

  The Corridor is owned and operated by the Alameda Corridor Transportation Authority (ACTA), a joint powers agency formed by the Cities and Ports of Long Beach and Los Angeles.[36] ACTA's seven-member Governing Board includes two representatives from each Port; a member of each city council, and a representative of the Los Angeles County Metropolitan Transportation Authority. Following the April 2002 opening, operations and maintenance decisions are made by a four-member Alameda Corridor Operating Committee which includes one representative each from the Port of Long Beach, Port of Los Angeles, Burlington Northern Santa Fe Railway, and Union Pacific Railroad. These decisions are then implemented and managed by the Authority.

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[35] Evaluation of the Terminal Gate Appointment System at the Los Angeles/Long Beach Ports Final Report METRANS Project 04-06 Genevieve Giuliano, Sara Hayden, Paul Dell'aquila and Thomas O'Brien February 2008 https://www.metrans.org/sites/default/files/research-project/04-06_Giuliano_final_0_0.pdf

[36] Note that in the Southern California context, both Ports are essentially local government agencies.

> The $2.4 billion Alameda Corridor was funded through a unique blend of public and private sources. Revenues from user fees paid by the railroads are used to retire nearly $2 billion in bond debt. When the Corridor began operations in 2002, railroads paid $15.00 for each loaded 20-foot equivalent unit (TEU) container; $4.00 for each empty container; and $8 for other types of loaded rail cars such as tankers and coal carriers. Current charges are $23.26 per loaded TEU, $5.57 for each empty TEU, and $11.14 for other types of rail cars.[37] Current traffic in the Alameda Corridor averages 35.3 trains per day.[38]

In addition to these programs, SCAG and the Ports of Los Angeles have undertaken many studies related to options for reducing congestion. In 2008, SCAG published the results of an Inland Port Study which examined the feasibility of a short haul rail shuttle 60 miles inland to the cluster of distribution facilities in the Inland Empire (western Riverside County and southwestern San Bernardino County). The study identified a number of practical and institutional barriers, and costs would be high:

> *The costs of an inland port/rail shuttle would be substantial: operating subsidies that could exceed $200 per round trip, and multi-million dollar capital investments in rail terminals and linehaul capacity. The service could never be financially self-sustaining, regardless of fuel prices or other economic developments*.[39]

Southern California continues to struggle with congestion related to port activities. Disruptions related to labour negotiations occurred in 2014 and 2015, and the ports continue to struggle with congestion due to long truck turn times at the port terminals. Due to rising port and inland costs, the Ports of Los Angeles and Long Beach share of U.S. containerized imports from Asia declined from 56.4% in 2003 to 47.1 % in 2015[40] and opening of the expanded Panama Canal this year may further reduce Southern California's market share.

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[37] Alameda Corridor Transportation Authority http://www.acta.org/gen/ACTARate%20History.pdf
[38] Alameda Corridor Transportation Authority http://www.acta.org/
[39] Inland Port Feasibility Study Tioga Group, Railroad Industries and Iteris. Southern California Association of Governments, August 2008 http://tiogagroup.com/docs/Tioga_Grp_SCAGInlandPortReport.pdf
[40] Source: Calculated from US Census Bureau data https://usatrade.census.gov/

### 2.2.2 Environmental Issues

As previously noted, environmental issues have been the primary drivers in expanding the role of SCAG and other local governments in planning, programming, funding and construction of goods movement-related projects. The Ports of Los Angeles and Long Beach remain the largest source of air emissions in the region, accounting for about 10 percent of the region's smog-forming emissions.[41]

In 2000, the Multiple Air Toxics Exposure Study (MATES-II) study conducted for California's South Coast Air Quality Management District (SCAQMD) found that port-related emissions significantly increased health risks for residents of the South Coast Air Basin. The study was initiated as part of the Environmental Justice Initiatives adopted by the South Coast Air Quality Management District Governing Board in October 1997. It represented one of the most comprehensive air toxics programs conducted in an urban environment to date, and included a comprehensive monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to fully characterize Basin risk.

Using a detailed emissions inventory, the SCAQMD found that mobile sources (e.g., cars, trucks, trains, ships, aircraft, etc.) represent the greatest contributor to estimated cancer risks. About 70% of all risk was attributed to diesel particulate emissions; and about 20% to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde).[42] Risk was estimated to be highest along freeways serving the Ports. The study resulted in growing public opposition to port expansion projects.

As part of their Clean Air Action Program, the Ports of Los Angeles and Long Beach implemented a Clean Trucks Program in October 2008 to reduce air emissions by requiring compliance with more stringent 2007 emissions standards for all trucks serving the ports. The total cost of replacing the drayage fleet has been estimated at US$202 million[43]. A portion of the costs was borne by the Ports and state government who provided financial assistance under

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[41] "Is Zero-Emission Freight Possible? The Port of Los Angeles Thinks So" Katherine Gammon Smithsonian June 15, 2016 http://www.smithsonianmag.com/smithsonianmag/california-plans-clean-its-entire-freight-industry-2050-starting-la-ports-180959337/?no-ist

[42] Multiple Air Toxics Exposure Study (MATES-II) Final Report South Coast Air Quality Management District March 2000 http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-ii/mates-ii-contents-and-executive-summary.pdf?sfvrsn=4

[43] Benefit-Cost Analysis of the Ports of Los Angeles and Long Beach Clean Truck Program Tyler Durchslag-Richardson, Michael Mccreary and Paul Vu University of Southern California 2011 https://priceschool.usc.edu/files/documents/masters/research/MPP_11.pdf

various programs. In 2008, the Port of Los Angeles provided $44 million in payments to licensed motor carriers in order to incentivize their purchase of 2,200 Clean Trucks. Another $12.5 million was approved in May 2008 for incentive payouts on the purchase of 500 natural gas fueled trucks.[44] The Ports reported that as of 2012 all trucks serving the port were in compliance. Particulate emissions related to port activity have fallen by 83 percent since 2005.[45]

Public concern over freight-related emissions continues to pose a barrier to expansion of freight activity in Southern California. Most recently, development of a new near-dock rail facility proposed by BNSF, the Southern California International Gateway, has been stalled by a court's rejection of the environmental assessment certified by the Port and City of Los Angeles in 2013. The project was first proposed in 2005 to divert containers currently trucked 20 miles to BNSF's Hobart yard near downtown Los Angeles to a new site in Wilmington only 5 miles from the ports. The original Environmental Impact Report was challenged by a number of petitioners including the City of Long Beach; the South Coast Air Quality Management District; a number of community and environmental groups, including the Natural Resources Defense Council; the Long Beach Unified School District; and several transportation companies with business at the Port. The California Attorney General's Office later intervened in support of the petitioners.

The multiple lawsuits were combined into a single suit opposing the development. On March 30, 2016 the court vacated the project approvals by the Port and the City of Los Angeles, and suspended all project activities until the Port and City properly comply with the California Environmental Quality Act. The agency must complete a more robust and accurate analysis of the environmental impacts of the project before it can move forward.[46]

In spite of actions taken to date, SCAG acknowledges that the region will be unable to comply with national air emissions standards, and will have to rely on new technology:

> *In the South Coast Air Basin, attaining the national ozone standards will require reductions in emissions of NO well beyond reductions resulting from current rules, programs and commercially-available technologies. Previous regulations and incentive programs have*

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[44] Port of Los Angeles Clean Truck Fact Sheet January 1, 2012 https://www.portoflosangeles.org/ctp/CTP_Fact_Sheet.pdf

[45]

[46] "Trial Court Sets Aside Approvals for BNSF's Controversial SCIG Railyard" Charles Parkin Long Beach City Attorney March 30, 2016 http://www.longbeach.gov/attorney/press-releases/court-finds-environmental-review-defective-for-bnsf-s-scig-project/

*improved vehicle emissions performance, but as the region grows, existing measures are not enough to realize attainment of the ozone standards in the 2023 and 2031 time frames. With the projected changes in both truck and rail emissions, greater advancements in technology are needed to meet regional attainment objectives. As such, the 2016 RTP/SCS includes an action plan to facilitate technology development and reduce emissions.*[47]

In July 2015 the Governor of California, Jerry Brown, signed Executive Order B-32-15 which ordered the Secretary of the California State Transportation Agency, the Secretary of the California Environmental Protection Agency, and the Secretary of the Natural Resources Agency to lead other relevant state departments including the California Air Resources Board, the California Department of Transportation, the California Energy Commission, and the Governor's Office of Business and Economic Development to develop an integrated action plan by July 2016 that establishes clear targets to improve freight efficiency, transition to zero-emission technologies, and increase competitiveness of California's freight system.[48]

The State's Sustainable Freight Action Plan was released in July 2016. It sets out targets for the State's freight system:[49]

- System Efficiency Target: Improve freight system efficiency 25 percent by increasing the value of goods and services produced from the freight sector, relative to the amount of carbon that it produces by 2030.
- Transition to Zero Emission Technology Target: Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize near -zero emission freight vehicles and equipment powered by renewable energy by 2030.
- Increased Competitiveness and Economic Growth Target: Establish a target or targets for increased State competitiveness and future economic growth within the freight and goods movement industry based on a suite of common-sense economic competitiveness and growth metrics and models developed by a working group comprised of economists, experts, and industry.

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[47] Regional Transportation Plan/Sustainable Communities Strategy p 42.
[48] "Executive Order B-32-15" Office of the Governor if the State of California July 17, 2015 https://www.gov.ca.gov/news.php?id=19046
[49] California Sustainable Freight Action Plan Governor Edmund G. Brown July 2016 p. 10 http://www.casustainablefreight.org/files/managed/Document/288/CSFAP_Main%20Document_FINAL_07272016.pdf

On January 7, 2016, the Governor released his proposed 10-year funding plan that will provide a total of $36 billion for transportation, with an emphasis on repairing and maintaining the existing transportation infrastructure. The Governor's proposal also includes a significant commitment to improving infrastructure on the State's trade corridors, with approximately $2 billion slated for freight infrastructure investments. The package includes a combination of new revenues, additional investments of Cap-and-Trade auction proceeds, accelerated loan repayments, the California Department of Transportation's (Caltrans) efficiencies and streamlined project delivery, accountability measures, and constitutional protections for the new revenues.[50]

## 2.3 Land Use

The decentralization and consolidation trend for the distribution sector noted in the Literature Review has caused intractable transportation issues for Southern California. In particular, the growth of distribution facilities in the Inland Empire results in high volumes of port-related truck traffic transiting Los Angeles County:

> *Inland Empire: This huge distribution hub is located about 50-80 miles east of Los Angeles-Long Beach. At 1.1 billion square feet of space, this region dominates the big-box market in the U.S. This is a direct result of space constraints in the coastal California cities, as well as the higher cost of commercial real estate in those cities. The availability of quality, Class A distribution facilities of 300,000 square feet or larger is good. Drayage costs are about 30% higher to this region versus Los Angeles/Orange County, but real estate costs are about 30% lower and labor costs are lower due to a lower cost of living. Additionally, the Inland Empire is blessed with easy access to freeways, rail yards, airports and intermodal transportation infrastructure. High-profile retailers such as Wal Mart, Target, and Kohl's all have big box DCs in this region of Southern California. In fact, Walmart's 100-door facility here is the country's largest cross dock.*[51]

A study conducted for SCAG in 2012 estimated that 24% of containers imported through the Ports of Los Angeles and Long Beach are handled at facilities in East Los Angeles or the Inland Empire:

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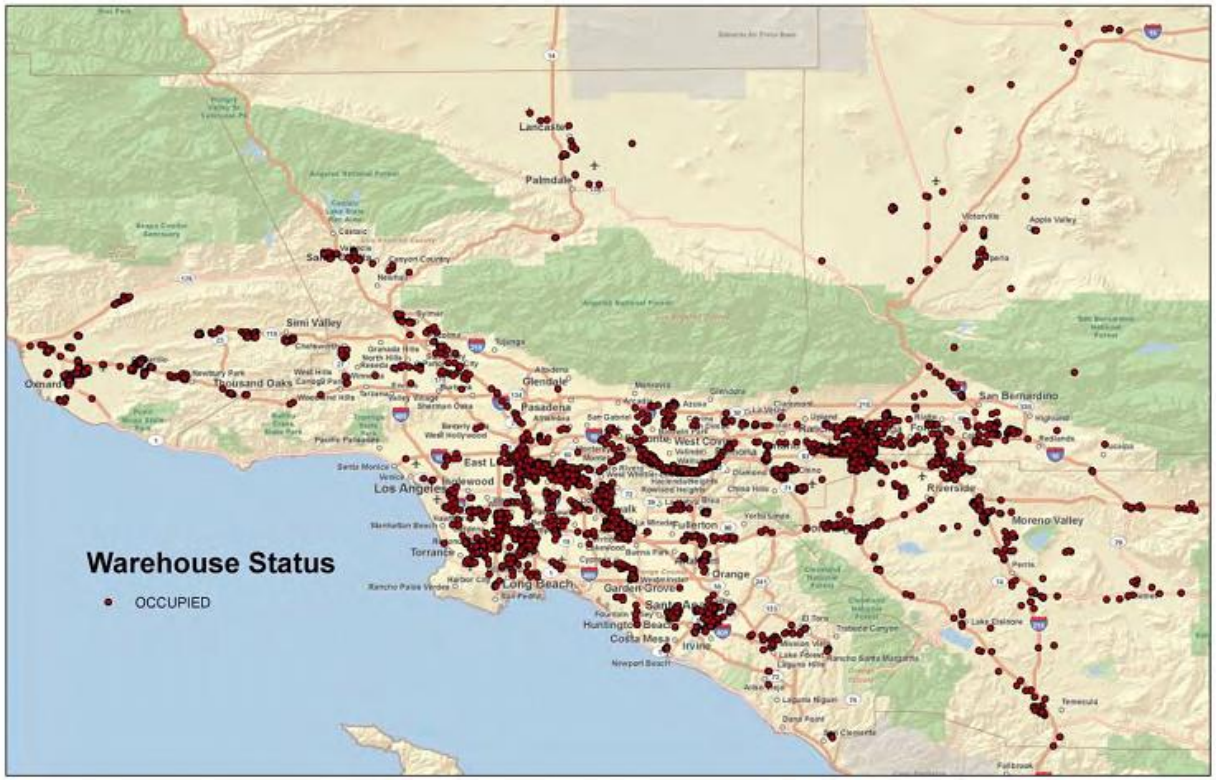
[50] Ibid., p. 12.
[51] "Where to Locate a Southern California Distribution Center" Connie Anderson Weber Logistics Jan. 31, 2013 http://www.weberlogistics.com/blog/california-logistics-blog/bid/263979/Where-to-Locate-a-Southern-California-Distribution-Center

*About 24% of … of import cargo is transloaded (whether to be loaded onto a train or trucked) in logistics facilities located in eastern Los Angeles County and the Inland Empire. At these logistics facilities, either operated by BCOs or by third party logistics service providers (3PLs), the imported products are either stored until outbound orders are received or immediately cross-docked to the shipping doors for loading into domestic equipment. Included in the definition of transloading are products being shipped to an intermediate distribution point before they reach their final destination (i.e., retail store, consumer, repair facility, etc.) by rail in 53-foot domestic containers or by truck in 53-foot wheeled trailers.*[52]

The distribution of warehouse facilities circa 2010 is shown below:[53]

**Southern California Warehouse Locations**




[52] Transloading of Marine Containers in Southern California Cambridge Systematics and Starboard Alliance Company for the Ports of Los Angeles and Long Beach December 13, 2012 p.
[53] Industrial Space in Southern California: Future Supply and Demand for Warehousing and Intermodal Facilities (Task 5 Report) Cambridge Systematics for Southern California Association of Governments June 2010 p. 2-8.

The eastward sprawl of logistics facilities results in extremely high traffic levels on major truck routes. SCAG's current proposal to accommodate growth in this traffic includes construction of a new East-West Freight Corridor consisting of truck-only lanes near the State Route 60 (SR-60) freeway. Cost of the project is currently estimated at $20.3 billion.

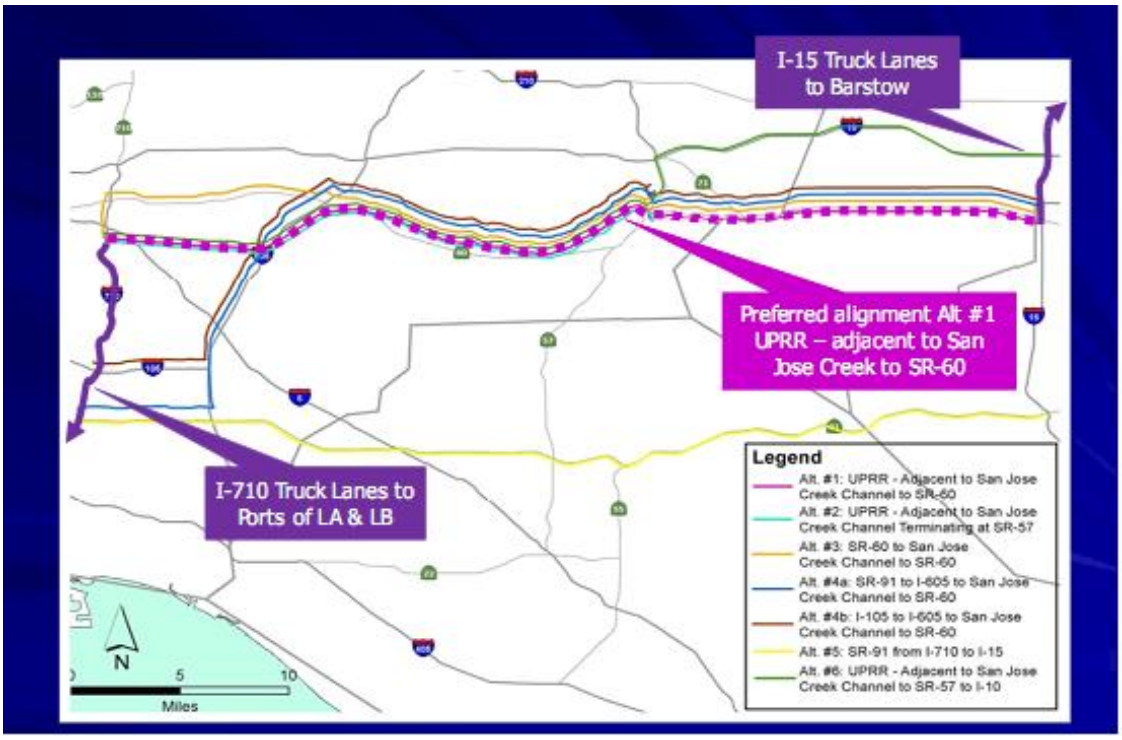
Potential benefits of the project include:

- Mitigation of Future Truck Traffic: Truck traffic is projected to grow significantly on all existing key east-west freeway segments. The corridor's traffic mitigation impacts would be significant, especially considering that some segments of the EWFC are forecast to carry between 58,000 and 78,000 trucks per day in 2040.
- Reduction in Regional Delay: The EWFC is projected to result in substantial delay reduction for both trucks and autos. Within the identified project influence area, all traffic is expected to experience a reduction of approximately 4.3 percent, with heavy-duty trucks seeing a nearly 10 percent decrease. This reduced delay would provide demonstrable travel time savings as well as reduce emissions from idling vehicles on congested roadways.
- Impact on Parallel Routes: The EWFC is projected to draw significant volumes of truck traffic away from parallel routes, easing congestion and creating capacity for other vehicles on general purpose lanes. Estimates indicate that the EWFC could reduce daily traffic on portions of SR-60 (between 42-82 percent), I-10 (up to 33 percent), SR-91 (up to 19 percent), I-210 (up to 17 percent) and major regional arterials (up to 21 percent).
- Mobility Benefits for Critical Markets: The EWFC would offer considerable benefits to regional businesses and industries served by the numerous clusters of warehousing and manufacturing facilities near the route. Portions of the recommended potential route lie within a five-mile radius of 52 percent of the region's warehousing square footage and 27 percent of regional manufacturing employment.
- Reduction of Truck-Involved Accidents: The East-West Freight Corridor offers the potential to reduce truck-involved crashes as a result of the separation between trucks and other vehicles. Safety analysis revealed that several existing east-west corridors have high rates of truck-involved crashes, including segments of SR-60, SR-91 and I-10.
- Preservation of Jobs and Income: Increasing congestion is making Southern California a less attractive place to do business, threatening jobs and the positive economic impacts

of the goods movement sector. An EWFC delivers a transportation system with greater capacity and less congestion in support of industries that depend on efficient freight movement throughout the SCAG region.

- Reduction of Harmful Emissions: The East-West Freight Corridor provides an opportunity to reduce harmful pollutants through the use of zero and near-zero emission technologies for freight transportation, although the technology to be used will be determined as the market evolves.

**Proposed Alignment of East-West Freight Corridor[54]**




The project is intended to be financed through bonds linked to future toll revenues.[55]

The major challenge facing Southern California in maintaining its competitiveness as a trade gateway to other regions in the face of rising costs due to infrastructure expansion requirements and leading-edge environmental initiatives.

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[54] Major Goods Movement Projects for the SCAG Region Presented to FuturePorts Conference Gill V. Hicks Cambridge Systematics, Inc. June 19, 2012 p. 5.

[55] "Paying for Transportation and Related Infrastructure: Where We Have Come From, and Where We Are Headed" Hasan Ikhrata, Executive Director Southern California Association of Governments Lake Arrowhead October 28, 2012
http://164.67.121.27/files/Lewis_Center/arrowhead/2012/Session%201/Ikhratav4.pdf

## 2.4 "Last Mile" Urban Delivery Issues

Considerations of "Last Mile" urban delivery issues are absent from goods movement planning at the regional level, in spite of the fact that the Los Angeles urban area is the most densely populated in the U.S. However, unlike other U.S. cities such as New York or San Francisco the population is relatively evenly distributed throughout the city core and suburbs:

> *The LA region's combination of high, evenly distributed density puts it in an unfortunate position: it suffers from many of the problems that accompany high population density, including extreme traffic congestion and poor air quality; but lacks many of the benefits that typically accompany more traditional versions of dense urban areas, including fast and effective public transit and a core with vibrant street life.*[56]

A comparison among the five most densely populated metropolitan areas in the U.S. is shown below.[57]

| Population and Employment Density for Five Densest Metropolitan Areas in the U.S. | | | | |
|---|---|---|---|---|
| | Metropolitan Density | | Central City Density | |
| | Population per Acre (rank) | Jobs Per Acre (rank) | Population per Acre (rank) | Jobs Per Acre (rank) |
| Los Angeles | 59 (1) | 31 (1) | 70 (4) | 1251 (5) |
| New York | 47 (2) | 27 (2) | 560 (1) | 2444 (1) |
| Chicago | 41 (3) | 22 (4) | 75 (3) | 2276 (2) |
| San Francisco | 40 (4) | 21 (5) | 275 (2) | 1839 (3) |
| Washington DC | 34 (5) | 24 (3) | 68 (5) | 1701 (4) |

The relatively low density of population and employment in the central Los Angeles area may explain why "Last Mile" issues have not been prominently featured in regional goods movement planning activities.

However, California is at the forefront of efforts to integrate multimodal transportation elements into the circulation elements of communities' General Plans. Under the 2008 California Complete Streets Act, communities are required to plan for the development of a well-

[56] "What Density Doesn't Tell Us About Sprawl" Eric Eidlin Access Spring 2016 http://www.accessmagazine.org/articles/fall-2010/density-doesnt-tell-us-sprawl/
[57] Ibid., p. 5.

balanced, connected, safe, and convenient multimodal transportation network. The network should consist of complete streets which allow for all users to effectively travel by motor vehicle, foot, bicycle, and transit to reach key destinations within their community and the larger region.[58]

To comply with the act, Los Angeles County undertook a study to identify and designate a Countywide Strategic Truck Arterial Network (CSTAN).

> *The CSTAN is a planning tool that is intended to accomplish six goals. 1) Identify truck arterial system needs and connectivity gaps; 2) Prioritize funding to projects showing the greatest expected benefits; 3) Minimize truck and pedestrian/bicycle conflicts; 4) Establish a database of arterial truck data that can be used by industry as well as for planning purposes; 5) Assist the trucking industry in identifying designated truck routes; and 6) Support the development of the Federal PFN.*[59]

The study used existing truck count data from previous studies, Caltrans[60] automated count stations, and the SCAG heavy duty truck model supplemented by new classification counts at 65 locations in 31 different cities. It also assembled data on truck crashes and GIS data on zoning to ensure that industrial areas are adequately served by the truck network. The CSTAN was overlaid with bike/path data to identify potential conflict locations between trucks, bicycles and pedestrians.[61]

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[58] Update to the General Plan Guidelines: Complete Streets and the Circulation Element Governor's Office of Planning and Research State of California December 2010. https://www.opr.ca.gov/docs/Update_GP_Guidelines_Complete_Streets.pdf

[59] Los Angeles County Strategic Goods Movement Arterial Plan Final Report Iteris for Los Angeles County Metropolitan Transportation Authority May 2015 http://media.metro.net/projects_studies/call_projects/images/15_Final_Report.pdf

[60] California Department of Transportation.

[61] Los Angeles County Strategic Goods Movement Arterial Plan Final Report p. 18.

# 3 NEW YORK CASE STUDY

Transportation planning for the New York City region is the responsibility of the New York Metropolitan Transportation Council (NYMTC), a regional council of governments that is the Metropolitan Planning Organization for New York City, Long Island and the lower Hudson Valley. The 10-county region — including the 5 boroughs of NYC, plus Nassau, Suffolk, Westchester, Putnam and Rockland counties — is home to more than 12 million people. NYMTC members are elected officials and heads of transportation and environmental agencies responsible for establishing and implementing transportation plans, projects and programs. Voting members include the New York City DOT Commissioner; New York City Department of City Planning Director; Metropolitan Transportation Authority Chair/CEO; and New York State Department of Transportation Region 11, Regional Director. Non-voting members include the Federal Highway Administration, Federal Transit Administration, New York State Department of Environmental Conservation, US Environmental Protection Agency and the Port Authority of NY & NJ.

The region is home to the Port of New York/New Jersey, the third busiest container port in the U.S., handling 6.4 million TEU's in 2015.62 The Port is overseen by the Port Authority of New York & New Jersey (PANYNJ), an interstate agency formed in 1921 to develop and modernize the port district centred around New York harbour and encompassing 1500 square miles from both states. PANYNJ conceives, builds, operates and maintains infrastructure critical to the New York/New Jersey region's trade and transportation network. These facilities include the busiest airport system in the U.S., marine terminals and ports, the PATH rail transit system, six tunnels and bridges between New York and New Jersey, the Port Authority Bus Terminal in Manhattan, and the World Trade Center. The governor of each state appoints six members of the agency's Board of Commissioners, subject to state senate approval. Commissioners serve as public officials without pay for overlapping six-year terms.[63]

## 3.1 Freight Planning

**NYMTC published their first Regional Freight Plan in 2004:**

> ***At the time it was published in 2004, the New York Metropolitan Transportation Council (NYMTC) Regional Freight Plan was generally considered to be one of the***

[62] NAFTA Region Container Traffic Port Ranking 2015 American Association of Port Authorities http://aapa.files.cms-plus.com/Statistics/NAFTA%20CONTAINER%20PORT%20RANKING%202015%20revised.pdf

[63] Port Authority of New York & New Jersey website http://www.panynj.gov/port-authority-ny-nj.html

***premiere, state-of-the art urban and regional freight planning undertakings. The Regional Freight Plan provided, for the first time in this region, a comprehensive understanding of commodity flows, relative importance of major freight corridors, key infrastructure deficiencies and needs, and a series of outreach materials designed to help stakeholders and the public understand why freight is present in their communities and the activities it supports.[64]***

NYMTC has recently undertaken Regional Freight Plan Update 2015 - 2040 Interim Plan which includes stakeholder outreach, data gathering, and analysis. The Interim Plan includes a review of planning studies and projects that have recently concluded or are on-going, an analysis of commodity flow data, assessment of the components and condition of the region's multi-modal freight network, and documentation and outreach materials that clearly and simply explain a very complex regional freight system to community stakeholders and the public at large. These activities are aimed at establishing a foundation from which NYMTC can address freight in its update of the Regional Transportation Plan (RTP) and in the next phase of the Regional Freight Plan Update, which will identify and evaluate potential freight projects, policies, and strategies, and develop a plan for implementing them.

In addition to NYMTC's Regional Freight Plan, a Comprehensive Goods Movement Action Program for the New York - New Jersey Metropolitan Region (GMAP) has been jointly developed by PANYNJ and the New Jersey and New York Departments of Transportation. GMAP is designed to resolve issues related to regional freight movements, including high congestion costs, fragmented multi-jurisdictional freight management, aging infrastructure and a lack of reliability, connectivity and capacity in the transportation system.[65]

The New York Department of Transportation has undertaken a New York State Freight Transportation Plan which will use existing studies and reports as the basis for a statewide plan. In June 2015, NYDOT published a synthesis report highlighting the results of ten regional freight plans and projects as a starting point for development.[66]

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[64] Plan 2040 Appendix 8 Regional Freight Plan Update: Interim Plan Summary Report NYMTC February 2014 https://www.nymtc.org/Portals/0/Pdf/RTP/Appendix8.pdf

[65] Comprehensive Goods Movement Action Program for the New York - New Jersey Metropolitan Region (G-MAP) PANYNJ, NJ DOT, NYDOT https://www.panynj.gov/gmap/pdf/GMapBrochure.pdf

[66] New York State Freight Transportation Plan Background Analysis (Deliverable 1) NYDOT June 2015 https://www.dot.ny.gov/portal/page/portal/content/delivery/Main-Projects/projects/P11618881-Home/P11618881-repository/Background%20Analysis%20Report.pdf

As the agency responsible for operating the maritime Port of New York & New Jersey and the major airports (John F. Kennedy International Airport, LaGuardia Airport, Newark Liberty International Airport, Stewart International Airport and Teterboro Airport) PANYNJ has a leading role in freight planning related to international trade.

The locations of container terminals at the Port are shown below.

**Port of New York & New Jersey Container Terminals**


Red Hook Terminals operates the only terminal handling containers on the eastern side of the harbor. Red Hook Terminals is a multi-product terminal, capable of bulk and breakbulk cargoes, containers, yachts, heavy lifts, autos, or special project cargoes. The Red Hook terminal cannot handle large container ships due to draft limitations (42 ft). The company also operates a barge terminal in Newark, New Jersey and a cross-harbor rail barge.[67]

[67] Red Hook Stevedoring and Terminal Operators http://www.redhookterminal.com/#pagetop

During the last 40 years, most of the bi-state port's container traffic has gravitated to New Jersey, which has better rail and highway links with inland markets and more land for cargo handling. About 85 percent of the port's container volume moves through New Jersey terminals.

New York officials are seeking a tenant to reactivate the South Brooklyn Marine Terminal, which is close to the Red Hook terminal. Both sites have recently been designated as part of the U.S. Maritime Administration's Marine Highways initiative, which may facilitate federal subsidies for expansion of rail and container barge services. Operations of a new cross-harbor service between Red Hook and Port Newark Container Terminal began in September 2016. The new service is in addition to an existing two-barge service linking Red Hook with its sister Newark terminal, which currently handles about 40,000 containers on its barges, each of which has capacity of more than 400 twenty-foot-equivalent units.[68]

**Red Hook Container Terminal**

A 2001 report noted that the Red Hook container on barge service was subsidized by the Port Authority since 1991 as mitigation for the reconstruction of the Gowanus Expressway.[69] Additional funds of $1.9 allocated from the federal Congestion Mitigation and Air Quality

[68] "New York seeks to reactivate South Brooklyn terminal" Joseph Bonney Journal of Commerce June 30, 2015 http://www.joc.com/port-news/us-ports/port-new-york-and-new-jersey/new-york-seeks-reactivate-south-brooklyn-terminal_20150630.html

[69] "Moving Freight On Water" Gotham Gazette Roberta Weisbrod September 2001 http://www.gothamgazette.com/waterfront/sep.01.shtml

(CMAQ) Improvement Program were matched in a 50:50 ratio to purchase a barge for the service.[70]

Maintaining the working waterfront is one of the objectives of the Vision 2020: New York City Comprehensive Waterfront Plan.[71] However, based on information published by the Citizen's Budget Commission, port operations on the New York side of the harbour are uneconomic and the Brooklyn and Red Hook terminals are strong candidates for closure and repurposing. They generated losses in 2013 of $205,718 per acre and $184,788 per acre, respectively; together they include only 5 percent of total Port Commerce acreage and account for a small share of total cargo.[72] In 2002 the Bloomberg administration proposed redevelopment of the Red Hook site, and PANYNJ resisted proposals from American Stevedoring Inc. (ASI), the terminal operator, to renew the lease. After five years of lawsuits and negotiations, a new 10 year lease for ASI was finally announced in April of 2008. The Port Authority also agreed to New York's request that it provide $5.6 million for economic development initiatives on the Brooklyn waterfront and subsidies for the barge operations used by American Stevedoring. Nearly half the money, $2.6 million, would serve as a credit against back rent owed by the company. In 2011 American Stevedoring was evicted from the premises and operations were taken over by PANYNJ.

In 1998 the New York City Economic Development Corporation commissioned the Cross Harbor Freight Movement Major Investment Study (CHMIS) with funding of $4 million from the U.S. Department of Transportation and $1 million from the New York City Industrial Development Agency. Currently virtually all surface freight to and from the area east of the Hudson River (including the five counties that comprise New York City, plus Nassau and Suffolk counties on Long Island) moves by truck. There is no direct rail connection in the area. Freight trains from the west and south destined for New York City (except for Staten Island, via the Arthur Kill Vertical Lift Bridge), Long Island and Connecticut must cross the Hudson River using

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[70] CMAQ and Intermodal Freight Transportation US Federal Highway Administration https://www.fhwa.dot.gov/environment/air_quality/cmaq/reference/intermodal_freight_transportation/intermodal.pdf

[71] Vision 2020: New York City Comprehensive Waterfront Plan Goal Support economic development activity on the working waterfront New Yrok Department of City Planning 2011 http://www1.nyc.gov/assets/planning/download/pdf/plans-studies/vision-2020-cwp/vision2020/chapter3_goal3.pdf

[72] Righting the Ship: A Course Toward Fiscal Sustainability for the Region's Maritime Ports Citizen's Budget Commission January 2015 pp. 1-2. http://www.cbcny.org/sites/default/files/REPORT_PORTCOMMERCE_01132014.pdf

the Alfred H. Smith Memorial Bridge which is 140 miles (225 km) north of New York City at Selkirk, New York, making a 280-mile (451 km) detour.

In 2004 a Draft Environmental Impact Statement for the Cross Harbor Freight Movement Improvement Project was submitted jointly by the US Department of Transportation, Federal Highway Administration, Federal Railroad Administration and the New York City Economic Development Corporation. It highlighted three options analysed in the CHMIS and a subsequent feasibility study including the No Action alternative; the Transportation Systems Management alternative, which included enhancement of existing "float bridge" (rail barge) operations; and the Rail Freight Tunnel alternative which would see construction of a would establish a direct rail freight connection between the East- and West-of-Hudson regions through the construction of a rail freight tunnel under New York Harbor.[73]

In 2014 the Port Authority of New York and New Jersey and the Federal Highway submitted a Tier I Environmental Impact Statement which narrowed the project to two alternatives: an enhanced cross-harbor railcar float or a cross-harbor tunnel between Jersey City and Brooklyn. The enhanced railcar float operations would expand existing service between Greenville Yard in Jersey City and 65th Street Yardin Brooklyn with regular service at full operations and res-establish the operation to 51st Street Yard in Brooklyn, which was temporarily discontinued in the aftermath of Superstorm Sandy. The cross-harbor tunnel would provide a rail crossing from Greenville to the Long Island Rail Road Bay Ridge Branch, and would be constructed to accommodate double-stacked containers and double tracked.[74] The Tier I EIS was accepted in December 2015, and PANYNJ will now move forward with a more detailed Tier II analysis for the two projects.

## 3.2 Congestion Mitigation and Environmental Issues

To reduce truck traffic and congestion PANYNJ has undertaken a major expansion in rail capacity at the container terminals. The ExpressRail System is a comprehensive $600 million rail program which has created dedicated rail facilities - and additional support track and rail

[73] Draft Environmental Impact Statement Cross Harbor Freight Movement Project US Department of Transportation, Federal Highway Administration, Federal Railroad Administration and the New York City Economic Development Corporation April 2004 pp. s-6 to s-9. http://www.panynj.gov/port/pdf/CH-DEIS-2004.pdf

[74] Tier I Record of Decision Cross Harbor Freight Program Federal Highway Administration December 9, 2015 http://www.panynj.gov/port/pdf/Record-of-Decision.pdf

yards - for each of the port's major container terminals. These facilities include ExpressRail Elizabeth, ExpressRail Newark and ExpressRail Staten Island.

In 2013 PANYNJ authorized $105 million for design, construction and realignment of parts of five main access roads to marine terminals in the Newark-Elizabeth port complex.[75]

While compliance with environmental assessment requirements is a necessary element in goods movement planning in the New York region, environmental issues have not been the driving force.

## 3.3 Land Use

The trends of decentralization of distribution activities and the increasing scale of distribution facilities have resulted in substantial growth in inland distribution centres in central New Jersey and the Lehigh Valley in eastern Pennsylvania. Warehouse and distribution space in the Lehigh Valley has grown from 12 million square feet to 40 million over the last 20 years, and truck traffic is forecast to double over the next 20 years and the Lehigh Valley Planning Commission is proposing formation of a Freight Movement Advisory Board to help the region to adapt.[76]

To mitigate these trends, in 2006 PANYNJ teamed with the New Jersey Economic Development Authority to develop the “Portfields Initiative,” a public-private program to develop brownfields sites in New Jersey. The projects are designed to support the international trade infrastructure in and around the New York/New Jersey seaport and air cargo centers by opportunities for private developers, communities and others to transform underutilized and brownfield sites into productive warehousing and distribution centers.

Replacing old structures that are too small for today's technologies, the new facilities will be vast modern warehouses with state-of-the-art IT infrastructure and security systems. ProLogis is one of the private sector participants in the initiative. The company's Elizabeth Seaport Business Park and Port Reading Business Park total more than 400 acres of Portfields property. When fully developed, they will include 4 million square feet of warehouse distribution space. Another private sector participant is AMB Property Corporation, which had approximately 12.7 million square feet of operating and development facilities in northern New Jersey as of March 31,

[75] “NY/NJ OKs $105 Million for Port Roads” Journal of Commerce Joseph Bonney December 5, 2013.
[76] “Lehigh Valley truck traffic: 'If we don't get ahead of this, we're doomed'” The Morning Call Matt Assad July 14, 2015

2008. In April, 2008 AMB announced its plans to develop an 878,000 square foot, cross-dock distribution center in the second half of 2008. The facility will be built to LEED specifications that apply to the most efficient of green buildings. The center is on a site that is part of a former landfill along Routes 1 and 9 in Jersey City. In May 2008, AMB announced it preleased an aggregated 183,000 square feet at two brownfield developments and one redevelopment project in northern New Jersey. The three development projects are close to Port Newark/Elizabeth, including Target Logistics, an international logistics provider and freight forwarder.[77]

## 3.4 "Last Mile" Urban Delivery Issues

New York has been the North American leader in initiatives to address "Last Mile" issues. In New York City more than 91% of all goods are delivered via trucks, and these activities significantly contribute to traffic congestion and higher costs as a result of wasted time, missed deliveries and parking tickets.

New York City Department of Transportation (NYCDOT) has undertaken a number of initiatives to mitigate these problems. In addition to typical activities like establishment and managing of the regional Truck Route network, NYCDOT maintains a comprehensive truck crash database, collects high volumes of traffic count data which is warehoused in a Traffic Information Management System, and operates a Modeling & Data Analysis Unit to support the agency's internal planning, project development, analysis, and technical review processes, and to coordinate with external agencies on regional projects and planning.[78]

NYCDOT has undertaken other innovative programs to mitigate Last Mile problems, including:

- Delivery windows to make curb space available for delivery trucks and thus reduce double parking and traffic congestion, and improve the efficiency of truck deliveries. Development of delivery windows includes public outreach to merchants and through curb utilization surveys. The data is used to determine the peak demand time and duration for truck deliveries. It also aids in developing curb regulations that balance passenger vehicle parking and commercial deliveries. Typically, these initiatives are

[77] PortViews Vol. 7, No. 2 Summer 2008 PANYNJ
https://www.panynj.gov/port/portviews/pv_fa_vol7_no2_2.html
[78] Urban Freight Initiatives New York City Department Of Transportation
http://www.nyc.gov/html/dot/downloads/pdf/2015-09-14-urban-freight-initiatives.pdf

developed alongside other NYC DOT efforts to manage curb access reduce conflicts between trucks, bicycles and pedestrians. These initiatives include but are not limited to: Bus Rapid Transit (Select Bus Service), curbside bike lanes, Park Smart peak-rate parking programs, plazas and congested corridors programs.[79]

- Promotion of Off-Hour Deliveries (OHD). The concept of OHD, in which goods are delivered in the evening or early morning hours rather than during the business day, presents an opportunity to address the issues of costs, congestion and air quality. Implementing an OHD program, however, presents many difficulties, including rescheduling work shifts, providing a means for businesses to receive deliveries when they may not have employees on duty, and overall coordination between carriers and receivers.

NYCDOT issued a Request for Proposals to undertake a pilot program in 2002. Rensselaer Polytechnic Institute was selected, and a consortium of Rensselaer Polytechnic Institute, Rutgers University, the Rudin Center at New York University, and ALK Technologies Incorporated received funding from the U.S. Department of Transportation in March 2007 under the Commercial Remote Sensing and Spatial Information Technology Applications Program.

NYCDOT recruited businesses to voluntarily receive OHD through the use of financial incentives. They also identified and enlisted industry leaders to help encourage businesses to participate. Off-hour deliveries in the pilot occurred between 7 p.m. and 6 a.m. OHD was facilitated for some companies by the use of unassisted delivery systems – thus minimizing evening staff needed by the receiving businesses. In unassisted deliveries, drivers are provided a key to the storage (or walk-in refrigerator) area of a business. Double doors, delivery lockers, or container/storage pods can also be deployed in unassisted systems. Some retail receivers did not use the unassisted delivery option because they were concerned about theft of their merchandise. These receivers had staff stay late to accept the deliveries.

In the end, 25 receiver businesses and eight carriers participated in the pilot study. Each participated for a minimum of one month between October 2009 and January 2010. Participating carriers were supplied with GPS-enabled smartphones and navigation software, which allowed them to log GPS position, speed, date and time every three seconds.

[79] Ibid., p. 12.

Delivery companies' vehicles saw travel times improve 130% from a pilot of off-hour deliveries, based on a comparison of evening and midday travel speeds.[80]

Following the conclusion of the pilot program, all of the receivers doing staffed OHD reverted back to the regular hours, and almost all the receivers doing unassisted OHD remained in the off hours in spite of the termination of financial incentives.[81]

Phase 2 of the pilot seeks to certify vendors on the basis of the strength and coverage of the programs they have in place to ensure safe and community friendly unassisted OHD (driver training programs, use of low noise delivery technologies and practices, insurance coverage) to assist in convincing businesses to shift to OHD.[82]

[80] Off-Hour Deliveries NYCDOT http://www.nyc.gov/html/dot/downloads/pdf/ssi10-offhour.pdf
[81] Update on the NYC-OHD Program: Trusted Vendor Program Research Presentation to the International Urban Freight Conference Long Beach 2015 José Holguín-Veras p. 8. https://www.metrans.org/sites/default/files/Track7.4Holguin_Veras.pdf ,
[82] Ibid. p. 18.

# 4 NORFOLK CASE STUDY

Norfolk, founded in 1682, is the second largest city in the Commonwealth of Virginia. Virginia has a population of 8.3 million. The population of the Norfolk metropolitan area is 1.6 million. The state is one of the original 13 colonies, is the 12th most populous and the 14th most densely populated in the US.[83] Like Halifax, Norfolk is a navy town, hosting the US navy and the largest naval base in the world. At 50ft. (15m), Norfolk also features the second deepest berths on the east coast of North America after Halifax.

Portsmouth Harbor[84]


The Virginia Port Authority (VPA) is an autonomous agency of the Commonwealth of Virginia that owns the The Port of Virginia (also called Hampton Roads). At 2.5 million TEUs in 2015, the Port of Virginia is the eighth largest container port in North America. It is also a large bulk cargo

[83] Cambridge Systematics, Virginia Statewide Multimodal Freight Study, Phase I, 2010, p. ES-3.
[84] Source: Virginia Port Authority.

port, handling vast quantities of coal from West Virginia, Kentucky and Pennsylvania. Overall, it handled 75 million ton**nes** of cargo in 2014, ranking 8th overall in the US.

The Port of Virginia operates six marine terminals **(**Norfolk International Terminals (NIT), Newport News Marine Terminal (NNMT), Virginia International Gateway (VIG), Portsmouth Marine Terminal (PMT), and Richmond Marine Terminal (RMT)**)** and the Virginia Inland Port (VIP), located about 200 miles inland**.** Three of these facilities are container terminals and a fourth terminal is under long term development at Craney Island, as Norfolk seeks to capitalize on its deep channels and post-Panamax-ready berths. There are another 40 private terminals handling a variety of mostly bulk products.

Virginia International Gateway, the port's largest terminal, was built by APMT and commissioned in 2007. In July 2010, the VPA and VIG entered into a 20-year lease agreement under which the VPA is now operating the terminal. A new lease agreement to extend the Port's lease until 2065 was negotiated in 2015. The terminal is managed by Virginia International Terminals, LLC (VIT), a private operating company, through a Service Agreement with the VPA. The terminal was designed such that many of its operations are performed remotely from a centralized terminal operations centre. Its total footprint is 576 acres of which 231 are operational. It is one of the few semi-automated terminals in the Western Hemisphere. Capacity of Phase I is 1 million TEUs per annum, and when another 60 acres comes on stream, it will add another 1 million TEU capacity. It has 3,205 ft of linear berth capacity and 8 super Post-Panamax cranes.

The port is also a "grantee" of Foreign Trade Zone 20, where companies such as Stihl Inc., Newport News Shipbuilding, Becker Hydraulics, Canon Virginia and Keurig Green Mountain Inc. are located.[85]

## 4.1 Freight Planning

Both the state and the Port of Virginia have invested heavily in transportation planning.

The Office of Intermodal Planning and Investment is located within the Office of the Secretary of Transportation and was created in 2002 to encourage the coordination of multimodal and intermodal planning across the various transportation modes within the Commonwealth. Since

[85] Annual Report Port of Virginia, 2015, p. 9.

then, the office has produced multiple statewide planning efforts, performance reports and collaborated with multiple entities to promote a safe, strategic and seamless transportation system.[86] A statewide Virginia Surface Transportation Plan (VSTP) serves as a blueprint for effective and sustainable statewide transportation investments, policies and planning initiatives. It is developed jointly by the Virginia Department of Transportation (VDOT) and the Virginia Department of Rail and Public Transportation (DRPT) through an integrated approach involving numerous statewide and regional transportation agencies, as well as key stakeholders and the general public. In 2013 the Virginia Multimodal Freight Plan was added as an addendum to the statewide plan. [87]

Hampton Roads Transportation Planning Organization (HRTPO) is the Metropolitan Planning Organization for the Norfolk region. In 2009, the HRTPO Board established the Freight Technical Advisory Committee (FTAC) to "advise the TPO Board on regional freight transportation requirements." In 2012 HRTPO staff conducted the Hampton Roads Regional Freight Study that included the enumeration of delays currently experienced by trucks, and a recommendation for addressing those delays. This was followed in 2013 by a study on Existing and Future Truck Delay in Hampton Roads, 2013. The HRTPO's Regional Performance Measures monitor the share of port freight moved by rail, and the HRTPO's State of Transportation monitors port activity and truck.[88]

In 2010 the Commonwealth of Virginia completed a state-wide multi-modal freight study.[89] Virginia has an extensive goods movement cluster, which includes truckers, railroads, shipping, air cargo, wholesalers, and warehouse and distribution facilities. Overall, it represents about 7% of the state's GDP. In Hampton Roads alone, it employs 32,000 people.

Much of the state's freight is handled by different transportation modes or handled multiple times on its end-to-end journey from origin to destination. This is especially the case for waterborne and airborne shipments, where a truck is usually involved in some part of the overall move.

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[86] Office of Intermodal Planning and Investment http://www.vtrans.org/about_us.asp#our_office
[87] "Plans" Office of Intermodal Planning and Investment http://www.vtrans.org/plans.asp
[88] Freight Transportation Hampton Roads Transportation Planning Organization http://www.hrtpo.org/page/freight/
[89] Virginia Statewide Multimodal Freight Study, Phase I, Cambridge Systematics et al. 2010.

Critical issues for the state's highway system include: [90]

- Roadway and bridge/tunnel condition;
- Safety and emergency response;
- System performance;
- Intermodal connectivity;
- Environment;
- Industry support and partnerships;
- time shifting;
- Mode shifting; and
- Funding.

The study identified a number of projects to enhance the multi-modal network in the state, and many of these projects have been completed, are underway or planned.[91] It recognizes that what is calls the mid-Atlantic Gateway has an enormous opportunity to capitalise on its location, deep water, and changes to global trading patterns. It also recognizes that it faces enormous competition from other gateways.

Freight bottlenecks have been identified in the following situations: [92]

- Major urban areas with high levels of congestion;
- Intersections of major highway arteries; and
- Rail system points where growing freight and passenger needs must be accommodated over shared infrastructure.

The Port of Virginia is pursuing at least $2 billion in new capital spending over the next decade, to "capitalize on changing trade patterns and bigger vessels"[93]. It is redeveloping segments of

[90] [90] Virginia Statewide Multimodal Freight Study p. ES-15.
[91] Cambridge Systematics…Hampton Roads Subdivision, p. 25.
[92] Virginia Statewide Multimodal Freight Study p. 18.

NIT, expanding VIG and continuing with the development of Craney Island. In the short term, it is building a new gate complex at NIT and expanding the rail facilities at VIG.

The Craney Island terminal is the largest fully-permitted port expansion project in the U.S. it is currently a dredge disposal site and will be developed over the next 10+ years. It will double the port's container handling capacity. It is expected that up to 50% of its total volume will move by rail; the existing Commonwealth Rail Line will be extended from state route 164 to Craney Island through a project known as Port of Virginia Gateway. This will create dual rail access on-dock with both Norfolk Southern and CSX. "It will increase container throughput on the west side of the Elizabeth River, away from the region's most congested tunnels and bridges, and in close proximity to rail facilities and distribution locations".[94]

## 4.2 Congestion Mitigation and Environmental Issues

In 1984, the Virginia Port Authority began to examine ways to increase its market share.[95] Their inspiration came from a facility owned by the port of Rotterdam, near the German border, about 120 miles from the port at Venlo in the Netherlands. Along with the Norfolk Southern railway, they determined that an inland terminal could be a means to extend the port's hinterland into Ohio, Pennsylvania, Maryland, West Virginia, New York and Virginia itself. Most of this hinterland was being served by the Port of Baltimore. A site was selected in the Shenandoah Valley near Front Royal. It had access to two interstate highways and 1,400 ft. of rail trackage alongside. The initial concept was to run three trains per week, moving a total of 20,000 TEUs per annum. Initially, marketing was focused on cargo being trucked or moved by barge to Baltimore.

By 1996, the facility had grown to 40 acres with over 17,000 feet of rail track and was handling about 100,000 containers per annum, all of which was considered new business for the VPA. VIP provides all the services that a port terminal does including at least 6 trains per week, warehousing, customs, very flexible operating hours, a chassis pool, and reefer plugs. Effectively, the port was moved 220 miles inland from Norfolk and 60 miles east of Washington. Once operational, the VPA joined with Washington Dulles International Airport to attract warehouse/distribution facilities to the corridor connecting the two facilities. There are now over

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[93] Annual Report, Port of Virginia 2015 p. 22.
[94] Craney Island Port of Virginia http://www.portofvirginia.com/facilities/future-facilites-improvements/
[95] J. Robert Bray, "Virginia Inland Port: The Case for Moving a Marine Terminal to an Inland Location", presentation to AAPA, September 1996.

80 distribution centres operating in Virginia, with over 30 million sq. ft. of warehouse space, averaging 375,000 sq. ft. Forty of these DC's are located near VIP in Front Royal. The largest are those of Wal-Mart (2 million sq. ft.) and QVC Network (1.2 million sq. ft).

More recently, Norfolk has concentrated on improving the road network in the vicinity of its port terminals. The I-564 Intermodal Connector Project, which received Federal Highway Administration funding to build 2.82 miles of four lane limited access highway to connect the existing I-564 to both the navy base and the largest container terminal, NIT.

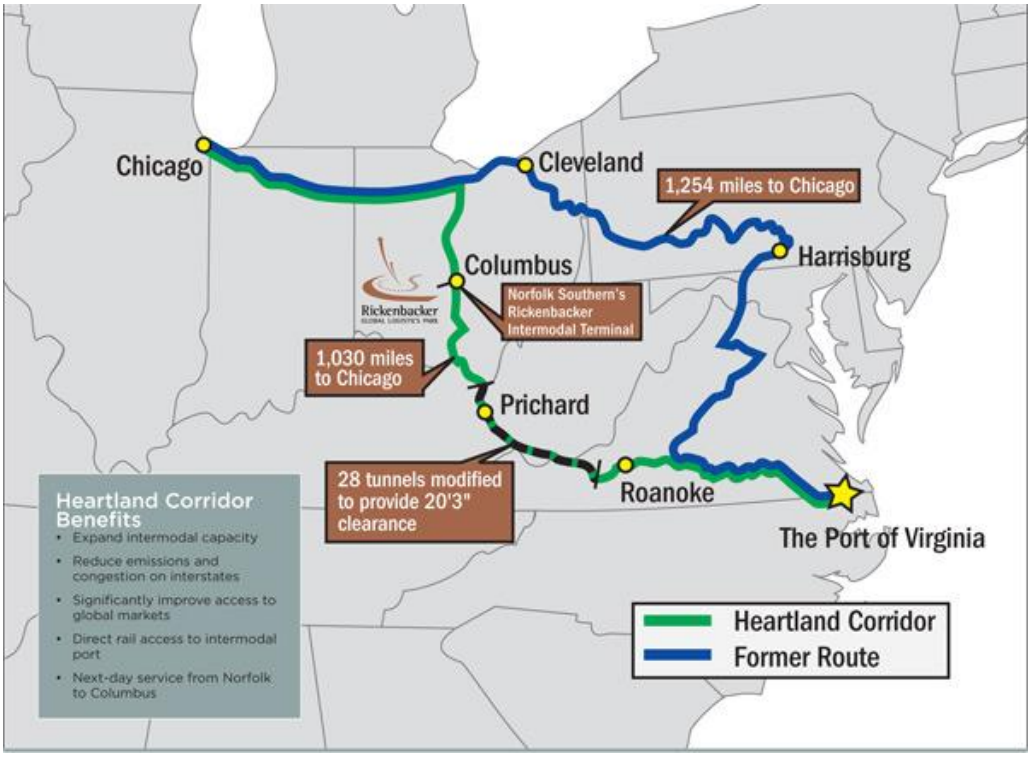
The Port of Virginia also operates the marine highway 64 Express, a short sea tug and barge operation between Norfolk and Richmond, Va, a distance of 98 miles. The service carries about 10,000 FEUs per annum and is one of the few successful "marine highways" in the US. As of 2015, about 63% of Norfolk's cargo arrived and departed by truck, 33% by rail and 4% by barge. The percentage of cargo handled by rail is the highest of any port in the US.

Virginia is served by 10 freight railways, including two Class I railways, Norfolk Southern (NS) and CSX, both of which have made significant investments to improve service to the U.S. mid-west.

Major investments on the NS network were made through the Heartland Corridor Project at a cost of $356.6 million. It included the $191.6 million Heartland Central Corridor Double-Stack Clearance Project which makes the most direct rail route to the major markets of Columbus and Chicago accessible to double-stack container trains, shortening the trip to Chicago by over 200 miles by obviating the need to travel via Harrisburg and then west or to Knoxville and then north. Project funding included $83.4 million from federal SAFETEA-LU funds, $9.8 million from the Virginia Rail Enhancement Fund, .8 million from the Ohio Rail Development Commission and $98.4 million from Norfolk Southern Railroad. Separate but complementary projects included new intermodal terminals in Prichard, WV ($35 million) and Columbus, OH ($70 million) and the Western Freeway Rail Relocation project: ($60 million) funded through a combination of federal, state and Norfolk Southern contributions.[96]

[96] Project Profiles: Heartland Corridor FHWA Innovative Finance Support http://www.fhwa.dot.gov/ipd/project_profiles/wv_heartland.aspx

**Heartland Corridor**[97]

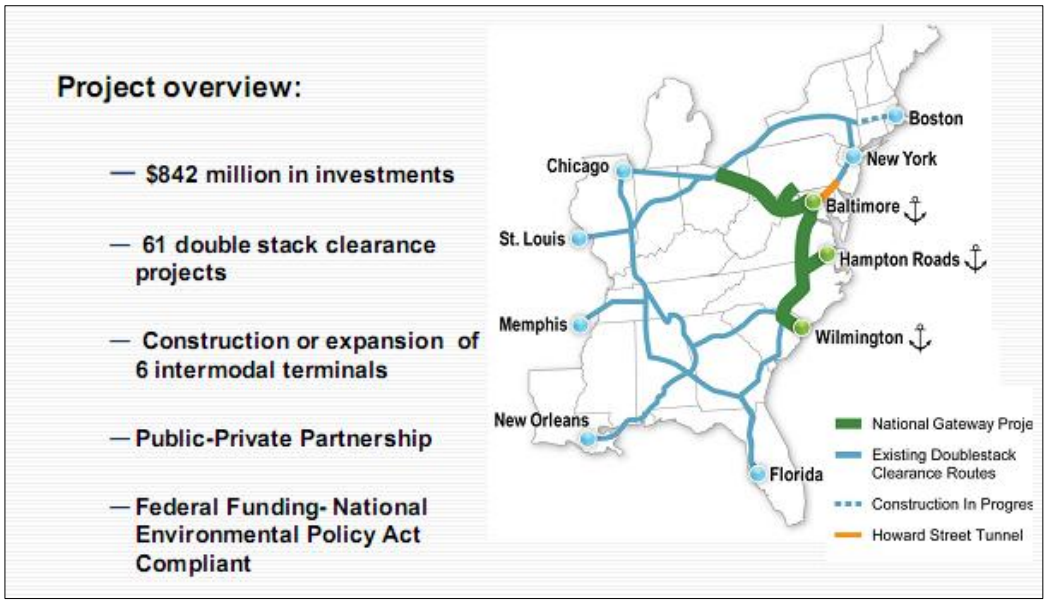



CSX also embarked upon The National Gateway initiative, an $842 million project to improve rail transportation between East Coast ports and the Midwest by increasing clearances to enable double staking of containers. It included 61 double stack clearance projects and construction or expansion of 6 intermodal terminals, including the new $175 million Northwest Ohio Logistics Centre. Funding included $258 million from federal sources, $191 million from State sources, and $393 million from CSX.

In December 2014, CSX opened an 89 acre intermodal terminal just off the Island of Montreal, in Valleyfield PQ. This terminal is mainly served from the port of New York, but also Baltimore and Norfolk, and will handle about 100,000 containers per year.

[97] Source: Heartland Corridor Rickenbacker Global Logistics Park http://www.rickenbackerglp.com/intermodal/corridor.aspx

**National Gateway Project**




The Port of Virginia's Annual Report contains a statement of "Fiscal and Environmental Responsibility.[98] It has been ISO 14001 certified for its Environmental Management System. New hybrid- electric shuttle trucks and propane-powered pick-up trucks operate on their terminals.

## 4.3 Land Use

The Port of Virginia recognizes that its older terminals have a significant impact on local neighbourhoods and adjacent facilities. NIT "is bounded by U.S. Navy facilities, established neighbourhoods, and major transportation corridors, such that outward expansion opportunities are unlikely".[99]

The state is also aware that Hampton Roads, in particular, must accommodate "the mobility, consumer and logistics needs of an increasing number of residents, workers, visitors and businesses, while concurrently serving its nationally significant port and military installations reliably, safely and efficiently".[100]

[98] "Annual Report", p. 15
[99] VPA 2040 Master Plan: Executive Summary, May 28, 2013, p. 13.
[100] Cambridge Systemetics Hampton Roads Subdivision". p. 4.

# 5 CENTRAL PUGET SOUND (SEATTLE – TACOMA) CASE STUDY

The Central Puget Sound Area encompasses four counties (King, Kitsap, Pierce and Snohomish) in central Washington State, and includes the cities of Seattle and Tacoma. The region contains 82 cities and towns and has a population of 3.7 million. Seattle has a population of 668,342, and the population of Tacoma is 205,159.

The central Puget Sound is home to two major ports: Seattle and Tacoma. The two ports handled 3.5 million TEU's in 2015, ranking 5th among NAFTA ports, just ahead of Vancouver.[101] Both ports are "municipal corporations" of the State of Washington, considered as special purpose governments with separately elected commissions of five members. They are legally separate and fiscally independent of other State or local governments. Commissioners are elected directly by the residents of King and Pierce counties respectively.

Historically competition between the two ports for container traffic has been intense. However, due to concerns over a declining market share relative to Southern California and BC ports, in 2015 they agreed to jointly operate the container terminals under a new organizational structure, the Northwest Seaport Alliance.[102] The Federal Maritime Commission provided the necessary regulatory approval, and the two ports finalized the unification during a joint meeting in August 2015. While the ports remain separate organizations that retain ownership of their respective assets, they formed a port development authority (PDA) to manage the container, breakbulk, auto and some bulk terminals in Seattle and Tacoma. The PDA will be governed jointly by the two ports through their elected commissions. Other assets and operations, including SeaTac airport, cruise business, marinas, grain terminals and industrial real estate, such as the Northwest Innovation Works and Puget Sound Energy facilities and Terminal 91 uplands, remain outside the alliance.

[101] NAFTA Region Container Traffic Port Ranking 2015 American Association of Port Authorities
[102] "Ports of Seattle, Tacoma Agree to Alliance" Wall Street Journal Erica E. Phillips June 5, 2015.

## 5.1 Freight Planning

Goods movement planning for the region is carried out at multiple levels in Washington State.

### 5.1.1 Washington State

Washington State Department of Transportation (WSDOT) has a Freight Systems Division responsible for developing the Washington State Freight Mobility Plan and managing the state's freight rail capital programs and operations. Freight programs include the Freight Rail Investment Bank and Freight Rail Assistance Programs, both of which support rail freight in the state. The Bank is a public sector loan program intended for small projects or parts of larger projects where state funds would enable project completion. The state also has a Freight Freight Mobility Strategic Investment Board (FMSIB) to identify and recommend investments that improve freight movement and mitigate barriers on strategic state corridors, grow jobs and the economy, and bolster Washington as a leader in international trade. FMSIB is governed by a 12 member Board appointed by the Governor. FMSIB is also responsible for creating the Washington State Freight Advisory Committee required by Section 1117 of MAP-21, the 2012 version of the federal transportation bill.[103]

The Washington rail network includes two Class 1 railways (BNSF and Union Pacific), and over 20 short-line railroads which operate about 40 percent of the total number of right-of-way miles in the state and connect communities to the national rail system. The waterway network includes Puget Sound and the Columbia/Snake River system which enables barge transportation as far inland as Lewiston, Idaho.

State planning activities set the framework regional freight transportation planning. WSDOT produces a Washington State Freight and Goods Transportation System report which classifies highway, county road, rail, and waterway system components on the basis of freight volumes to guide investment priorities. Freight volumes on the highways and county roads are estimated from vehicle traffic and classification counts. Data on rail freight movements is obtained from

[103] Washington State Freight Mobility Plan Washington State Department of Transportation October 2014 pp. 19-22. http://www.wsdot.wa.gov/NR/rdonlyres/4AB1DCDE-5C29-4F08-B5E7-697F432C34D7/0/2014WashingtonStateFreightMobilityPlan.pdf

railways active in the state, and waterway volumes are obtained from US Army Corp of Engineers data.[104]

The Freight Mobility Plan is guided by three objectives:

- Developing an urban goods movement system that supports jobs, the economy, and clean air for all; and provides goods delivery to residents and businesses.
- Maintaining Washington's competitive position as a global gateway to the nation with intermodal freight corridors serving trade and international and interstate commerce, and the state and national Export Initiatives.
- Supporting rural economies' farm-to-market, manufacturing, and resource industry sectors.[105]

WSDOT has identified truck freight bottlenecks through the use of Global Positioning System (GPS) technology to gather data on travel speeds across the road network. From 2008 to June 2013 WSDOT collected GPS speed and location data from over 7,000 trucks on Washington's truck freight corridors every day and systematically analyzed the truck freight highway network and quantitatively identified truck freight bottlenecks. This analysis is being enhanced through access to larger data sets from FHWA with the goal of identifying truck freight bottlenecks on the entire truck freight economic corridor network.[106]

WSDOT, working with the Washington State Freight Plan Technical Teams, Tribes, FMSIB, every Metropolitan Planning Organization (MPO) and Regional Transportation Planning Organization (RTPO) technical committee in the state, and many cities, counties, and ports, uses their traffic count and bottleneck data and other objective criteria to define the State's Truck Freight Economic Corridors including:

- T-1 freight corridors that carry more than 10 million tons per year.
- T-2 freight corridors that carry 4 to 10 million tons per year.

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[104] Washington State Freight and Goods Transportation System (FGTS) 2015 Update WSDOT Freight Systems Division March 2016 http://www.wsdot.wa.gov/NR/rdonlyres/3ECFC2D0-8A56-4D86-B4CB-2006B0792D43/0/2015UPDATEFGTSReportWEB.pdf
[105] Washington State Freight Mobility Plan p. 2.
[106] Ibid., p. 52.

- Alternative freight routes that serve as alternatives to T-1 truck routes that experience severe-weather closures, and carry 300,000 to four million tons per year.
- First/last mile connector routes between freight-intensive land uses and T-1 and T-2 freight corridors.107

In developing the Freight Mobility Plan, WSDOT's Freight Systems Division interviewed over 150 firms at their places of business and has identified five major trends that will change freight flow volume, routing, and the economic value of the commodities shipped on the State Freight Economic Corridors in the next six years. Washington State Freight Advisory Committee also provided knowledgeable inputs into the near-term freight trends.[108]

The Freight Mobility Plan includes state-wide forecasts of freight traffic, freight policy recommendations for other levels of government and for the state, and a list of recommended capital investments for funding consideration.

### 5.1.2 Puget Sound Regional Council

At the regional level, the Puget Sound Regional Council has developed a comprehensive, multimodal Freight Strategy that serves as the freight component of the region's long-range transportation plan, Transportation 2040. The Freight Strategy takes a look at all of the main freight modes, including rail, truck, air, and marine cargo, and examines the current and future issues as the region looks to planning for a sustainable transportation system out to 2040. The Freight Strategy has been developed through coordination with member agencies and other regional freight stakeholders. It establishes 23 recommendations across major planning issues brought up in Transportation 2040, including congestion and mobility, safety and security, sustainable funding, maintenance and preservation, and the environment.[109]

### 5.1.3 Seattle Department of Transportation

The Seattle Freight Master Plan focuses primarily on urban truck movement to support Seattle's increasing demand for the delivery of goods and services in a safe and reliable manner. Railroad, marine, airfreight, and pipeline, which primarily transport natural gas, are also critical components in the plan. However, because the roadway network is within the City's purview,

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[107] Washington State Freight Mobility Plan p. 33.
[108] Ibid., p. 88.
[109] "PSRC Releases Freight Strategy" Puget Sound Regional Council http://www.psrc.org/transportation/freight/

the FMP focuses on how truck freight provides access to these other modes.[110] The FMP is one of our City's four modal master plans: pedestrian, bicycle, transit, and freight. A draft for public input was released in May 2016.

Seattle Department of Transportation (SDOT) has collected truck volume data at more than 620 locations on certain arterials for the past 4 years. This data has been instrumental in the development of the FMP network, and also used to create the City's first truck volume map.[111]

SDOT also assembled additional data and mapped truck crash locations; freight mobility constraints such as at-grade rail crossings, height and weight restrictions, movable bridges and geometric constraints; and freight bottlenecks, classified as locations with high truck volumes and significant congestion.[112]

A network of Major Truck Streets (MTS) that accommodate freight movements throughout the city and connect major freight generators was designated in the 2005 Transportation Strategic Plan and incorporated into the City's Comprehensive Plan. State routes and highways are also included in the network.[113] The Freight Master Plan recommends an expanded freight network based on four functional classifications:

- Limited Access Facility – Limited access facilities support through movements and/or long-distance trips. These facilities include interstate and state highways.
- Major Truck Street – This designation is now one of several elements in the overall freight network. As defined previously, a major truck street is an arterial street serving connections to the regional network, between and through industrial land uses (manufacturing/industrial centers and intermodal terminals), commercial districts, and urban centers.
- Minor Truck Street – Minor truck streets make connections for goods delivery to urban villages and neighborhood commercial districts. They also provide secondary connections to the major truck street network, thereby creating system redundancy and resiliency.

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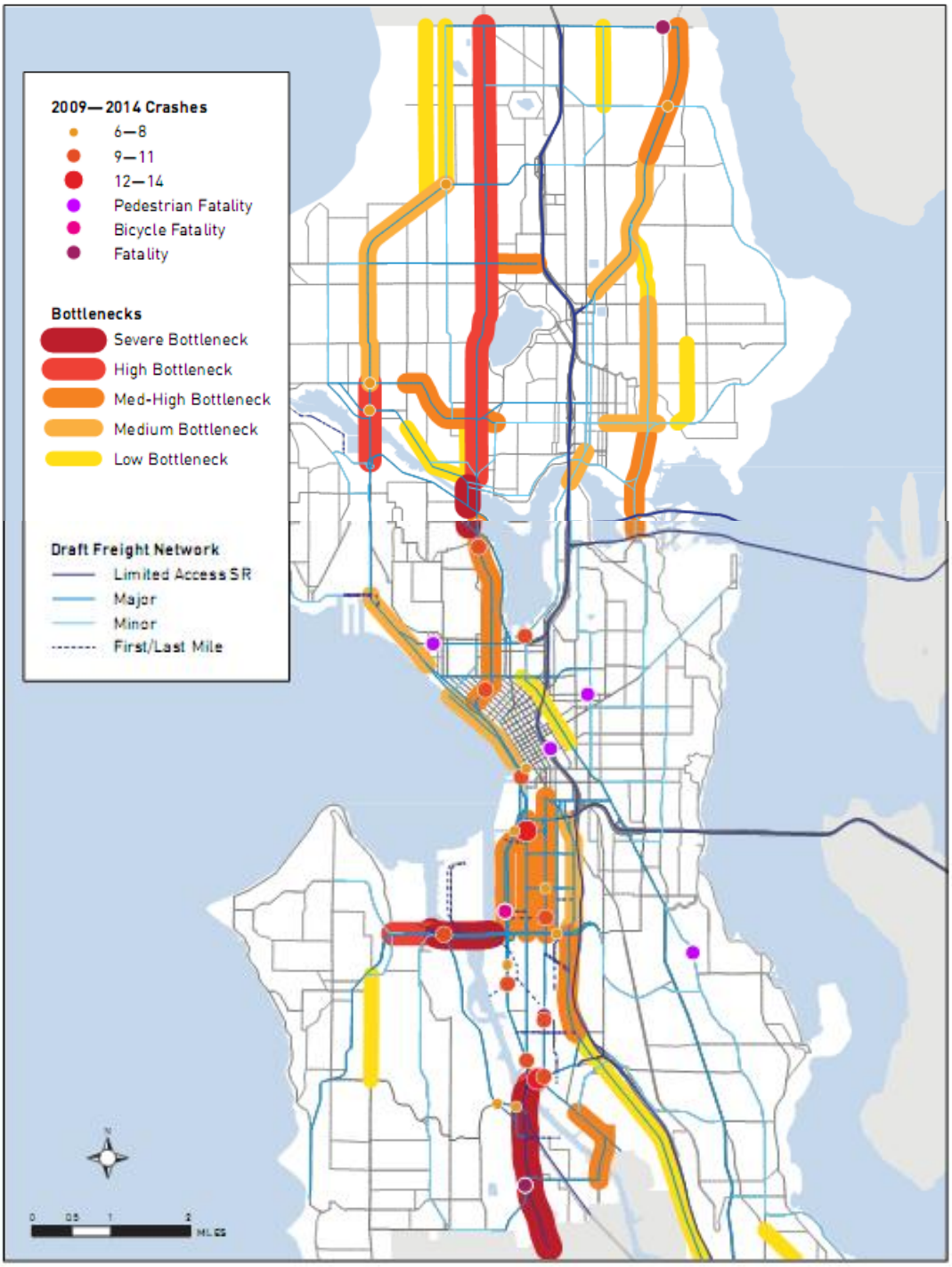
[110] City Of Seattle Freight Master Plan Seattle Department of Transportation May 25, 2016 p. 7. http://www.seattle.gov/transportation/freight_fmp.htm
[111] City Of Seattle Freight Master Plan p. 35.
[112] City Of Seattle Freight Master Plan pp. 68-76.
[113] City Of Seattle Freight Master Plan p.24.

- First/Last Mile Connector – These are defined as locations where short truck movements are required for access to/from key freight activity centers, such as Port facilities and intermodal terminals.[114]

FIGURE 5-5: FREIGHT BOTTLENECK AND SAFETY LOCATIONS




[114] City Of Seattle Freight Master Plan p 61.

The new network supplements the MTS with Over-Legal and Heavy Haul networks, specific routes that provide for oversized and overweight trucks, referred to as "over-legal." Permits are required to operate these vehicles on designated over-legal streets. Every vehicle that meets the over-legal specifications, which includes an exceedance of the maximum weight, height, width, and/or length (as specified by state and city laws) is required to obtain a permit to transport goods using the city's street network.

In October 2015, the City of Seattle approved legislation that established a Heavy Haul network of city streets to allow heavier cargo containers to be transported between the Port of Seattle, industrial businesses, and rail yards with appropriate permits. The measure also provides a framework and funding to repair and build roadways within the network, calls for semi-annual safety inspections of heavy haul trucks, and aligns city weight regulations with those of the state and other municipalities across the country.[115]

## 5.2 Congestion Mitigation and Environmental Issues

Since 1998 spending on infrastructure projects to reduce congestion related to the Ports of Seattle and Tacoma has been guided primarily by the Freight Action Strategy for the Seattle-Tacoma (FAST) Corridor. The mission and goals of the FAST Corridor are described as follows:

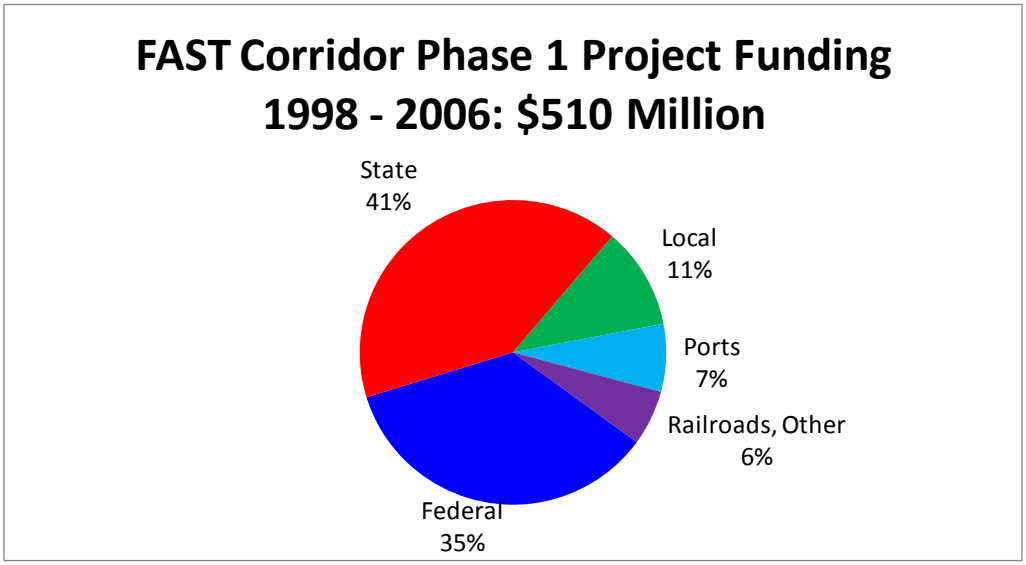
> *Each of the FAST Corridor partners works to achieve a common freight mobility vision. That vision integrates local and regional transportation system improvements along mainline rail lines and truck corridors near ports in the central Puget Sound region. These projects move international maritime and domestic trade, while supporting Puget Sound's economy and locally mitigating the impact of freight that benefits other parts of the country.*[116]

Project partners for the FAST Corridor include Washington State agencies (Washington State Department of Transportation (WDOT), the Freight Mobility Strategic investment Board, the Transportation Investment Board); the US Federal Highways Administration; the Puget Sound Regional Council; King, Pierce and Snohomish Counties; the Ports of Seattle, Tacoma and Everett; twelve cities; the BNSF and UP railroads; and the Washington Trucking Association. The FAST Corridor has been developed in two phases. Phase 1 included 18 projects with a total cost of approximately $510 million. Projects consisted primarily of road-rail grade

[115] City Of Seattle Freight Master Plan p. 24.
[116] FAST Corridor April 2006 http://psrc.org/assets/1833/fastbrochure.pdf

separations. The first project was completed in 2001 and the remaining projects were substantially completed by 2006. Major funding sources are shown below:[117]

**FAST Corridor Phase 1 Funding Sources**




A second list of nine projects with a total estimated cost of approximately $250 million was subsequently developed. In 2006 responsibility for FAST Corridor planning was centralized in the Puget Sound Regional Council (PSRC). In July 2011 PSRC reported that 17 of 27 FAST Corridor freight projects (and project phases) have been completed at a total cost of $570 million, of which federal funds accounted for $150 million or 26%. Additional federal funds for five projects were provided under the American Recovery and Reinvestment Act of 2009, and the five remaining projects were recommended as priorities in the 2012 Regional Freight Strategy.[118]

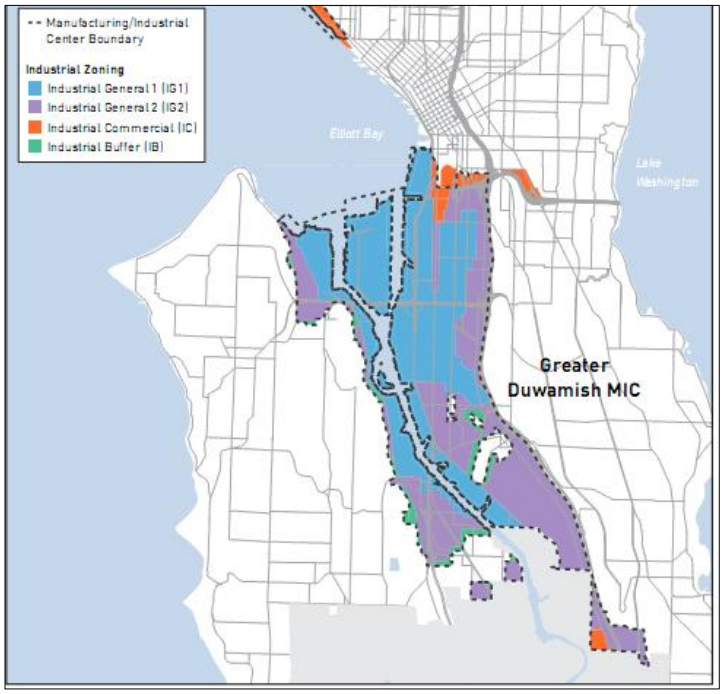
## 5.3 Land Use

Due to its location in downtown Seattle, the Port of Seattle is most vulnerable to land use conflicts which may threaten the long term viability of port operations. Port of Seattle container terminals are clustered immediately south of the downtown area in one of two designated Manufacturing/Industrial Center (MIC) zones in the City, the Duwamish MIC. A proposal in 2013 to build a new basketball arena on industrially zoned land near the existing baseball

[117] Information on FAST Corridor projects and funding up to 2006 is taken from Railroads and the Central Puget Sound Region Presentation to Western Regional Rail Conference Freight Mobility Panel; Dennis Beaulieu, Coordinator Freight Mobility Roundtable, Puget Sound Regional Council, 2006.
[118] Planning for Freight in the Central Puget Sound Region Presentation to Seattle Freight Mobility Advisory Board; Freight Planning – PSRC July 19, 2011.

stadium and industrial zoning in the Duwamish MIC raised concerns about how the City could protect industrial land. As a result, the City signed a memorandum of understanding with King County and the arena proponent which directed the Seattle Planning and Development Department to identify policies that could help maintain an industrial sanctuary while accommodating an expanding role for the stadium district.[119]

**Duwamish Manufacturing/Industrial Zone**




As a result of the study, DPD proposed two amendments for consideration in the Comprehensive Plan:

- Limit the future application of the IC zone inside the M/IC boundaries to prevent the expansion of offices and other non-industrial uses.
- Retain land in the Manufacturing/Industrial Centers for industrial uses and develop criteria for evaluating requests to remove land from a M/IC, recognizing the important economic resource the land in these centers represents.

[119] Industrial Lands Policy Discussion Summary and Recommendations Seattle Planning and Development Department December, 2015
http://www.seattle.gov/dPd/cs/groups/pan/@pan/documents/web_informational/p2366839.pdf

In preparation for development of the Freight Master Plan the City undertook the Industrial Areas Freight Access Project, a joint project with the Port of Seattle to identify and initiate solutions to freight mobility, circulation and access needs within and between:

- The Greater Duwamish and Ballard Interbay Northend Manufacturing and Industrial Centers (MICs); and
- Connecting corridors from the centers to the regional transportation system, including the interstate and state highways, Port of Seattle facilities and local rail yards.

The study identified a number of potential projects endorsed by both the City and the Port of Seattle, and recommended ongoing data collection by Seattle DOT.[120]

## 5.4 "Last Mile" Urban Delivery Issues

Last Mile issues are dealt with at the local level. For example, the City of Seattle uses four distinct types of load zones, including generic loading zones, passenger loading zones, truck-only loading zones, commercial vehicle load zones, and Commercial Vehicle Load Zones (CVLZ) to provide a special parking space for service delivery vehicles.[121]

Due to heavy congestion, the movement of large trucks is restricted in the core of the city. In the Downtown Traffic Control Zone, vehicles of 30 feet or longer may operate by permit on weekdays between 9 AM and 3 PM, and without a permit from 7 PM to 6 AM. Curfews are in effect from during weekday peak traffic periods (6 AM to 9 AM, and from 3 PM to 7 PM). With a permit, oversized loads may travel in the zone from 7 PM to 6 AM.[122]

While the Seattle Freight Master Plan does not include an Urban Goods Delivery Strategy, it outlines steps toward development of one, including 14 actions including a pilot program for off-hours delivery and exploration of freight demand strategies.[123]

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[120] "Seattle Industrial Areas Freight Access Project Overview" Seattle DOT
http://www.seattle.gov/transportation/freight_industrialareas.htm
[121] "Load Zones" Seattle Department of Transportation
http://www.seattle.gov/transportation/parking/parkingload.htm
[122] City Of Seattle Freight Master Plan p. 28.
[123] City Of Seattle Freight Master Plan p. 83.

# 6 METRO VANCOUVER CASE STUDY

Metro Vancouver is comprised of 21 municipalities and one First Nation in the Lower Mainland region of southwest BC. Vancouver is the largest city, with a population of 603,500 in 2011. Population of the entire region is approximately 2.5 million. The region is home to the Port of Vancouver, Canada's largest and most diversified Port and the largest export port in North America.

Metro Vancouver (formerly the Greater Vancouver regional District) provides core services for the region, including drinking water, wastewater treatment and solid waste management. Metro Vancouver also regulates air quality, plans for urban growth, manages a regional parks system and provides affordable housing. The regional district is governed by a Board of Directors of elected officials from each local authority.

In 1998 the provincial government created a regional transportation authority, TransLink (formerly called the Greater Vancouver Transportation Authority, or GVTA) to replace the provincially-operated BC Transit in the Greater Vancouver Regional District and assume many transportation responsibilities previously held by the provincial government. In addition to planning and operation of the transit system, Translink, in partnership with municipalities, plans the region's Major Road Network, a network of approximately 600 km of road that facilitates the safe and efficient movement of people and goods across the region. It connects the provincial highway system with the local road network and some corridors also serve cyclists and pedestrians. TransLink provides funding for the operation, maintenance and rehabilitation of the MRN, but ownership and operational responsibility for the MRN remains with the respective municipalities. TransLink also shares the cost of road and bike improvement projects with municipal partners and other stakeholders.

The Vancouver Fraser Port Authority (VFPA) is responsible for the stewardship of federal port lands in and around Vancouver. VFPA was established by the Government of Canada pursuant to the Canada Marine Act, and accountable to the federal Minister of Transport. Prior to the formation of the new authority in 2008, there were three separate port authorities in the Metro Vancouver region: the Port of Vancouver, which was the largest port in Canada; the Fraser River Port Authority; and the North Fraser Port Authority.

The Vancouver Airport Authority is responsible for the development and maintenance of airport infrastructure, overseeing day-to-day operations at Vancouver International Airport (YVR). The

airport was transferred from the Government of Canada to local control in 1992. YVR is Canada's second busiest airport, serving 20.3 million passengers and handling 271,500 tonnes of cargo in 2015.

## 6.1 Freight Planning

Planning related to the movement of freight has focused primarily on Metro Vancouver's role as a gateway for international trade through the Port of Vancouver and (to a lesser extent) Vancouver International Airport. Federal devolution of these two organizations in the early 1990's facilitated development of a coalition of interests to lobby for federal and provincial funding for trade-related infrastructure projects, and other potentially beneficial policies and programs.

The Greater Vancouver Gateway Council (GVGC) was formed in 1994, and in 1995 adopted the "Gateway" concept as a marketing and advocacy tool. The GVGC is structured as a private sector led partnership. The voting members are primarily transportation service providers in the marine, road, rail and air modes, and are typically represented by senior executives. For example, the most current information on the GVGC's Executive lists Craig Dickson, CEO of Vancouver International Airport, as Chair; Mr. Robin Silvester, President and CEO of Vancouver Fraser Port Authority as Past Chair; Mr. Brad Eshleman, President BC Marine Terminal Operators Association as Vice Chair; and Mrs. Louise Yako, President and CEO of the BC Trucking Association as Treasurer. Federal, provincial and local government agencies and private sector organizations participate as resource members.

The Gateway Council adopted a vision of "Greater Vancouver as the Gateway of Choice for North America" in 1999. To advance this vision, the Council undertook to identify the key elements of the transportation infrastructure network in the Lower Mainland – the Major Commercial Transportation System or MCTS.

The first major project which was completed was the MCTS Road Study – identification of major road corridors serving Gateway-related freight and passenger movement. The work was done directly by the members of the Council, so it represented the expert opinion of those who provide the services. This was followed by similar studies of the MCTS Rail System, and the MCTS Waterborne Study which identified key issues and infrastructure requirements for the promotion of shortsea shipping in the region.

The resource members of the Council (Transport Canada, BC Ministry of Transportation and Infrastructure, and others) provided funds and expertise for more technical analysis of the MCTS system.

The success of the GVGC in attracting government investment can be attributed to its role in coordinating stakeholder lobbying; the MCTS reports represented a consensus among the voting members and provided lists of potential projects for government consideration; individual projects were typically further defined through development of Busines Cases to support the need for improvements.

In 1999 Translink took over responsibility for planning of the Major Road Network, including development and maintenance of the regional travel demand model. In 1999, a comprehensive study of the trucking industry and goods movement in the Greater Vancouver/Fraser Valley jointly commissioned by TransLink, Transport Canada, British Columbia Transportation Financing Authority, British Columbia Ministry of Transportation and Highways, Insurance Corporation of British Columbia, Vancouver Port Authority, Vancouver International Airport Authority and the Fraser River Port Authority. The scope of the Lower Mainland Truck Freight Study included data collection through truck driver trip diaries, truck traffic volume and clssification counts, and specific surveys for special generators such as the Port terminals and for externally generated trips. The data was used for the development of a truck demand forecasting model that was incorporated into the EMME/2 regional transportation demand model.[124] It was also incorporated into a province-wide study on goods movements by Transport Canada published in 2002.[125]

Updates of the truck classification counts were conducted in 2008[126] and in 2014[127] with funding assistance from Transport Canada and the BC Ministry of Transportation and Infrastructure. In

[124] 1999 Lower Mainland Truck Freight Study Summary of Findings Translink Strategic Planning Department July 2000 http://www.translink.ca/-/media/Documents/plans_and_projects/urban_showcase/goods_movement/background_research/Goods%20Movement%20Study%20%20Truck%20Freight%20Study%20Summary%201999.pdf

[125] Freight Transportation in British Columbia TP 13909E Transport Canada March 2002.

[126] 2008 Metro Vancouver Dangerous Goods and Truck Classification Survey Creative Transportation Solutions for Transport Canada BC MOTI and Translink November 2008 http://www.translink.ca/-/media/Documents/plans_and_projects/urban_showcase/goods_movement/background_research/2008%20Dangerous%20Goods%20and%20Truck%20Classification%20Survey%20Final%20Report.pdf

[127] 2014 Metro Vancouver Truck Classification and Dangerous Goods Survey Acuere Consulting for Transport Canada BC MOTI and Translink http://www.translink.ca/-

2006 Cambridge Systematics completed Phase 1 of a Greater Vancouver Goods Movement Study which was jointly funded by Transport Canada, BC MOTI and Translink. A contract for $705,000 was awarded to Cambridge Systematics to undertake Phase 2 of the study in 2007 but the project was not successfully completed.

In 2013, Translink committed to development of a Goods Movement Strategy as part of its regional transporttaton strategy.[128] Following 18 months of consultations, the Draft Final Strategy was presented at a stakeholder workshop in June 2016. The scope of the startegy includes three key objectives:

- Advancing urban freight priorities.
- Coordinating with provincial and national partners on their priorities to improve Gateway-oriented freight. Note that Translink's strategy does not envision a major role in planning for gateway-realted infrastructure.
- Advancing regional sustainability and livability goals. Key challenges to livability arising from goods movement include competition for scarce space on the roads and at curbside; safety and perceptions of safety; vibrations and noise; and emissions of visible smoke, Criteria Air Contaminants and greenhouse gases.

Proposed goals include improving the efficiency and reliability of goods movements by reducing the amount of time spent in congested conditions and reducing the variability in travel times on the Regional Road Network; and safer and quieter goods movement through reductions in collisions, noise and vibration, and air emissions.[129] The strategy is expected to be submitted for Board approval in the fall of 2016.

## 6.2 Congestion Mitigation and Environmental Issues

The Greater Vancouver Gateway Council has been very successful in leveraging federal and provincial investments in trade-related infrastructure. The largest projects included:

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/media/Documents/plans_and_projects/urban_showcase/goods_movement/background_research/2014_truck_classification_and_dangerous_goods_survey_report.pdf

[128] "TransLink brings forward Goods Movement Strategy" May 2013 http://www.translink.ca/en/About-Us/Media/2013/April/TransLink-brings-forward-Goods-Movement-Strategy.aspx

[129] Moving the Economy Reviewing the Draft Regional Goods Movement Strategy (RGMS) for Metro Vancouver Presentation to Regional Stakeholder Forum Translink June 16, 2016

- Construction of nine road/rail grade separations on the 70 km Roberts Bank Rail Corridor. Roberts Bank is located within the Corporation of Delta on the south side of the Fraser River estuary, approximately 35 km south of downtown Vancouver. It was developed to due to concern over the ability of the existing port facilities in the Inner Harbour (Burrard Inlet) to accommodate anticipated growth in port traffic. Roberts Bank was chosen because "it best fulfilled all requirements for a new port location: direct, uncongested railway access routes for all railway operators; large areas of level undeveloped land immediately adjacent to berth areas; direct access for vessels from deep water, with no tidal or other navigational delays; water depths of at least 20 m that could be in creased by dredging if required; remoteness from densely populated areas to minimize impacts from occasional air, water, or noise pollution; direct access to a principal highway system; and minimal disturbance to bird and fish life."[130]

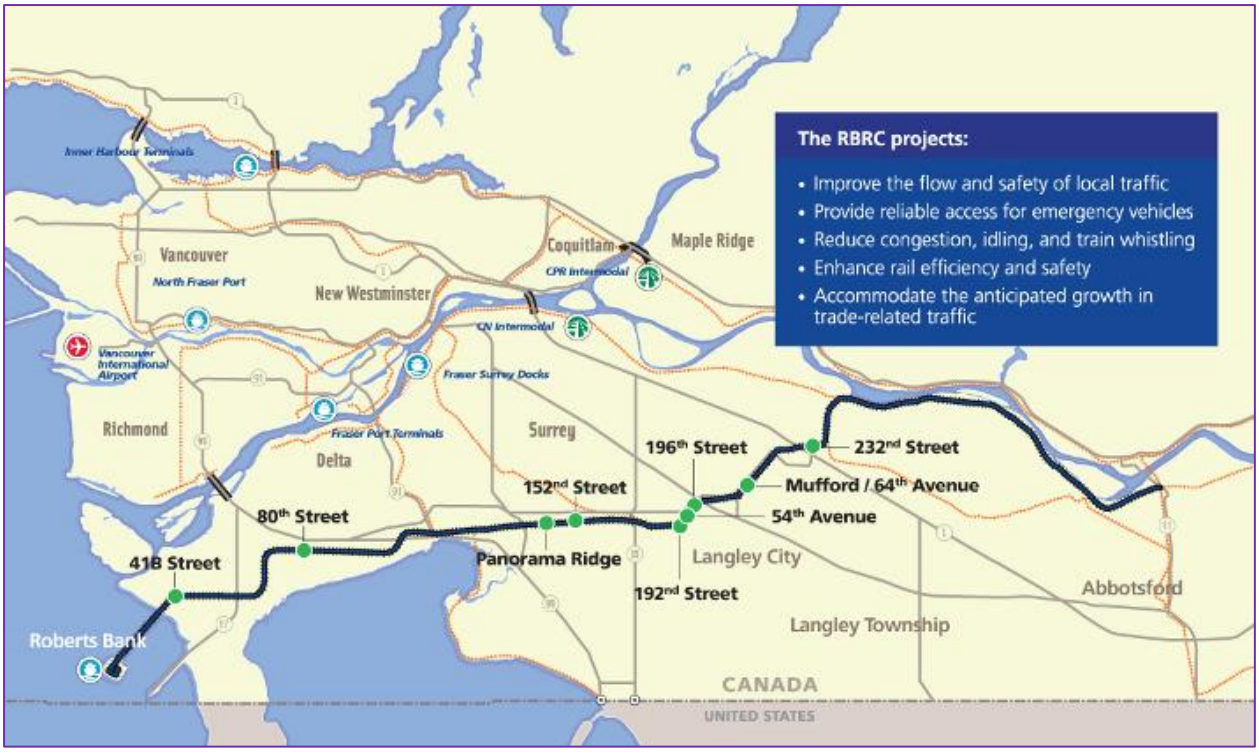
  The Westshore coal terminal began operations at Roberts Bank in 1970, followed by Deltaport in 1998. Roberts Bank has been selected as the site for the next major expansion of container capcity at the Port of Vancouver through construction of a new terminal ("T2") with a planned capacity of 2.4 million TEU's at an estimated cost of $750 million.

  Since the construction of Roberts Bank, rapid population growth in the communities of Delta, Langley and Surrey resulted in urban development along the rail corridor. Growing port volumes boosted the number of trains on the corridor, and the railways have implemented longer trains (up to 12,000 feet or 3.7 km for intermodal trains) which resulted in lengthy delays at level crossings.

  The Roberts Bank Rail Corridor project was designed to mitigate the impact of rail traffic serving the Deltaport container terminal and Westshore Terminals coal facility on local traffic congestion.

[130] History Of Development at Roberts Bank - An Overview Hemmera Envirochem Inc. for Vancouver Port Authority November 2004 p. 4. http://www.robertsbankterminal2.com/wp-content/uploads/A-History-of-Development-at-Roberts-Bank-An-Overview-2004.pdf

**Roberts Bank Rail Corridor**




The total cost was $307 million, funded as shown below:

| Roberts Bank Rail Corridor Project Funding | |
|---|---|
| **Funding Source** | **Contribution ($ Millions)** |
| Federal (Asia Pacific Gateway Initiative) | $75 |
| Province of British Columbia | $50 |
| Port Metro Vancouver | $50 |
| TransLink | $50 |
| Rail companies (CP, CN, BCRC and BNSF) | $32 |
| City of Surrey | $22 |
| Township of Langley | $15 |
| City of Langley | $8 |
| Corporation of Delta | $5 |
| Total | $307 |

- Construction of the South Fraser Perimeter Road linking Roberts Bank to Highway 1 at a total cost of $1.264 billion, of which the federal government contributed $365 million and the Province the remainder.

  While environmental benefits are an important consideration in goods movement planning in Metro Vancouver, they have not been the driving force. Unlike Southern

California, there are no serious current issues with regional air quality and no mandatory federal or provincial requirements for improvements in environmental performance.

Environmental issues are tangentially involved in justifying government infrastructure investments to reduce traffic congestion, though the primary motivation appears to be overcoming public resistance to port expansion by mitigating negative impacts on local traffic. The Roberts Bank Rail Corridor projects fit into this category. The Roberts Bank Rail Corridor has been only partially successful in this regard; for example, the City of Langley Master Transportation Plan states:

*Because of the significant impact of rail activity on the quality of life, safety and mobility within the City, Council does not support further increases in freight traffic through the city. If further growth in rail traffic occurs, the City prefers a strategy that maximizes use of recently built infrastructure and only as a last resort may consider additional grade-separations along major corridors such as the Langley Bypass, Fraser Highway and 200th Street.*[131]

## 6.3 Land Use

Metro Vancouver is facing a critical shortage of industrial land. There are three major causes:

- The region is geographically constrained to the north by mountains, and to the south by the U.S. border.
- Competitive pressures for land use due to rapid population growth and high levels of residential and commercial construction.
- The Province's Agricultural Land Reserve makes it extremely difficult to convert agricultural land to other uses.

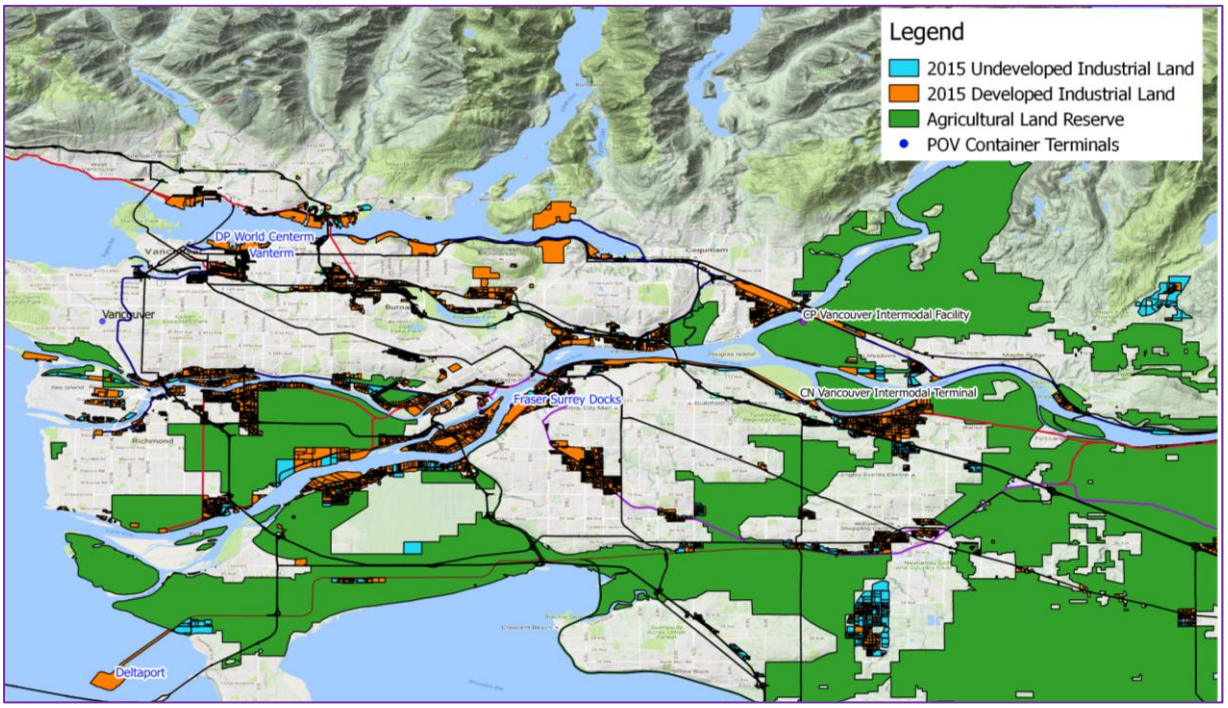
The consequence has been a declining supply of industrial land. Metro Vancouver's 2015 Industrial Land Inventory found that of the 11,331 ha of industrial land in the region, approximately 80% is already developed,[132] and that at current levels of absorption the supply may be substantially depleted by the early 2030's.[133] Industrial land suitable for logistics activities related to port activity – large parcels with good transportaiton access to facilitate

[131] City of Langley Master Transportation Plan 2014 Urban Systems p. 7. http://www.city.langley.bc.ca/sites/default/files/uploads/Engineering/DOCSLANG-%23129347-v2-Master_Transportation_Plan_2014.pdf
[132] METRO VANCOUVER 2015 Industrial Lands Inventory Summary Report p. 12. http://www.metrovancouver.org/services/regional-planning/PlanningPublications/PPEIndustrialLandsInventorySummaryReport.pdf
[133] Ibid., p. 7.

efficient trucking - is particularly scarce.[134] Superior availability of suitable land ata a significantly lower price has been a major factor in the growth of Calgary as a Western Canadian distribution hub.

Metro Vancouver's Regional Growth Strategy includes land use designations and policies designed to protect industrial lands for industrial uses. It calls on municipalities to "support and protect industrial uses for existing industrial lands and "exclude uses which are inconsistent with the intent of industrial areas".[135] The Port of Vancouver has purchased a number of industrial sites to ensure the availability of land for port-related development.

**Metro Vancouver Industrial and Agriculural Land 2015**




## 6.4 "Last Mile" Urban Delivery Issues

Translink is responsible for planning of the Major Road Network. The authority to designate or restrict truck movements is shared between the Commercial Vehicle and Safety Enforcement branch of the Ministry of Transportation and Infrastructure, TransLink and the municipalities. However, a 2010 study noted that "coordination among the 21 municipalities with respect to

[134] Ibid., p. 7.
[135] Metro Vancouver 2040 Shaping Our Future Regional Growth Strategy Bylaw No.1136, 2010 p. 27.

truck definitions, routes, or regulation, permitting and enforcement is a challenge for TransLink."[136]

In general jurisdiction over local streets, including "Last Mile" urban delivery issues, remains with individual municipalities. While municipalities generally include considerations of goods movement issues in their transportation plans, there are few specific initiatives.

The City of Vancouver's Transportation 2040 Plan is typical. It includes a section on Local Goods and Services Movement, which calls for maintenance of an efficient network of truck routes, maximization of loading zone efficiency, support for low impact methods of delivery (bicycles, etc.), and support for local production through protection of the industrial land base.[137] However, no specific targets are identified.

**Off-Hours Delivery in a No Stopping Zone - Downtown Vancouver 9 PM 19/08/2016**


[136] Streamlining Opportunities for the Permitting, Enforcement, and Regulation of Regional Truck Movements Paper prepared for presentation at the Best Practices In Urban Transportation Planning Session of the 2010 Annual Conference of the Transportation Association of Canada Halifax, Nova Scotia Helen Cook, TransLink; Phoebe Cheung, P.Eng., SNC Lavalin; Vivian Law, P.Eng., SNC Lavalin http://conf.tac-atc.ca/english/resourcecentre/readingroom/conference/conf2010/docs/b1/cook.pdf

[137] Transportation 2040 Plan City of Vancouver 2012 pp 53-54. http://vancouver.ca/files/cov/Transportation_2040_Plan_as_adopted_by_Council.pdf

# 7 PORTLAND OREGON CASE STUDY

Portland is the largest city in the state of Oregon. The Oregon metropolitan area accounts for 2.4 million of the state population of 4 million. It is located at the confluence of the Columbia and Willamette Rivers, approximately 165 km from the ocean.

Aviation and marine transportation activity in the area is overseen by the Port of Portland. The Port of Portland was created by the State of Oregon to promote the maritime, shipping, aviation, commercial and industrial interests of the port. It is a regional government encompassing Clackamas, Multnomah and Washington counties in Oregon. The Port of Portland has broad powers to acquire or dispose of assets, engage in commercial operations, provide utility and rail services within the Port, construct and maintain waterways, own unit trains, and provide marine services on the Snake and Columbia Rivers. The Port of Portland's assets include four airports (Portland International, Hillsboro, Troutdale and Mulino), four marine terminals and four industrial parks. The Port also owns and operates the Dredge Oregon to help maintain the navigation channel on the lower Columbia and Willamette Rivers.

The Port of Portland operates at a disadvantage to other West Coast ports due to its inland location. Draft limitations on the Columbia River limit the size of vessels which can call at the port. A major dredging program to deepen the navigational channel on the Columbia River from Portland to the ocean was completed in 2010. Dredging under the Columbia River Channel Improvement Project began in 2005. The project increased the depth of 103 miles of the navigational channel from the mouth of the Columbia River to Portland from 40 feet to 43 feet. Total cost is estimated at $178.4 million included $27.7 million from each of the Oregon and Washington State governments. Federal appropriations over the life of the project totalled approximately $113 million from 2001 through 2009.[138]

After years of losing money operating Terminal 6, the port's container terminal, in FY 2011 the Port of Portland entered into a 25 year lease with International Container Terminal Services, Inc. (ICTSI Oregon, Inc.) for the operation of the facility[139]. The lease includes the intermodal yard and the slab-steel bulk operation. ICTSI, Inc., is headquartered in the Philippines, and is a new entrant to West Coast container operations.

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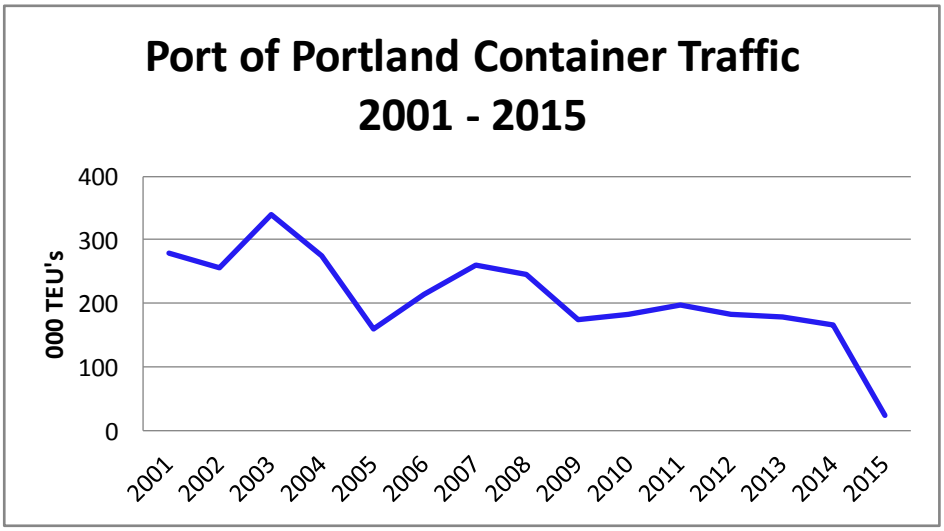
[138] "Columbia River dredging ends this year, benefits end mixed" The Oregonian April 24, 2010.
[139] "Port of Portlands path to idle container terminal began with shift in philosophy" Beth Nakamura The Oregonian September 16, 2016
http://www.oregonlive.com/business/index.ssf/2016/09/port_of_portlands_path_to_idle.html

Poor labour relations between the new terminal operator and the ILWU led to reduced productivity at the terminal. In early 2015 the two largest container lines serving Portland, Hanjin and Hapag-Lloyd, ceased to call at the port. The remaining carrier, Westwood Shipping Lines, ceased port calls in May 2016.[140]




Loss of the container service has had a significant impact on regional exporters. Prior to the loss of service, containers of agricultural products were shipped by barge on the Columbia and Snake River systems from as far east as Lewiston, Idaho (265 miles upstream) to Portland for transfer to ocean-going vessels. With the loss of container service at Terminal 6, trucking (or barge service for Idaho exports from Lewiston, Idaho) to Boardman Oregon and from there by rail to Portland or Puget Sound became the most viable option for Idaho exports. Inland transportation costs for containers from Lewiston increased have increased from $850 by barge to approximately $2,000 by truck.[141] For Oregon hay, straw and seed exports, shippers now either truck their products to Northwest Container Service's facility at Portland for loading on rail to Puget Sound, or truck all the way to the ports of Seattle and Tacoma.[142]

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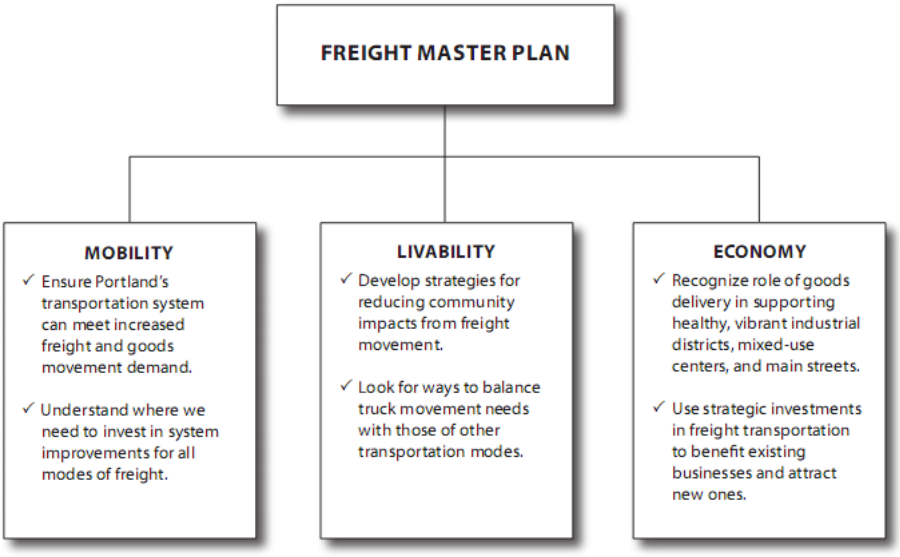
[140] "How did the Port of Portland lose its entire container business?" Ship-Technology.com Chris Lo September 15, 2016 http://www.ship-technology.com/features/featurehow-did-the-port-of-portland-lose-its-entire-container-business-4996185/

[141] "Legume Farmers Feel The Squeeze From Oregon's Port Feud" OPB Conrad Wilson September 1, 2015 http://www.opb.org/news/article/port-portland-farmers-agriculture-harvest-shipping/

[142] Oregon Trade and Logistics Initia http://www.ship-technology.com/features/featurehow-did-the-port-of-portland-lose-its-entire-container-business-4996185/ tive Stakeholder Engagement Report Oregon Peter Friedmann and Abigail Struxness Lindsay, Hart LLP and FBB Federal Relations December 2015 http://cdn.portofportland.com/pdfs/TL-Report-Appendix-2.pdf

## 7.1 Freight Planning

Portland completed its first Transportation System Plan (TSP) in 2002. During this process, the City recognized the need to better understand and plan for freight movement. The TSP identified a study to ascertain freight transportation system needs and deficiencies, and develop solutions.[143]




The development of the Freight Master Plan occurred in two phases. The first phase of planning began in January 2003 and accomplished the following:

- Completion of the Freight Master Plan - Interim Report, which built the case for freight planning and identified the Plan's objectives.
- Adoption of a City Council resolution that acknowledged the importance of goods movement to Portland's economy, established the Portland Freight Committee, directed Portland Office of Transportation to develop a Freight Master Plan, and identified short-term opportunities for freight mobility improvements.
- Evaluation of existing freight policies, identification of freight-related issues, development of freight mobility project prioritization criteria, compilation of previously identified freight projects, and research on freight street design considerations.

[143] Freight Master Plan City of Portland Adopted May 10, 2006 p. 7.https://www.portlandoregon.gov/transportation/article/357098

The second phase of the Plan began in July 2004. In this phase, a set of technical analyses of needs and deficiencies, and identified solutions in the form of policy revisions, infrastructure improvements, and implementation activities was completed. The supporting technical documentation for the Freight Master Plan is contained in a series of technical memoranda prepared by staff with support from a consultant team. The technical memoranda included reports on Innovations and Trends, Data Synthesis, Existing Conditions, Needs Assessment, Solutions and Strategies, Freight Performance Measures, and Freight Coordination within the Portland Office of Transportation.

The Portland Freight Master Plan was prepared in coordination with other plans, programs and studies of freight mobility in the region. The Portland Planning Bureau and the Portland Development Commission prepared the Industrial Districts Atlas[144] and the Target Industrial Plan for the Distribution and Logistics Industries,[145] respectively, which identified the current land uses and employment in the City's industrial districts, and made projections of the potential future growth of these districts. The Port of Portland provided essential data and plans for its marine terminals, airports, and overall ground transportation needs, which were incorporated fully into the Freight Master Plan. Moreover, the Port's information for the Columbia River Channel Deepening Project and the Commodity Flow Forecast Update/Lower Columbia River Cargo Forecast provided fundamental data for the current and future products that flow into and out of the region, and the modes that will be used to move them.

Output from the Emme2 model maintained by Portland Metro, the regional metropolitan Organization (MPO), provided transportation data on truck volume and level-of-service during PM peak periods that was used to refine the truck street network. The Oregon and Washington departments of transportation provided the I-5 Rail Capacity Study and working data and proposals for the Columbia River Crossing which provided the regional level data on the major highway and railroad freight routes through Portland.

The Oregon Department of Transportation (ODOT) has extended urban land use – transportation modelling to the entire state by developing the Oregon Statewide Integrated Model (SWIM2). SWIM2 is an integrated land use transport model covering the entire State of

[144] Industrial Districts Atlas City of Portland 2004 https://www.portlandoregon.gov/bps/47561
[145] Portland : Economic development target industry plan fiscal year 2006/2007 https://scholarsbank.uoregon.edu/xmlui/handle/1794/8611

Oregon. The SWIM2 model incorporates the interaction between Oregon's economy, land use and transportation systems using a set of connected modules that cover different components of the full system including:

- Economic Model: determines the growth of the state's economy.
- Population Synthesizer.
- Location Model: allocates business productions and transactions.
- Aggregate Land Development – identifies land availability.
- Person travel.
- Commercial goods transport.
- External goods transport.

SWIM2 has been used to assess a variety of transportation investments and programs.[146]

## 7.2 Congestion Mitigation and Environmental Issues

### 7.2.1 Congestion Mitigation

In 2005 a lottery-bond-based initiative, ConnectOregon, was developed to invest in air, rail, marine and ports, and transit infrastructure. It was the first major funding initiative targeted at multimodal (or non-highway) transportation in Oregon. ConnectOregon focuses on improving the connections between the highway system and the other modes of transportation for better integration and to improve flow of commerce and remove delays. The Oregon Legislature appropriated $100 million in each of 2005, 2007, and 2009 for ConnectOregon. The program was extended at a reduced funding level of $40 million in 2011 and $45 million in 2013. The most recent update of the program has added bicycle and pedestrian projects to the eligibility criteria. Projects in the Portland area which have been approved for funding in the latest program (ConnectOregon VI) for the 2016-17 biennium include:

[146] The Oregon Statewide Integrated Model (SWIM) Tara Weidner, Oregon DOT SYSYNC Model Integration Workshop Annapolis, MD, January 22, 2015
http://smartgrowth.umd.edu/assets/documents/presto/tara_weidner.pdf

| ConnectOregon VI Project Funding Portland Area | | | |
|---|---|---|---|
| **Applicant** | **Project** | **Type** | **Funding ($000)** |
| Port of Portland | Terminal 6 Auto Staging Facility | Marine | $2,628.7 |
| Union Pacific Corp | Portland Passenger-Freight Rail Speed Improvement Project | Rail | $8,294.1 |
| Marion Ag Service | Marion Ag Service Rail Spur | Rail | $498.6 |
| City of Portland | Flanders Crossing Active Transportation Bridge | Bike/Ped | $2,877.0 |
| Total | | | $14,298.4 |

A new Columbia River Crossing project was proposed to improve conditions in the five-mile segment of I-5 between SR 500 in Vancouver Washington and Victory Boulevard in North Portland with designs for bridge, highway, transit and bicycle and pedestrian improvements. The new I-5 bridge over the Columbia River was planned to help relieve congestion and improve driver safety, be high enough to eliminate bridge lifts and provide protection in the event of an earthquake. Total cost of the project was estimated at $3.1 to $3.5 billion. Funding was anticipated from the federal, Washington and Oregon governments and from tolling of bridge traffic. The project was terminated after the Washington State Senate failed to approve $450 million in funding, in part due to opposition to inclusion of light rail in the project.[147]

### 7.2.2 Environmental Issues

Portland is seen as a leader among US cities in promoting sustainability in land use and transportation through a combination of growth management and transit development. Bus, light rail and commuter rail transit services in the Portland, Oregon, metro area are operated by the Tri-County Metropolitan Transportation District of Oregon (TrimMet), "a municipal corporation of the State of Oregon", with powers to tax, issue bonds, and enact police ordinances. TriMet is governed by a seven-member board of directors appointed by the Governor of Oregon. Improvements in transit are seen as the primary strategy for mitigating the environmental and economic impacts of population growth on transportation congestion.

The U.S. Environmental Protection Agency (EPA) listed the Lower Willamette River as a Superfund site in 2000. The affected area encompasses approximately 10 miles of the Willamette River in Portland, from the Broadway Bridge north to near the confluence of the Willamette and Columbia rivers. Contamination of this site came from more than 100 years of regional development (urban, industrial and agricultural), ship building and ship scrapping (dating from World War I and World War II to the Korean War), as well as combined sewer overflows and storm water discharges. Cleanup at 14 locations around the river has already

[147] "State Senate deadlock kills Columbia Crossing" Seattle Times Hal Bernton July 1, 2013 http://www.seattletimes.com/seattle-news/state-senate-deadlock-kills-columbia-crossing/

occurred. On June 8, 2016 the EPA released their proposed cleanup plan for the Lower Willamette River.[148] The US Superfund legislation requires that the total cost of cleanup be paid by parties responsible for the historic pollution and for the areas where it occurred. Parties with potential liability (PRPs, or potentially responsible parties) include past and current property owners and operators, as well as generators, transporters and disposers of hazardous substances. Sometimes companies that caused contamination are no longer in existence. When a historical PRP business leaves no funds to pay for cleanup, the remaining PRPs must assume those costs. The bill for cleanup could exceed $1 billion. Portlanders will be responsible for some of these costs because public entities (including the Port of Portland) and utilities are among the responsible parties.[149]

## 7.3 Land Use

In Oregon a statewide body, the Land Conservation and Development Commission (LCDC), has the responsibility to among other things, adopt and enforce binding land use policies (hereinafter "Goals"), administrative rules, and planning procedures for the state and its component parts. The most noteworthy planning tool of the Oregon program is the urban growth boundary (UGB), a legally binding, legislatively-created line that separates "rural land" from "urban land". Land outside the UGB can be developed for urban uses only if the purpose complies with goals set out in the legislation.

Jurisdiction over land use planning in the Portland Metropolitan Region rests with the Metropolitan Service District ("Metro"). Metro is currently the only democratically-elected regional government in the United States with power to influence or decide significant land use and transportation planning issues. Metro encompasses twenty-five cities and the urbanizable portions of three counties on the Oregon side of the Columbia River.[150] Metro derives its land use planning power from statutes, the Oregon Constitution, and a charter approved by regional voters in 1992. The charter considerably enhanced the ambit of Metro's power by exercising its home rule self-governance powers under the Oregon Constitution and

[148] "Portland Harbor Superfund Cleanup" Port of Portland https://www2.portofportland.com/Superfund#Cleanup-Completed
[149] "Portland Harbor Superfund Site: Who Pays?" Port of Portland May 2016 http://cdn.portofportland.com/pdfs/Superfund%20Who%20Pays.pdf
[150] Urban Growth Management in Portland, Oregon Edward J Sullivan 2015 p. 459. https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/18814/Sullivan.pdf?sequence=1

efining Metro's mission as "planning and policy making to preserve and enhance the quality of life and the environment".[151]

Oregon law requires that every five years, the Metro Council evaluate the capacity of the region's urban growth boundary to accommodate a 20-year forecast of housing needs and employment growth. The analysis includes forecasts and assessment of the industrial land inventory to ensure the availability of sufficient land to support growth in industrial employment. In its 2014 Urban Growth Report, Metro undertook a special analysis of the availability of large industrial sites (over 25 buildable acres) for major developments. Sites of this size are often required for the development of large scale logictics and distribution facilities. The analysis found that there may be demand for eight to 34 large industrial sites between 2015 and 2035, and the current inventory included 50 large vacant industrial sites inside the UGB that were not being held for future expansion by existing firms. The analysis suggested that given the availability of large sites in the existing UGB area, policymakers may wish to focus making its existing large industrial sites development-ready. Existing sites typically require actions such as infrastructure provision, wetland mitigation, site assembly, brownfield cleanup, annexation by cities, and planning to make sites development-ready.[152]

## 7.4 "Last Mile" Urban Delivery Issues

A Portland firm, B-Line, has pioneered the use of tricycles instead of trucks for deliveries to restaurants in Portland. B-line's three-wheeled, electric-assist tricycles, each hauling a large rectangular cargo carrier, have been making deliveries and pickups around Portland's urban core since 2009. Each unit can carry up to 700 pounds of product and make 15 different stops in about two and a half hours. The company is considering expansion to other cities.[153]

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[151] Ibid., p. 465.
[152] 2014 Urban Growth Report Metro September 2014 http://www.oregonmetro.gov/sites/default/files/2014-urban-growth-report-Revised-Draft-FINAL.pdf
[153] "How a New HQ Will Help B-Line Trikes Deliver Farm Fresh Goods to Portland Restaurants" Portland Monthly Rachel Sandstrom August 24, 2015 http://www.pdxmonthly.com/articles/2015/8/24/how-a-new-hq-will-help-b-line-trikes-deliver-farm-fresh-goods-to-portland-restaurants

# 8 Auckland Case Study

New Zealand has a population of 4.4 million. Auckland, located on the North Island, is the largest city in the country, with a population of 1.4 million. It is the main commercial and service centre for the country.

In 2015, Ports of Auckland, owned by Auckland Council Investments Limited, handled 972,434 TEUs of container cargo, 90 cruise ships, 243,000 auto imports, and 5.9 million tonnes of bulk and non-containerised cargo. It vies with Tauranga, 200 km to the south, as to which is New Zealand's largest port.

Cargo-handling facilities are located on Waitematā Harbour adjacent the Central Business District. In some respects the port and harbour resemble Halifax; if one looks out from downtown Auckland, on the left is a bridge, and on the right are cargo terminals and in the middle is Rangitoto Island. The harbour opens up into the magnificent Haurakai Gulf, as if Halifax Harbour was attached to St. Margaret's Bay or Mahone Bay.

Auckland boasts some of the best container terminal productivity in the world; its Fergusson Container Terminal handled 1,677 TEU per quay metre in 2015, compared with an average of 1,462 in South East Asia, the world average of 1,072, north Europe average of 931 and North America at 781. It also scores well in terms of TEU per hectare, at 25,553, compared with North Europe at 18,015 and North America at 11,016. South East Asia was well ahead, however, at 42,097. (Based on 2015 volumes, Halifax handled 6,666 TEUs per hectare and 239 TEUs per quay metre).

## 8.1 Freight Transportation

Two issues have dominated port planning for the past number of years: 1) container handling capacity; and 2) the ability to handle the largest cruise vessels at the existing terminal.

In 2013 a proposal that was brought forward to Auckland City Council by Ports of Auckland to infill parts of the harbour to expand two terminals did not receive the required approvals and resulted in the establishment of the Port Future Study Group. It was tasked with recommending a long term strategy for the provision of facilities to accommodate sea-based imports and exports as well as the cruise industry, taking into account competing uses for city centre waterfront space and the various impacts of options available. The Group examined four options: 1) constraining the port; 2) downsizing the port; 3) relocating trade volume; 4) growing the port; and 5) building a new port.

The Study Group considered a long list of potential sites for a new port, narrowing it down to seven (7). It concluded that the port could reasonably take 10 years to plan a move to another location, and have it operational in the 2030's. In the meantime, it should pursue options that will increase the productivity at existing container facilities, such as partial automation, and extend a couple of berths to accommodate cruise and container vessels. Ports of Auckland fully endorsed these findings.

## 8.2 Congestion Mitigation and Environmental Issues

At the same time as the Port Future Study Group was deliberating, the Auckland Transport Alignment Project was undertaken by a group of six stakeholders in the Auckland region. Their interim report asks two fundamental questions: 1) Should we build more; and 2) should we address demand? The emerging approach as of May 2016 was to promote three types of intervention: 1) influence travel demand patterns; 2) provide new infrastructure and services; and 3) make better use of existing networks.

The largest and fastest growing employment centre in Auckland is the city centre, and the city has a number of existing transportation alternatives, including autos, ferries, buses and commuter rail. It also has a number of major constraints similar to Halifax, such as a bridge connecting it to the north shore region and its location on an isthmus, which creates pinch points. It is looking at some interesting demand management tools such as variable network pricing and car sharing. Rather than investing in new infrastructure in the next decade, the report recommends concentrating on demand management, ITS technologies, route protection and land acquisition in growth areas, i.e. improving the productivity of the existing transport system. The Port Future Study suggested that spreading the timing of truck movements to reduce congestion impacts could alleviate some consequences of short term growth.

Ports of Auckland is committed to the development of inland terminals throughout the North Island. The port believes it has "to reach out to the hinterland and provide infrastructure which makes it as easy as possible for exporters and importers to get their goods to market." It also believes there is a lot of waste in the supply chain, particularly in the movement of empty containers around the country, that their network of freight hubs can reduce waste and reduce costs for their customers. "The network enables us to better balance the volumes of imports and exports so that we are not shipping out empty containers, but rather New Zealand exports".

Until recently, the sole inland terminal at Wiri, about 28 km from the port, was little more than an empty container depot. It is now being developed into an intermodal freight hub, with new cold storage and cross-dock facilities. “From south of Auckland, trucking companies can drop export containers off at the terminal and head back south with a backhaul, without the hassle of entering Auckland CBD. The same goes if they need to pick up an import container from Ports of Auckland; they only have to go as far as the Wiri inland port and not have to worry about heavy Auckland traffic further north.” All shuttle moves are carried out between the hours of 1800 and 0600. “This saves time and money and is a great way to help reduce pollution caused by vehicle emissions”. One of the big challenges was getting shippers to use the terminal. One incentive that has been tried is increasing the demurrage charged at the port and reducing it at the inland terminal. In marketing the facility, the port concentrates on the shipper rather than the shipping line, because the shipper gets better access to their cargo and containers.

Other terminals are being built at Longburn, 528 km away, Mount Maunganui, near Tauranga in the Bay of Plenty region, 220 km from Auckland; and Northgate, 90 km from the port. These will be operated by third-party logistics companies such as Nexus Logistics and Toll Holdings.

These inland terminals are also a counterpoint to their competitor, the Port of Tauranga, 200 km away, which has its own inland terminal, Metroport, located in the heart of Auckland.

Sustainability and the environment are paramount considerations for Ports of Auckland. The city itself has set a goal to be named the most liveable city in the world within the next 30 years, as measured by both the Mercer Quality of Living Survey and Economist Intelligence Unit’s Global Livability Report . The port’s 2014/15 Annual Report states “we are committed to further improving our sustainability and have achieved significant success with increasing rail use and the relative reduction in truck movements.” It increased the number of rail shuttles to the inland terminal at Wiri, from 8 to 21 per week, handling over 100,000 TEUs per annum and taking 53,500 trucks off local roads. Rail movements only represent 13% of overall container traffic, however, the port is committed to expanding its network of inland terminals and increasing the share of rail to 30% over the next 5-10 years.

The port has also endeavoured to reduce the speed of vessels sailing in the Haurakai Gulf, to protect the local Bryde’s whale population. The port considers its location next to the city as reducing its carbon footprint.

## 8.3 Land Use

A background study by EY provides some interesting insight into “social transformation” and its impact on ports, which has some applicability in the Halifax context. “As urbanization in the city continues and the population continues to grow, there is the growing challenge of accommodating a growing population and economy. Auckland is now clearly experiencing an urbanization renaissance and liveability phenomenon, epitomised by its clearly defined aspirations to be the world’s most liveable city, with a Maori identity that is its point of difference in the world.” Furthermore, “as the values of the city and its people have changed, the importance that they once placed on the role of the ports in the economy has shifted to valuing amenity and urban form over that of the ports contribution to the economy. The decision to relocate port activities away from the downtown core in the longer term supports this shift.

## 8.4 ”Last Mile” Urban Delivery Issues

According to the Foundation Report for the Auckland Transport Alignment Project, Auckland’s “freight task” is projected to increase by 78% over the next 30 years, with a significant majority of freight and commercial travel consisting of internal distribution within Auckland. Some of this internal demand is driven by international and inter-regional movements, with cargo being moved initially within Auckland before its final destination. While less visible, however, over 70% of freight kilometres travelled within Auckland are by light commercial vehicles such as couriers and delivery vans.

# 9 SYDNEY, AUSTRALIA CASE STUDY

Sydney is the largest city in Australia, with an estimated 5 million people as of 2016. The second largest is Melbourne, to the southwest, at 4.3 million. The country as a whole has 24 million inhabitants. New South Wales, where Sydney is located, is home to one-third of Australia's population and has the largest economy of any state. Sydney's container terminals handle imports such as electronics, furniture, white goods, and food, as well as Australian exports such as wine, farm produce, wool, cotton and wine.

Sydney is the second largest container largest port in Australia, handling about 2.2 million TEUs in FY2015. Melbourne is the largest at 2.5 million TEUs, followed by Brisbane (1.1 million TEUs) and Freemantle (700,000 TEUs). Australia has several massive coal-handling ports, such as Port Hedland, Dampier and Newcastle, which handled 372, 177 and 160 million tonnes respectively, in 2013-14. All of Australia's ports handled 1.2 billion tonnes in that period, more than twice the volume of all Canadian ports.

Australia was a relatively early participant in containerisation, with several consortia established to serve the trade by the late 1960s. Early terminals were established in the inner harbour at White Bay, Darling and Port Jackson, very close to downtown Sydney.

**Cargo Handling near downtown Sydney, 1970s[154]**

[154] Source: First Port Future Port: Celebrating 100 Years, chapter 6., p. 103.

Despite having the largest natural harbour in the world, by the 1970's, these facilities became constrained. Botany Bay, about 12 km south of the central business district, had been identified as a logical site for future port activity as early as the 1940s and the first container terminal opened there in 1979, followed by another in 1982. An A$512M expansion was started in 2006 and a third terminal, operated by Hutchison Port Holdings, was opened in 2013.

In April 2013, operation of Port Botany (and Port Kembla) was privatised—under a 99-year operating lease awarded to NSW Ports, a consortium of institutional investors. Sydney Ports Corporation—the previous owner and operator of Port Botany—retained ownership and operation of Sydney Harbour, and White Bay and Glebe Island terminals.

## 9.1 Freight Transportation

Freight planning and port strategy is taken very seriously in New South Wales (NSW). The NSW Freight and Ports Strategy[155] outlines key actions required to deliver improvements in network efficiency and capacity as well as delivering a sustainable freight network which balances efficient freight movements with community expectations and good environmental outcomes.

NSW Ports' Five Year Port Development Plan declared that the biggest issue port-related transport logistics chains is the provision of efficient road and rail connections to and from the port.[156] Moreover, "increased use of rail will reduce the growth in port-related truck movements, managing the volume of trucks on the shared road network".[157] A big priority for both the port and community is to increase the share of cargo moving by rail; in 2012-13, about 278,000 TEUs moved by rail only 14% of Port Botany's container trade.

NSW Ports expects their inland terminals to be an "essential" part of their future port supply chain.[158] They also want to locate empty container depots within or adjacent to stevedore terminals, to minimise truck movements in internal and surrounding port roads. Current growth forecasts indicate new container handling capacity will not be required for another 20 years, as it is estimated to be about 7.2 million TEUs. NSW Ports' focus is to improve the productivity and use of underutilised, vacant or underperforming parcels of land.

[155] NSW Government, "Freight and Ports Strategy", November 2013.
[156] NSW Ports, Five Year Development Plan, March 2014.
[157] IBID.
[158] NSW Ports, "Navigating the Future: NSW Ports 30 Year Master Plan", October 2015.

Similar to Vancouver and to a lesser extent, Halifax, NSW has a Freight Advisory Council, which assisted in the development of the NSW Freight and Ports Strategy and advises on strategic issues impacting efficiency and productivity within the freight industry. This includes all modes, not just containers. The Strategic Action Program considers that unused capacity is a waste of the investment in network infrastructure and that "pinch points, congestion and usage limitations all reduce the ability of businesses to perform."[159] It also recognizes that having good data helps inform the decision-making process.[160]

## 9.2 Congestion Mitigation and Environmental Issues

About 80% of the container cargo handled at Sydney is destined within a 40 km radius of Port Botany. The goods associated with this volume are either destined for the Sydney market or are unpacked at Sydney-based distribution centres, repackaged and distributed to regional NSW or other states.

Trucking congestion at Port Botany container terminals has been substantially reduced by regulations imposed by the NSW government under the Port Botany Landside Improvement Strategy. The regulations imposed mandatory performance standards for both truckers and terminal operators. They were initially enforced by Sydney Ports Corporation; with privatization of the port, this responsibility has been passed to Transport NSW.

Sydney has had one inland terminal in operation since 1947, at Cook's River, about 12 km from Port Botany and 18 km from downtown Sydney, where port terminals used to be located. This terminal is primarily used for empty container storage.

In May 2016, Sydney opened an Intermodal Logistics Centre (ILC) at Enfield, about 25 km from the city centre and 18 km from Port Botany. The project cost A$165M, and is operated by Aurizon, a publicly listed Australian rail freight operator, after Hutchison Logistics Australia withdrew its interest. A third terminal is being developed at Moorebank, about 33 km southwest of Port Botany.

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[159] "NSW Freight and Ports' Strategy", p. 51.
[160] Ibid., p. 53; see also Janette Sadik-Khan, *Streetfight: Handbook for an Urban Revolution*, (New York, Viking Press, 2016). Sadik-Khan was Transportation Commissioner in the Bloomberg administration. Bloomberg was obsessive about data and decisions relating to transportation investments were data-driven.

**Moorebank Intermodal Terminal, Artist's Concept**[161]


Currently about 20% of containers are moved in and out of the port by rail. With the development of the ILC and intermodal shuttle service, it is expected to increase to 40%. To be successful it was determined that a potential site had to have:

- Close proximity to the area it serves;
- Connected to a rail line;
- Within easy access of trucking routes;
- Located in an industrial area;
- Large enough to allow other freight-related activities to take place;
- A large market nearby; and
- Environmentally and socially sustainable.

It is expected that each train will carry between 60-80 TEUs. The Enfield ILC is built on a 60 ha site, with a 12 ha intermodal facility. Total capacity is expected to be 150,000 TEUs, with potential to grow to 300,000 with further expansion, and there will be enough space provided for six warehouses of 650,000 sq. ft.

[161] Source: http://www.micl.com.au/whatwillitlooklike/

It is expected that the ILC will resulting a competitive alternative to moving containers by truck and that "delivering containers closer to their origin and destination improves delivery cycle times and reduces trucking costs".[162] Empty container storage on site can further reduce costs and unnecessary truck movements, compared to current practice, where empty containers are generally trucked back to the Port Botany area. It is expected to reduce the reliance on road transport to and from Port Botany.

While there is an aspiration to move a greater percentage of freight by rail, there is also a recognition that truck volumes will continue to increase, from 3,900 per day in 2015 to 6,900 by 2045. NSW Ports "will advocate for investment in road infrastructure that provides efficient access to the port to meet forecast growth".[163]

The NSW Freight and Ports Strategy also addresses network efficiency, and advocates such measures as shifting more freight to off-peak periods, for port-related and city delivery activity. This will free up additional road capacity, but the concept will only work if the dispatch and receiving facilities are open. The requirements of commuter rail also impact the movement of freight, particularly during morning and evening peaks. Some expansion of the rail network is therefore required to meet growth expectations.

NSW Ports has an Environmental Management Plan[164] that provides an overarching framework for the management of port and port-related activities within those precincts.

Environmental management and community engagement is a paramount concern to NSW Ports. They are committed to the principles of sustainable development. They consider one of their main challenges to be maintaining and expanding port operations in an urbanising environment. This notion is in line with the state's overall objective to "balance freight needs with those of the broader community and the environment".[165]

Other environmental concerns include the impact of noise, traffic generation and emissions on adjoining neighbourhoods. These are considered in the planning process and mitigation measures are incorporated into these developments.

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[162] NSW Government, "NSW Freight and Ports Strategy", November 2013, p. 11.
[163] NSW Ports, "Navigating the Future", p. 47.
[164] NSW Ports, "Environmental Management Plan", 2013.
[165] NSW Freight and Ports Strategy", November 2013, p. 11.

## 9.3 Land Use

Urban encroachment near ports, intermodal terminals and around key freight road and rail corridors is a significant issue. The closest residences to operational sites are 200 m from Port Botany, 110 m from Port Kembla (another port operated by the organization), 60 m from the Enfield ILC and 100 m from Cooks River intermodal terminal.

NSW Ports also believes port and intermodal terminals require protection from urban encroachment and redevelopment to higher-value land uses such as residential, retail and commercial uses in order to operate efficiently.[166] This notion is in line with the state's Freight Strategy, which recommends identifying, and protection strategic freight corridors as well as embedding freight requirements in planning schemes.[167] The state is also examining the potential to use surplus national defense lands for cargo handling and logistics facilities.

In terms of land use planning, their approach considers:

- The appropriateness of land use zones as well as uses permitted within those zones;
- Identification of future freight requirements in order to protect the long term growth of those assets; and
- Reservation and protection of existing and future infrastructure corridors, including the identification of buffer zones.

They consider avoiding conflicting land use in the first place to be a better policy than attempting to mitigate those impacts once they occur. NSW Ports is committed to engaging and consulting with local communities and has several committees established for that purpose. "Community awareness and support is an important part of the long term operation" of the port.[168]

## 9.4 "Last Mile" Urban Delivery Issues

Transport NSW monitors and keeps data on the types of vehicles used in general delivery and urban goods movement. It had found recently that online shopping and direct home delivery will result in lower movements to retail centres, but some business areas (like downtowns) will need

[166] NSW Ports, "Navigating the Future…", p. 5.
[167] NSW "Freight and Ports Strategy…" pp. 17, 22.
[168] NSW Ports, Five Year Development Plan, p. 32.

more frequent deliveries as pedestrian traffic grows around them. Pressure for parking and loading zone space could increase competition for this space as well as congestion.

# 10 HELSINKI CASE STUDY

Finland has a population of 5.4 million. It is a so-called Nordic country and is considered to be one the Scandinavia countries as well. It borders Russia on the east and Sweden on the west, and is located across the Gulf of Finland from Estonia. Finland is a member of the EU and NATO and is in the Eurozone. Because of geopolitical factors and the poor state of road and rail connections through Russia to central and western Europe, Finland is highly dependent upon marine transportation.

At 1.4 million people, metro Helsinki is the largest urban area in Finland. Recent growth in Helsinki has been based on the information sector and telecommunications, although the latter has been affected by the struggles experienced by Nokia. The city has also benefited by clustering, particularly in telecommunications, food manufacturing, medical engineering, biotechnology, health services and shipbuilding. Like Halifax, Helsinki has benefitted from a highly educated labour force, its “highly advantageous logistical position”, high quality of local research activities and the presence of a number of institutes of higher learning.

The port of Helsinki mainly serves the capital city, but has rail and motorway connections throughout the country and east into Russia. In 2015, it handled 430,000 TEUs of containers and 516,000 trailers. Imports include consumer goods, while exports include forest products and steel. In terms of unitized cargo, exports outperform imports, amounting to 5.5 million and 4.8 million tonnes, respectively. The port handles about 30% of Finland’s foreign trade, while its share of passenger traffic is close to 80%.

Helsinki is also a large ferry and cruise passenger port. About 11 million passengers use the port each year; most are ferry passengers sailing between Helsinki and Tallinn, with another 436,000 cruise passengers. Ferry services operate to and from Tallinn as well as Stockholm and both Travemünde and Rostock, Germany. There is also a relatively new ferry service connecting Helsinki with St. Petersburg that attracted about 250,000 passengers in 2015.

Of a total of 10.41 million tonnes, major cargo markets are Estonia (3.5 m tonnes), Germany (3.43 m tonnes), the Netherlands (1.10 m tonnes), Sweden (0.67 m tonnes), Belgium (0.50 m tonnes), Denmark (0.39 m tonnes, Poland, the UK (0.31 m tonnes) and Russia (0.33 m tonnes), which are served by a combination of ferries, ro-ro and short sea container feeder ships. Overseas cargo is transhipped at Hamburg, Bremerhaven, Rotterdam or Antwerp.

The Port of Helsinki comprises three harbours: South Harbour, West Harbour, and Vuossari Harbour to the east of the city. They each have their own unique markets and are in transition. South Harbour is in the city centre and has several ferry terminals for services to Tallinn and Stockholm. West Harbour, which is being redeveloped has services to Tallinn and St. Petersburg. Vuosaari handles most cargo and has ro-ro, ro-pax and container feeder services to a number of markets.

## 10.1 Congestion Mitigation and Environmental Issues

The main cargo-handling area, for containers, in West Harbour began to become congested and in 1996, Helsinki City Council approved a plan to build a new harbour in Vuosaari, on a former shipyard located 15 km to the east. Construction began in 2003 and was essentially completed by late 2008.

In January 2009 the Port of Helsinki opened its new port facility at Vuosaari. It cost €682 million, and represents a real commitment to sustainable transportation. The terminal covers 240 ha, features two 750 m container berths and 10 cranes, as well as 15 ro-ro berths and a logistics park. Its maximum annual capacity is 1.2 million TEUs and 800,000 trucks and trailers. It is directly connected to a motorway and the national rail system.

**Vuosaari Terminal, Helsinki**

After completing the Vuosaari project in 2009, the city and port began to plan for the redevelopment of the Jätkäsaari district and West Harbour areas (see below). In 2015, it established a "Port Jury" together with the residents of these districts, "to consider the special questions related to the area".[169]

[169] Port of Helsinki, *Annual Report*, 2015, p. 5.

The port is now embarking on the development of West Harbour, adjacent the new Jätkäsaari district. It will include a new ferry terminal, dock and marshalling area, as well as reconfigured streets and roads, and public transportation, to minimize the impact on the new neighbourhood. It "invests in architecture, eco-friendliness and passenger comfort".[170] The new terminal will cater to Tallink Line's fast-growing Helsinki-Tallinn ferry service, as well as St. Peter Line, which operates to St. Petersburg. In 2015, the old terminal at this site handled 4.7 million passengers, 817,000 cars and 197,000 trailers, just between Helsinki and Tallinn. The terminal represents a total investment of €64 million, of which 30% will be contributed by other sources.

**Jätkäsaari District in relation to Helsinki city centre[171]**

[170] IBID., p. 7.
[171] Source: Jätkäsaari: A new maritime inner city district, City of Helsinki Planning Department.

Helsinki is not dependent on the Russian market and only 10% of Helsinki's cargo is "transit" cargo, i.e. moving beyond the metro region. With the vastly improved rail connection at Vuosaari, the port aspires to increase this to 20%, and is aiming at a larger percentage of the Finnish market.

The Vuosaari project vastly reduces the volume of trucking through the urban core of Helsinki. Heavy traffic between port sections has been eliminated. This amounted to 2,300 "lorries" and 900 trucks per day. This traffic was not permitted in the inner city, but was directed to routes around the city, through densely populated areas. Concentrating cargo at Vuosaari has resulted in heavy traffic being redirected to routes designed for goods traffic outside the inner city area. Vuosaari also has a 75 ha business park, including 50 ha devoted to logistics. A metro station is located 1 km away and is connected by public transportation.

In 2015, SA-TU Logistics built a new 4,000 m² facility at Vuosaari to serve the export containerisation of both the metals and forest industry. it provides short term storage, containerisation and unloading of containers of timber, plywood, and various steel items. It utilises a "load plate" device which aims to execute containerisation semi-automatically.

Moving cargo away from residential areas allowed for new residential areas to be developed within 5-10 minutes of the city centre, and a reduction in pollution and emissions from heavy vehicles. A new sustainable community is being developed which will feature the most advanced thinking and urban planning principles. "The urban structure is dense and the area has an effective public transport network based around the tram and metro. As presently envisioned, the Jätkäsaari district will be home to 16,000 residents and 6,000 jobs.[172] It will feature a greenbelt, a sports park, a beach and other amenities. Main streets are designed to accommodate pedestrians, bikes, short term parking, one lane of traffic and a tram. Residents will park underground.

Environmental planning was paramount in the development of Vuosaari. This is typified by the decision not to blast through a hill to build a rail and road corridor, but to construct a tunnel instead. It is 14 km in length; construction was scheduled to take place outside bird nesting

[172] "Jätkäsaari: A new maritime inner city district", City of Helsinki City Planning Department, 2009.

season, 1 April-31 July. Road and rail operations occur side by side, saving space and facilitating noise control and landscaping. To minimize the impact on nearby housing, "specialized structures {were} used between the rock and the rails. Stringent restrictions have been placed on the maximum levels of structure-born noise in the structures above the tunnel".[173]

Other measures have been taken to reduce emissions from ships, to receive and manage waste from ships, to reduce and treat any leakage from vessels and to use lighting that "diffuses radiation in the environment". Care has also been taken to ensure all buildings on the site are of a high architectural and aesthetic standard.

Interestingly, the shift of cargo operations away from central Helsinki is not universally applauded. There is a school of thought that argues that the while the new facilities at Vuosarri will undoubtedly improve the port's competitiveness, the closure of the city terminals will "strongly affect Helsinki's identity as a port city" and the city's characteristic port atmosphere shall be weakened.

## 10.2 Land Use

Helsinki's growth rate in the 2000's meant that it would have to start planning to accommodate an additional 25-30,000 residents by 2020. (The 2013 Helsinki Plan anticipates an additional 600,000 by 2050)[174]. A number of sites were considered outside the city, which would have entailed longer commutes and extensive roadway construction. The alternative locations were located 26 km away from the city centre and it was felt that "this would fragment the urban structure of the region and result in total extra driving of some 73 million km annually.

It was felt that "concentrating the cargo ports in Vuosaari and giving the inner city areas thus freed over for housing, jobs and recreation will have a positive impact on the environment and the whole regional structure".[175]

[173] "The Vuosaari Harbour Project and the Environment", Helsinki City Environment Centre, June 2005.
[174] Helsinki City Plan: Vision 2050, Helsinki City Planning Department, 2013.
[175] IBID.

# 11 GOTHENBURG CASE STUDY

At 9 million people, Sweden is the largest country in Scandinavia and the fourth largest country in the Baltic region after Russia, Poland and Germany. It is a very rich and sophisticated market. Gothenburg is the second largest city in Sweden, with a metropolitan population of 920,000. Its economy is built on several business clusters including the auto industry, biomedicine, the food industry, logistics, transportation, design, ICT, finance and shipping.

It is the largest port in Scandinavia, handling over 42 million tonnes overall, as well as over 900,000 containers and another 535,000 short sea trailers. It is also a ferry port, handling over 1.6 million passengers.

Gothenburg is a gateway for the whole Nordic and Baltic region. Almost 30% of Sweden's foreign trade passes through the port and about 70% of Nordic industry is located within 500 km of the port.

## 11.1 Freight Transportation

Port operations were recently privatized. The Gothenburg Port Authority is a private company and its container terminal is operated by APMT (a division of the A.P. Moller Group which owns Maersk Line). The roll-on, ro-off terminal is operated by a combination of DFDS (A Danish short sea operator) and Cobelfret, (a Belgian short sea operator). The container terminal was recently expanded to accommodate the world's largest vessels, and the port plans to build a new short sea terminal for European cargo.

Gothenburg is connected to its hinterland through a network of rail shuttles as well as close, mid-range and distant dry ports. In 2015, the port handled 850,000 TEUs of containers, and 532,000 short sea roll on-roll off units and 1.7 million ferry passengers.

The port's strategy is to become a hub for the Nordic region, and to "collect large enough quantities in one place" to justify having the largest vessels call there.[176] It views consolidation of freight to be "vital" to Sweden's competitiveness.

[176] Port of Gothenburg, "Sustainable Port: Sustainability Report of Gothenburg Port Authority", 2014.

Gothenburg has 70 daily rail shuttles to a total of 24 inland destinations. The percentage of cargo handled by rail has increased substantially in recent years, from 46% in 2012 to 53% in 2014, and volume has grown from 125,000 TEUs in 2000 to 406,000 TEUs in 2014.

Part of the port's strategy is to have "strong, sustainable freight hubs creating added value" for their customers. Chalmers University of Gothenburg and several academics there have actively promoted the concept of "dry ports".[177]

**Göteborg Kombiterminal[178]**

## 11.2 Congestion Mitigation and Environmental Issues

In 2011, heavy vehicle traffic accounted for 7-15% of the total traffic on Gothenburg's roads and the proportion decreases the closer they get to the city centre.[179] Most of this traffic is port-related.

As one of the biggest ferry, short sea and container feeder transhipment locations in Europe, the port and city are well aware of the environmental benefits of short sea shipping and rail transportation vs road.

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[177] See Violeto Roso, "The Dry Port Concept", PhD thesis, Chalmers University of Technology, 2009.
[178] Source: http://www.jernhusen.se/Foretag/gods-kombiterminaler/Goteborg/

[179] Azadeh Moazami and Sayeh Noroozi, "Urban Freight Transport in the context of Urban Development", MSc thesis, Chalmers University of Technology, 2011, p. 31.

The Port of Gothenburg has built a 1 million m² logistics park immediately adjacent its ro-ro and container handling facilities. The facility is directly served by rail and can distribute import cargo via numerous rail shuttles, or deliver cargo from the hinterland that is transloaded close to the port.

One of the port's rail shuttles is operated by Green Cargo AB to a dry port 10 km from the port. This shuttle operates 6 times per week. It also has an intermodal freight centre (IFC) or cargo village at Gullbergsvass. The city would like to move this terminal to free up additional land for urban development that would be close to downtown, and is looking at another site at Sävenäs, about 7 km away, but only 15 km away from the container terminal.

The port has reduced tariffs by 20% for all vessels using low sulphur LNG fuel and has built facilities for all vessels to plug into the electricity grid (cold ironing) instead of idling on their generators burning fossil fuel. Gothenburg partnered with Rotterdam to ensure develop an LNG supply chain, so that Gothenburg could play a key role in supporting the use of LNG fuel in the Baltic.

**Port of Gothenburg Logistics Park[180]**

[180] Source: Gothenburg Port Authority

Gothenburg's biggest shipowner, Stena Line, which is also the biggest ferry operator in the world, is also experimenting with the use of methanol as an alternative to conventional marine fuels and as an answer to the low sulphur regulations that came into effect last year.

The port has also decided to adopt the city's environmental program, as port and logistics activities are vital to the city's economy. Gothenburg's Environmental Plan[181] focuses on four components to achieve its overall objectives: 1) Buildings; 2) Transport: 3) Nature; and 4) Consumption.

The Plan places great emphasis on public transit and cycling; about 25% of journeys are made using public transport but only 10% by bicycle, far below other Scandinavian cities. Gothenburg aspires to have 40% of trips made by bicycle and is building more bicycle paths, bicycle parking facilities and bike-sharing. Like Copenhagen, it is building "motorways-for-cyclists" to connect the various neighbourhoods and regions of the city. The city also aims to double the use of public transportation and recognizes it needs to make suitable investments to make sure that happens.

## 11.3 Land Use

Transportation figures prominently in Gothenburg's city planning and land use strategy. Similar to other cities elsewhere, Gothenburg wants to curb urban sprawl and to densify. The city would like to build 30,000 housing units in the vicinity of the Gulbergsvaas intermodal terminal, as this site is close to downtown and the central railway station. One of the remarkable features of Gothenburg's city planning is the way it has been able to transition from industrial, to brownfield to new urban neighbourhoods, particularly along the riverfront where shipyards used to build ships.

## 11.4 "Last Mile" Urban Delivery Issues

Gothenburg is experimenting with small-scale distribution centres for inner city deliveries. On one micro terminal located at Chalmers University, goods and waste are being consolidated for approximately 15 schools and companies. Low speed electric powered vehicles combined with specially designed trailers are used to distribute the goods to the receivers and collect sorted waste fractions. Elsewhere in the city, small deliveries are consolidated and delivered in zero

[181] City of Gothenburg, "Gothenburg and the Environment: A Little Book about the Environmental Work in the City of Gothenburg", 2010

emission vehicles. Another specialized service is being developed to deliver seafood to local restaurants.

The city has also established a Local Freight Network to discuss city distribution with different stakeholders.[182] Thus far (as of 2011), it has introduced the following measures:

- Pedestrian streets with time windows for local deliveries.
- Length regulations for delivery trucks (10 m).
- Early morning distribution.
- Authorized vehicles in local environmental zones.
- Collaboration on local deliveries.
- Improvements in route planning.[183]

[182] Ibid., p. 36.
[183] Magnus Jäderberg, “City of Gothenburg Local Freight Network”, presentation, 2011.