600 NE Grand Ave.
Portland, OR 97232-2736

Metro | *Agenda*

2018 REGIONAL TRANSPORTATION PLAN UPDATE

Regional Freight Work Group - Meeting # 2

Date: May 23, 2016
Time: 10 a.m. – 12 p.m.
Place: Metro Regional Center, Council Chambers
600 NE Grand Avenue, Portland, OR 97232

Agenda items

10:00	**Welcome, and introductions**	All
10:10	**Existing Regional Freight Network, Freight Policies and Vision** *Review existing freight network and supporting freight policies.*	Tim Collins
10:20	**Funding Opportunities, Constraints in the Freight System, and Freight Modal Needs** *Discuss state and federal funding opportunities (FASTLANE), provide feedback on freight bottlenecks and freight modal needs.*	All
11:00	**Draft Key Freight Trends and Logistics Issues Report** *Summary of what's included and needed input for final report.*	Tim Collins
11:30	**Corridor Bottleneck Operations Study (CBOS) Project Atlas** *Review purpose and approach; and discuss unfunded bottleneck projects as they relate to freight and goods movement.*	Alan Snook (ODOT)
11:50	**Next steps** *Early September meeting to cover RTP freight performance measures and potential FASTLANE federal grant application projects.*	Tim Collins
12:00	**Adjourn**	

Meeting packet:

- Agenda
- Draft Key Freight Trends and Logistics Issues Report
- Summary of Commodities Movement and Key Freight Trends (available at meeting)
- Draft Corridor Bottleneck Operations Study Project Atlas Summary
- Regional Freight Plan (June 2010) - Freight Goals within a Regional Policy Framework
- 2014 RTP Regional Freight Policy section
- Federal FASTLANE Grants Summary (available at meeting)

Irving Street Garage visitor parking policy
Visit our website for a list of parking options for visitors conducting business at the Metro Regional Center: http://www.oregonmetro.gov/metro-regional-center

Getting there by moving freight

2018 Regional Transportation Plan update

2018 REGIONAL FREIGHT STRATEGY

Key Freight Trends and Logistics Issues Report

May 2016 - Draft

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Metro is the federally mandated metropolitan planning organization designated by the governor to develop an overall transportation plan and to allocate federal funds for the region.

The Joint Policy Advisory Committee on Transportation (JPACT) is a 17-member committee that provides a forum for elected officials and representatives of agencies involved in transportation to evaluate transportation needs in the region and to make recommendations to the Metro Council.

The established decision-making process assures a well-balanced regional transportation system and involves local elected officials directly in decisions that help the Metro Council develop regional transportation policies, including allocating transportation funds.

Project website: www.oregonmetro.gov/rtp

The preparation of this report was financed in part by the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration. The opinions, findings and conclusions expressed in this report are not necessarily those of the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration.

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INTRODUCTION

The Portland metropolitan region is the trade and transportation gateway and economic engine for the state of Oregon. Metro is working with the Port of Portland, Oregon Department of Transportation (ODOT), local government partners, and representatives of the freight community to develop a regional freight strategy that updates the 2010 Regional Freight Plan. Development of the Regional Freight Strategy will occur from October 2015 to fall of 2018. The Regional Freight Strategy (RFS) will serve as the freight component of the 2018 Regional Transportation Plan and provide a coordinated vision and strategy for moving commodities and enhancing access to global, national and regional markets, connections to and between marine and airport terminals, industrial areas, intermodal facilities, rail yards and other key freight destinations in the Portland metropolitan region. This report serves as the first work product in the work scope for the Regional Freight Strategy, and will highlight the key trends and challenges for the regional freight system, and summarize freight plans and freight logistics analysis that have been completed since the 2010 Regional Freight Plan was completed.

FREIGHT PLANS, FORECASTS, STUDIES AND LOGISTICS ANALYSES FROM MARCH 2012 TO PRESENT

Export Plans and International Trade's Economic Impact

The following summarizes the freight plans, freight studies and freight logistics analysis that have been completed since the 2010.

Greater Portland Export Plan – Metro Export Initiative (March 2012)

In the 2011 National Export Strategy, the Trade Promotion Coordinating Committee (TPCC) of the federal government cited the importance of metro areas in boosting national exports. As the strategy notes, "Metropolitan areas produce 84 percent of the nation's exports and are home to unique concentrations of capital, investment, and innovation." Portland is a prime example of a metro region where export growth is leading the way to economic competitiveness. Export-focused trade missions and direct assistance to companies demonstrated that an assertive region, coordinating with state and federal resources, could offer significant value to new-to-export and new-to-market companies.

Key stakeholders in Greater Portland decided to pursue a comprehensive export strategy. The region competed for, and was selected, as one of four pilot metros in the nation to partner with the Brookings institution on a Metro Export initiative (MEi). The Greater Portland MEi aims to convene and focus the regional trade community across traditional political boundaries, establishing shared export objectives across different agencies, levels of government, and the public and private sectors. The Metro Export initiative (MEi) is coordinated from the offices of Greater Portland Inc. (GPI), the region's public-private economic development organization.

There were three primary deliverables of the Greater Portland Export Plan: 1) A Market Assessment; 2) an Export Plan; and 3) a Policy Memo.

Key Findings of the Market Assessment

1. The great recession that started in 2008 was deeper in the Portland region than in the nation as a whole. The region shed 80,000 jobs – 7.4 percent of its total employment – between March of 2008 when the local recession began and December of 2009 when it ended (based on Brookings analysis of Moody's Analytics data). Unemployment peaked in June of 2009 at 11.2 percent of the labor force and stayed above 10 percent until February of 2011 (based on Bureau of Labor Statistics 2011).

2. The Portland region has been near the forefront of economic recovery. The Portland region recovered jobs at a faster rate than the nation and saw unemployment fall nearly twice as fast, from its peak of 11.2 percent to 8.5 percent in December 2011 (based on Bureau of Labor Statistics 2011).

3. Exports are at the core of the region's economic resilience and potential. Between 2003 and 2010, Portland increased its export volume by 109.3 percent, creating 45,863 new jobs. This growth made Portland the second-fastest growing export market among the 100 largest metropolitan areas. The region was 12th largest by volume in 2010, with $21 billion in exports, and had the third highest export intensity, with exports accounting for 18.2 percent of its economy.

4. A handful of companies and clusters drive much of the region's export strength. Ninety percent of the region's exports in 2010, and ninety-two percent of the export growth from 2003 to 2010, came from the region's top 10 exporting industries. The region's largest export industry is the computer and electronic products industry which accounts for 57 percent of total exports and 63.4 percent of export growth.

5. The region's more latent export strengths show strong potential for growth. The region's manufactured goods and service exports also play an important role and make the region one of the nation's more balanced metropolitan export markets.

6. The region's identified clusters are not reflected in the region's export strengths. This represents an opportunity for new export growth.

7. The region's economy is rich with small and mid-sized companies that have limited awareness of global opportunities. Many of the smaller companies have trouble getting out of the gate to pursue exports. Companies most frequently cited their limited knowledge of foreign export opportunities as the most significant challenge to expanding into new markets.

8. Small and mid-sized companies in the region fear the risks and hassles related to exporting. Several interviewees said they wanted to export, but did not know how to navigate the many risks involved.

9. The region's most successful exporting companies are intentional about exporting. Companies acknowledge that pursuing business opportunities in new foreign markets requires significant resources and persistence.

10. The region boasts a good quality, yet fragmented export service system. Though the region has a good set of export services providers to support, advise and direct companies through the many obstacles to exporting, the system has gaps and is reactive in nature. Companies are often not aware of, or do not fully understand the export services available to them, and do not know who to go to for help. As a result, only 21 percent of firms report having received assistance from these service providers.

The export plan

Goal: Consistent with the national export initiative, the Greater Portland Metro Export Initiative aims to double exports in five years.

Objectives: Based on the key findings from the market assessment, the Greater Portland Metro Export Initiative has three primary objectives designed to support the region's vision for export growth:

1. Create and retain export-related jobs, and maintain the region's standing as a leading export region.

2. Diversify export industries, increasing the number of companies exporting and the markets they access.

3. Create a strong local export culture and a global reputation for our region as a competitive trading region.

Strategies: Greater Portland Metro Export Initiative proposed four core strategies designed to best drive attainment of the goals and objectives:

1. Leverage primary exporters in the computer and electronic products industry.
2. Catalyze efforts under exporters in the manufacturing sector.
3. Build and improve the existing export pipeline for small business.
4. Use "We Build Green Cities" as a brand and market Greater Portland Inc.'s (GPi) global edge.

Policy:

Part of the purpose of the MEi is to identify impediments to export growth, and to propose policy corrections for improved export performance. Greater Portland Inc gathered initial policy recommendations during the development of the Mei for both federal and state/local policymakers on the following topics:

1. Funding for export led growth
2. Metro-wide level of export tracking data
3. Freight strategy to support export growth
4. Effective land use and tax structure
5. Movement of people and ideas
6. Alignment of performance measures

Additional details related to regional export policy recommendations are in a separate Greater Portland Inc Export Policy Memo.

The Traded Sector in Portland's Regional Economy (April 2012)

In December 2010, the Value of Jobs Coalition began an effort to gain a better understanding of the Portland-metro region's economy. As a continuation of that effort, this study focused on the Portland-metro's traded sector and shed some new light on why the traded sector is a critical part of the region's economy.

The study revealed the following reasons why the Portland-metro should support a strong and healthy traded sector:

- Expanding the Portland-region's traded-sector firms can help small business and inspire business creation. On average in 2011, 32 new businesses were created in Oregon for every 10,000 adults. This was comparable to the US average but represents a decline in job creation from the rates in 1999 to 2001.

- Generating more traded-sector jobs may increase family incomes because, on average, traded-sector workers earn about $15,300 more per year.

- The traded sector is competitive and changes over time. To be successful in growing, retaining and attracting future traded-sector jobs, the region must invest in its human, natural and physical capital.

What is the Traded Sector? How does it differ from the Local Sector?

The traded sector includes industries and employers which produce goods and services that are consumed outside the region where they are made. The local sector, on the other hand, consists of industries and firms that produce goods and services that are consumed locally in the region where they were made.

Most forms of manufacturing, specialized design services, advertising and management, and technical consulting are classified as traded in this analysis. Retail trade, construction, healthcare, education, real estate and food services are found in all metropolitan areas and mostly fall into the local sector.

The traded and local sectors differ in these important ways:

- Historically, the amount of output (or "value added") per job has been higher in traded sector industries.

Across industries, one can compare the value of the output (related to Gross Domestic Product) to the number of jobs required to produce it. The division yields a measure of value added per worker. If a job in the US is tied to the global supply chain and has a low value-added, it is at risk of being outsourced to a foreign location where labor is less costly. In manufacturing, for example, a combination of outsourcing and automation over the past several decades has eliminated lower value added US jobs in the traded sector. Such dynamics are less prevalent in the local sector.

- The growth in value added per job in the traded sector accelerated during the past decade and outpaced the growth in value added in the local sector.

The traded sector had a surge in value added per worker in a number of sectors. Notably, the electronics sector expanded exponentially the computing power available at a given price.

- Workers in the traded sector tend to be better educated, work more hours, and earn higher average wages.

On average, traded sector workers earn more than local sector workers. In Portland, the average annual wage for traded sector workers is $51,600 and the average annual wage in the local sector is $36,300. Consistent with this result, traded sector workers are also more likely to have a college degree and are more likely to work full time.

Executive Summary

The study contains the following findings from the executive summary:

1. Portland's traded sector pays higher wages, on average ($51,600 vs. $36,300), employs more full-time workers (70% vs. 56%), and employs more college graduates (40% vs. 31%) than the local sector.

2. The traded sector is not static and changes over time. Over the past 40 years, the share of traded sector employment in the traded goods sector has declined substantially as employment in traded services has grown. In Portland, the traded sector is constantly in flux as old industries die, new industries emerge, and industries move from one region to another. Over the past 40 years, the largest traded sector industries changed from wood products, agriculture, and shipping to electronics, computers, and other business services.

3. Variation in regional economic performance is tied to differences in the composition and performance of regional traded sectors. Across metro areas, the traded sector typically makes up 35 to 40 percent of total employment, however, the industries that comprise each area's traded sector differ.

Over the past 40 years, Portland's traded goods sector has performed well – increasing employment and wages at a rate faster than the US metro average, however, over the past 10 years, Portland's traded goods sector has lost employment and wages have fallen.

4. Empirical research confirms that the health of a region's traded sector significantly affects regional employment growth, income growth, and housing prices. Growth in the traded sector generates growth in the local sector, more people and more money means more customers for local businesses. On average, one additional traded sector job creates 1.6 local sector jobs. The traded sector also significantly influences regional income and price differences. Higher productivity and wages in the traded sector generate higher wages in the local sector and higher wages throughout the region tend to increase the cost of living.

5. Over the long-run, variation in traded sector (and thus regional economic) performance across regions stems from differences in regional economic capacity (e.g., natural resources, workforce skills, transportation infrastructure, social norms and governing institutions, innovative ability).

Conclusions

Over the past several decades, the US traded sector has shifted from predominantly goods producing to predominantly services producing. This transition can be linked to growth in global trade and technological changes.

The Portland metro region benefits from a strong base of traded sector jobs, and there are numerous reasons to grow and strengthen the Portland metro region's traded sector; New money introduced in the economy; potentially higher wages for local and traded-sector workers; and potentially higher entrepreneurialism and small business growth.

For state and regional policy-makers, the challenge is to determine what factors help or hinder both our traded goods and traded services sectors and develop a strategy for nurturing those factors that encourage the location, formation and growth of traded sector firms.

While the Portland-metro region has certain "fixed" natural and physical advantages for some traded sector firms, employers rely on "un-fixed" resources such as: An educated and trained workforce, modernized infrastructure, available land supply and a favorable business climate. Public and private sector leaders must work together to ensure that the Portland metro region's natural, physical, human and social capital is up to par for traded-sector firm needs. This means the following are needed:

- Investments in education as well as trade programs and research institutions;
- Modernized, affordable infrastructure that provides access to market;
- Sufficient supply of market-ready, developable land; and
- Tax structures that encourage investment and economic growth.

International Trade and the Portland Harbors Impact (2013)

General Overview:

This report was part of a series produced for the Value of Jobs Coalition to track and understand the opportunities and challenges in the Portland metro region's economy. This report includes summaries from three related studies: The first study was an update of international trade trends; the second study was an assessment of the Portland Harbor's economic impact; and the third study was an economic analysis of trade based businesses.

The second and third studies are about the connection between international trade and businesses engaged in trade activities, examining the economic impact of the Portland Harbor and that of five marine industrial businesses. The study about the Portland Harbor, including the Port of Portland, sheds some light on the harbor's economic impact – including income earned by the businesses that operate there and employees who work there.

The third study drills down even further into five marine industrial firms, demonstrating how traded sector businesses catalyze the region's economy, creating more local sector jobs through their procurement of goods and services.

The findings of each study show that, with access to one of the best multimodal transportation hubs on the West Coast, Portland-metro and Oregon businesses continue to rely on, and reap huge benefits from, efficient connections to domestic and international markets.

International trade trends (1st Study):

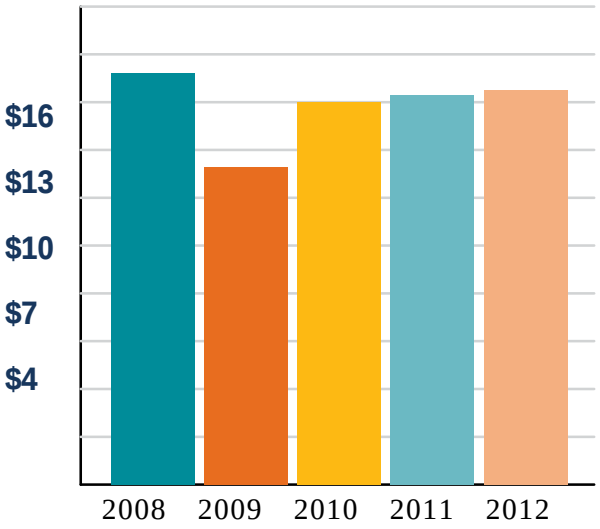
Key Findings

- The Portland-metro region exported one-fourth of its economic output in 2012.
- On the state level, goods exports accounted for 8.4 percent of Oregon's GDP in 2011.
- Oregon manufacturers and their workers depend on foreign customers for one in every four sales dollars.
- Oregon manufacturers and their workers depend on foreign customers for one in every four sales dollars.
- Overseas investment continues to provide regional jobs. During 2010, nearly 43,000 Oregonians worked for overseas-based companies throughout the state.
- Recent studies have found that workers in export industries and firms earned substantially more than those in non-exporting businesses. A previous 2010 Value of Jobs study concluded that export-related jobs pay on average18 percent more than non-exporting jobs across all industries.

Trends in Goods and Services Exports

In 2012, all exported goods from Oregon reached $16.5 billion as shown in Figure 1. Compared to 2008, this total was down from $17.2 billion (about 6 percent), but represented a third successive year of post-recession growth.

Figure 1: Oregon-made goods exported to the world, 2008-2012 (Value in billions of dollars)

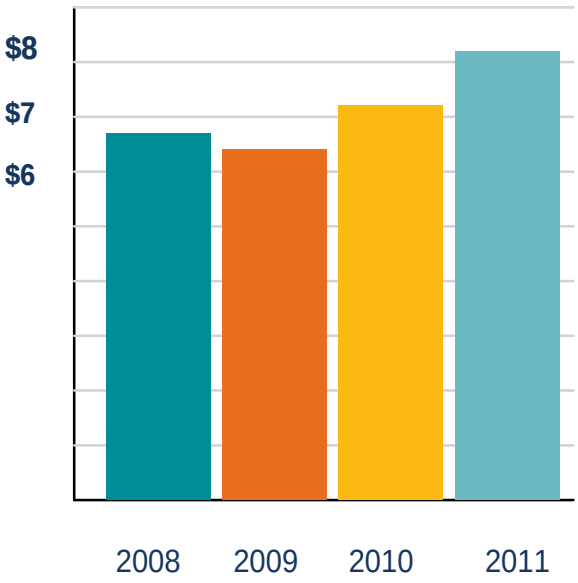


Source: U.S. Census Bureau

Ten leading sectors continue to account for the majority of Oregon's exported goods; in 2012 they were responsible for 88 percent of export revenue. However, nearly 40 percent could be attributed to just one sector – computers and electronics. Machinery, chemicals and transportation equipment together represented about 27 percent of total merchandise exports.

Exported services are increasingly important to the region's economy, which in 2011 totaled $8.2 billion (see Figure 2). Compared to 2008, this total was up from $6.7 billion. Particularly important is the export of technical services such as industrial process royalties, software licenses, and research and development.

Figure 2: Oregon's services exports to the world, 2008 to 2011 (Value in billions of dollars)



Sources: The Trade Partnership from U.S. government and private industry data

Oregon Imports as an Economic Driver

More than $16 billion in goods were imported to Oregon in 2012. More than 65 percent of the imports were raw materials, processed raw materials and components, and machinery and industrial equipment used by farmers, manufacturers and others to produce goods and services in Oregon.

Additionally, by providing access to lower cost materials, imports continue to play an important role enabling regional manufacturers and service providers to compete for sales in global, national and regional markets.

Portland Harbor's Economic Impact (2nd Study)

Overview

While the first section of this report looks at the macro level of international trade, this second report is focused on the economic impact and local benefits of all Portland Harbor activities. These activities include private terminals, manufacturing areas and public terminals owned by the Port and leased to private entities. Together harbor-related firms earned $1.5 billion in income and of those earnings, spent $1.47 billion with local businesses.

The harbor area is where all major cargo vessels come into the Port of Portland, taking goods in and out of the region to other cities around the globe.

Portland's intermodal connectivity – serving as a hub for goods moving from sea, to rail, to river, to road – gives Portland-metro a competitive advantage, but new investments are needed to stay competitive.

For example, Port investments designed to expand auto-import facilities and attract a major potash trader have paid off with new investments and jobs in the region. Portland is now the second largest auto import gateway on the West Coast and the largest potash exporter in the U.S.

Key Findings

- More than 7,000 jobs – from longshoremen and barge operators to accountants and administrators – are directly tied to harbor activities in 2011.
- An additional 4,000 jobs are indirectly supported by harbor activities, such as vendors who supply goods or services to harbor businesses but are not directly engaged in trade in 2011.
- Another 7,000 jobs throughout the region are supported by the spending of employees of harbor businesses, also called induced jobs in 2011.
- About half of direct trade-related jobs are with the Port of Portland.
- Harbor-related jobs are generally higher paying than the average wage for the Portland-metro region, sometimes substantially so.
- Harbor-related business spending amounted to $367 million in direct economic activity such as payroll for employees and procurement of local goods and services in the Portland-metro area.
- Harbor-related businesses generated an additional $200 million in indirect economic activity in 2011

Economic Analysis of Trade-based business (3rd Study)

Overview

This last study took a deeper dive into businesses that are engaged in trade-related activity and how those activities then translate into dollars spent in the local Portland-metro economy.

By looking at the relationships between large local marine industrial businesses and small to medium sized businesses that serve as their vendors and suppliers, one can see the connection between the traded and local sectors. Five such firms were interviewed about their spending on direct and indirect materials, services and capital over a two-year period, 2011 and 2012. In those two years, the five marine industrial businesses spent $1.29 billion with more than 50 percent of that spent with local firms.

Key Findings

- Marine industrial businesses have a significant economic impact on local business. In 2012 alone, the five firms surveyed spent $660 million on goods and services, of which more than 40 percent, or $264 million, was infused into the local economy.
- More than 80 percent of the $264 million in local spending by these harbor firms is for raw materials and components, and professional services, maintenance, catering and other services.
- Local firms supported by these dollars include those involved in planning and architecture, engineering, law, transportation, graphic arts / media production, software and information technology, advanced manufacturing plant production equipment, energy and utilities, and skilled trades such as electricians.
- About 288 local employers are supported by these harbor businesses.

- Even if spending on capital goods, materials and supplies goes to national or international firms, many maintain a local presence such as a distributor, service center, or local warehouse, with local employees and representatives.

The economic analysis projects that all marine industrial businesses spend between $6-7 billion a year, driving a significant portion of the local sector economy.

Global Trade and Investment Plan – Greater Portland Global (March 2015)

Greater Portland Global, a global trade and investment plan, draws on the region's work in the Global Cities Initiative, a joint project of the Brookings Institution and JPMorgan Chase, to integrate exports and foreign direct investment (FDI) into one strategic plan that replaces the Greater Portland Export Initiative and escalates global engagement to realize a stronger regional economy.

Exports and foreign direct investments (FDI) are integrated parts of global business, but until now they have not been unified under a coordinated regional approach. The interaction between exports and FDI are highlighted by these facts:

- Foreign-owned companies account for 20% of U.S. exported goods. In Portland, foreign-owned firms like Daimler Trucks North America are among the largest exporters.
- FDI is relatively concentrated in advanced industries and manufacturing, with 18% of U.S. manufacturing jobs in foreign-owned companies, many of which are strong exporters. In Portland, examples include Wafertech, Evraz, and Fiskars.
- Foreign students and tourists, which considered as a service export for the region, are key links for potential future FDI.
- Some FDI is part of a value chain that involves importing into the U.S. from a foreign market, adding value adding value, and then exporting to a foreign market.

Greater Portland sees the link between exports and FDI as a three-step interaction:

Key Findings from the Foreign Direct Investment (FDI) Market Assessment

Greater Portland conducted an in-depth FDI market assessment in the summer/fall of 2014 to serve as a foundation for the development of FDI components of Greater Portland Global. The assessment includes Brookings data benchmarked against other metropolitan cities and more than 35 one-on-one interviews with local companies and FDI service providers.

Key Finding No. 1

The Greater Portland region lags in FDI behind other comparably-sized metropolitan areas. According to the Brookings Institution, the region is the 23rd largest economy in the U.S., yet 29th in total FDI employment and 50th in FDI employment intensity. Employment growth in Greater Portland's foreign-owned enterprises (FOEs) has only been 1.6% annually since 1991, which ranks 67th out of the top 100 U.S. metros.

Key Finding No. 2

FDI has been concentrated in the region's legacy and established advanced manufacturing industries, specifically motor vehicle manufacturing and computers and electronics. Similar to national trends, FDI has gravitated to the region's manufacturing industries, accounting for 42 percent of total foreign-owned establishment employment.

The importance of Intel—the state's biggest exporter—and its supply chain as an attractor of foreign investment cannot be overestimated. The high concentration of foreign owned enterprises (FOEs) in the semiconductor sector—3,200 jobs or 7.8 percent of FOE jobs—is proof of this strong investment by European and Japanese companies. Silicon expertise also set the stage for the investment by German manufacturer SolarWorld.

Key Finding No. 3

Germany and Japan are responsible for a large concentration of FDI in the region. Together, these two countries account for 43 percent of total foreign-owned employment in the region, with Switzerland a distant third at 8 percent. While German FDI is centered on landmark investments in the region by Daimler and Adidas, Japanese investment is spread across a larger number of firms and a variety of sectors.

Key Finding No. 4

The region's strategic positioning on the Pacific Rim is not reflected in the region's FDI partners, outside of Japan. Almost 30 percent of regional exports go to three East Asian countries: China, Japan and Korea. Yet – outside of Japan, the region's second largest FDI partner ranked by employment – Korean and Chinese investment has largely not flowed into the region.

Key Finding No. 5

Greenfield investment, followed closely by mergers and acquisitions (M&A), has driven the region's growth in employment under foreign ownership. FOE jobs have boosted the regional economy, which gained a net 11,000 jobs from FOEs, and this growth occurred predominantly in FOEs that technically have a small business presence in the region, employing 51-250 people, even if the parent company may be a large business.

The data confirms what FOEs stated in interviews: the region is attractive as a "beachhead" to North American markets; its attraction is further buttressed by assets such as cheap electricity and abundant water and the highly developed talent pool of established sectors such as athletic and outdoor and computers and electronics.

Key Finding No. 6

Traditional business retention and expansion (BR&E) strategies can play a large role in retaining and increasing FDI. Daimler's 1981 acquisition of local legacy manufacturer Freightliner Trucks has resulted in the acquired company's growth and the foreign parent's continued commitment in the region.

Key Finding No. 7

Large-scale foreign capital flows have yet to enter the local market. Interviewees reported that large foreign investors view the region as a "Tier Two" metro, lacking the reputation and strong returns of investment havens like New York, Los Angeles and San Francisco. Nonetheless, reports have emerged of

"under the radar" interest and investment activity by foreign investment banks, private equity firms, and sovereign wealth funds.

Key Finding No. 8

Greater Portland's emerging sectors show strong potential for growth. In recent years, innovative sectors such as green building, clean tech and software which are growing at home –have begun to establish excellence internationally and drive investment locally from mergers and acquisitions.

Key Findings from the Export Market Assessment

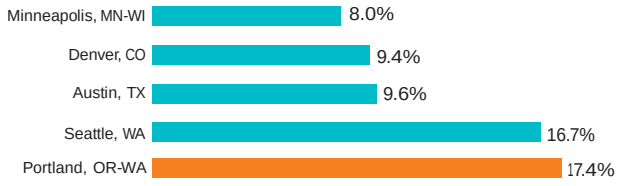
Greater Portland conducted an in-depth export market assessment in 2011 to serve as a foundation for the development of the original Greater Portland Export Initiative. The assessment included Brookings data benchmarking against other metros, a survey of 268 local companies, and more than 40 one-on-one interviews with local companies and export service providers. Economic data from Brookings was updated in 2014 during the creation of Greater Portland Global.

In addition to the information gained from the initial market assessment, the region has embarked on a three-year education initiative around exports and effective service delivery through the implementation of the Greater Portland Export Initiative.

Key Finding No. 8

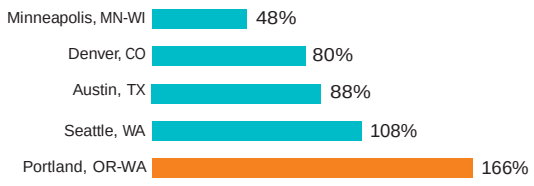
Exports are at the core of Greater Portland's economy. Between 2003 and 2013, Greater Portland increased its export volume by 166%, creating 39,374 direct new jobs for the region. This growth made Greater Portland the fifth-fastest growing export market among the 100 largest metropolitan areas. The region was 13th largest by export volume in 2013, with $26.7 billion in exports, and had the 11th highest export intensity, with exports accounting for 17.4 percent of its economy.

Exports as a Share of Output, 2013



Source: Export Nation, Brookings Institution, 2014

Real Export Growth, 2003 - 2013



Key Finding No. 2

A handful of companies and clusters drive much of Greater Portland's export strength. Eighty-eight percent of Greater Portland's exports in 2013 and 89 percent of export growth from 2003 to 2013 came from the region's top 10 exporting industries. The region's largest export industry, computers and electronics, anchored by Intel, accounted for 68 percent of total exports in 2013 and 69 percent of export growth, and grows each year.

Key Finding No. 3

Greater Portland's emerging export strengths show potential for growth. Though the computers and electronics industry plays the leading role in the region, Greater Portland possesses numerous other export sectors that have developed excellence and are just beginning to go abroad. Clean tech and sustainability firms, which have leveraged the region's excellence in urban development via the We Build Green Cities program, have made inroads in rapidly urbanizing markets in Asia and Latin America. The software sector—a spillover from the region's mature computers and electronics industry—has grown its brand domestically, and its most established companies are just beginning to enter international markets.

Key Finding No. 4

The most successful exporting companies are intentional about exporting. Companies acknowledged that pursuing business opportunities in new foreign markets requires significant resources and persistence. What is really needed is a commitment at all levels of a company that exporting is an important facet of the company's culture and future.

Key Finding No. 5

Greater Portland's economy is replete with small and mid-sized companies that have limited awareness of global opportunities. Many of the small and mid-sized companies have trouble getting out of the gate to pursue exports.

Key Finding No. 6

Greater Portland has developed an effective export services system, but serious risks will always remain with exporting. Under the Greater Portland Export Initiative, the region's export services system has become more streamlined. While the Export Initiative helped to develop a more robust export services system in the region, significant challenges still limit export opportunities for firms. During the last three years, impediments such as lack of financing, high tariffs, political uncertainty in foreign markets and transportation/shipping costs have held up export deals.

Key Finding No. 7

Service provision is most effective when delivered with an understanding that firms are on a continuum of preparedness for exporting.

Key Finding No. 8

An investment from abroad can also be an export opportunity. At the company level, the link between exports and FDI can be impossible to separate.

Objectives based on the findings

Based on key findings from the market assessments, the region's trade and investment plan has four primary objectives designed to support the region's vision for growth:

1. Create a strong local export and FDI culture and a global reputation for Greater Portland as a competitive region for international business.

2. Grow exports and foreign direct investment by aligning and coordinating the region's economic development efforts around key industries and markets.

3. Diversify export industries, increasing the number of companies exporting and the markets they access.

4. Build on FDI from leading source countries and industries, while also seeking to grow FDI from underrepresented source countries and industries.

International Trade and Logistics Initiative (April 2015 – February 2016)

Background

In April 2015, Governor Brown launched the International Trade and Logistics Initiative – led by Business Oregon, the Oregon Department of Agriculture (ODA), the Oregon Department of Transportation (ODOT), and the Port of Portland – to identify interim shipping options to help Oregon small and medium sized businesses stay competitive in the global marketplace and support longer term recruitment of new container service to Terminal 6. Small and medium sized shippers have fewer resources to find predictable and cost effective access to markets and are highly vulnerable to cost and logistics impacts of vessel service changes. Oregon shippers have scrambled to find alternative means to move their goods by truck or rail north to the ports of Seattle and Tacoma or south to the Port of Oakland, California. Over 88 percent of these shippers are small businesses.

Oregon is the 14th most trade-dependent state based on export share of the state's 2014 Gross Domestic Product. Over $20.1 billion of goods were exported from Oregon in 2015, and much of that export value was containerized. Oregon imported an estimated $14.8 billion in foreign goods in 2015, most of that total also containerized.

With the departure of Hanjin and Hapag-Lloyd container service at the Port of Portland's Terminal 6 in early 2015, thousands of Oregon businesses directly and indirectly experienced increasing challenges moving goods to and from global markets. While those using Terminal 6 have been impacted the most by service loss, shippers throughout the state that have benefited from lower costs resulting from the presence of this service will likely be impacted by that loss as well. Efforts to move Oregon and Pacific Northwest cargo through the Columbia/Snake River System and out from West Coast ports are hampered by escalating transportation costs for Oregon container shippers. Shippers are facing shortages of trucking services and equipment, loss of upriver barge container service, and growing congestion on highways and at other Ports.

1. Oregon International Trade Fact Sheet

Oregon Trade

14th Rank of Oregon's exports among U.S. states based on share of 2014 state Gross Domestic Product. Source: Oregon Department of Administrative Services, Office of Economic Analysis and the International Trade Administration, U.S. Department of Commerce

$20.1 billion Value of goods exported from Oregon in 2015.
Source: U.S. Census Bureau, Foreign Trade Division

$14.8 billion Estimated value of Oregon's 2015 imports.
Source: U.S. Census Bureau, Foreign Trade Division

Jobs and Economy

88.6% Percentage of those exporters that are small and medium-sized companies.
Source: Office of Trade and Economic Analysis, International Trade Administration, U.S. Department of Commerce

Nearly 500,000 Number of Oregon jobs supported by trade.

Source: Value of Jobs—International Trade 2013 Report, Portland Business Alliance

18% Percentage of additional earnings that exports contribute to workers on average in the U.S. manufacturing sector.

Source: International Trade Administration report: "Do Jobs in Export Industries Still Pay More? And Why?" By David Riker, Office of Competition and Economic Analysis

Container Service

53% Terminal 6 share of total Oregon containerized exports and imports in 2014.
Source: U.S. Census Bureau

38% Terminal 6 share of Oregon containerized exports in 2014.
Source: Port of Portland

70% Terminal 6 share of Oregon containerized imports in 2014.
Source: Port of Portland

$101 million Business revenues as a result of container shipping through Portland in 2014.
Source: Port of Portland

$15 million State and local taxes generated annually from containers moving through Portland in 2014. Source: Port of Portland

2. International Trade and Logistics Initiative Steering Committee Report

Initiative Approach, Economic Analysis and Shipper Interviews

The Trade and Logistics Initiative is a cross-agency collaboration by Business Oregon, ODA, ODOT, and the Port of Portland (Steering Committee) informed by the consultant work of two nationally recognized trade and transportation experts, Peter Friedmann, Lindsay Hart LLP, and Daniel Smith, The Tioga Group. The Steering Committee established a multi-pronged approach to the initiative to better understand shipper challenges and recommend potential actions to improve containerized freight transport.

The Tioga Group analyzed Oregon cargo movements, landside transportation costs and the other impacts of service withdrawal on Oregon importers and exporters, with special attention to small and medium sized firms. As part of this research, the Tioga Group completed 33 interviews with Oregon importers, exporters, truckers and other stakeholders. The following are some of the major findings and themes identified through this research:

- Portland's Terminal 6 serves broad geographic and commodity markets in Oregon, Idaho, and Washington. The Columbia/Snake River System expands the Portland cargo market to include southern Washington and Idaho. Cargo from this larger catchment area is critical to recruiting and sustaining cargo service at Terminal 6. In 2014, Terminal 6 captured about 43 percent of the containerized cargo in its multi-state cargo market and 53 percent of the Oregon market (exports and imports), with the remaining cargo moving through Puget Sound ports by rail or truck.
- The market share of the Port of Portland, home to the state's only international container terminal, has been strongest in the Portland metro area, in the Willamette Valley, and along the Columbia River. Over 1,000 Oregon shippers shipped through Terminal 6 in 2014.
- Oregon's 2014 containerized exports through Terminal 6 were dominated by agricultural and forest products. Containerized imports were dominated by consumer and industrial goods, tires and other products feeding regional and national distribution centers.
- The loss of Hanjin and Hapag-Lloyd service means that roughly 97 percent of the 2014 Terminal 6 volume must now be moved to and from the Puget Sound ports of Tacoma and Seattle. About 3 percent of this containerized trade still moves on Westwood Shipping Lines through Terminal 6.
- The companies interviewed pushed for restoration of service at Terminal 6. To date, most of those companies have not made changes that would preclude a return to Portland once weekly container service is restored. However, with carrier and shipper contract renegotiations in 2016, shippers will need to make long-term decisions.
- Most Oregon exporters and importers are using rail and truck to reach Seattle and Tacoma rather than changing their shipping patterns. A few have reduced shipments or diverted export products into domestic markets.
- Most shippers have reported increased transportation costs in the short term, typically from $400 to $450 per container.
- The cost impacts have been cushioned in the near-term by low ocean carrier "spot" rates and low fuel prices.
- The annual increased trucking costs to Oregon shippers from the loss of Terminal 6 service is estimated to reach $15.1 million in 2015 dollars.
- Smaller shippers import or export fewer containers annually, connecting to a limited range of foreign ports and customers, and have less negotiating leverage as a result.

Recommendations

To help mitigate the significant transportation cost impacts already sustained by Oregon shippers and improve capacity to move products to and from global markets, the Governor's Trade and Logistics Steering Committee has identified several potential investment opportunities and actions. The list below are some of the main recommendations from the Steering Committee Report that are intended to improve existing freight transportation system

capacity and infrastructure or add capacity to enhance Oregon shippers' competitiveness in the global marketplace.

- **Return of productive operations and weekly container and barge service to Terminal 6.** This is a priority for Oregon and Pacific Northwest shippers. Service restoration is essential to making significant Oregon freight movement improvements and addressing shipper transportation costs and reliability issues. It will also help remove the estimated 1,400 additional heavy trucks each week moving on Interstate 5 and Interstate 205 as a result of rerouting of cargo to Puget Sound ports. The State should press for resolution of the labor-management issues at Terminal 6.
- **Existing Intermodal Container Facilities.** There are five intermodal container facilities (Northwest Container Service-Portland, Northwest Container Service-Boardman, Portland Terminal 6, the Union Pacific Brooklyn Yard, and the Burlington Northern Santa Fe Portland Yard) that provide access to global and domestic markets for Oregon shippers and receivers. Some of these container facilities have requested *Connect*Oregon VI funding to enhance operations at their facilities. The Legislature approved $45 million in funding for *Connect*Oregon VI in 2015. *Connect*Oregon is administered by and has an established process to review and approve projects. Existing technical review and regional committees for this program will recommend projects for funding to the Oregon Transportation Commission in August 2016. As part of that process, they will determine the value of projects to the freight system and their benefit to Oregon shippers.
- **Container Satellite Yard to Support Westwood Terminal 6 Service.** The Port of Portland and ICTSI worked with Westwood Shipping Lines to restart their monthly service to Japan and Korea. Vital to this restart was securing a Rivergate area drop yard to store full containers near Terminal 6 for once a month loadings on Westwood. This action was deemed as having merit for pursuing early in the Trade and Logistics Initiative. The Port of Portland partnered with Portland Container Repair to create this drop yard to stage export containers off dock until just prior to a Westwood vessel call date.
- **Port Trucker Information System.** With rerouting of containers through Puget Sound ports and congestion at those ports and on Interstate 5, truckers moving Oregon products north have reported significant challenges staying within truck driver hours-of-service limits. This has exacerbated an already critical shortage of truck drivers nationally and in Oregon. Multiple stakeholders have recommended the creation of an information system to aggregate and make available in one location current information on:

    - Traffic conditions on Interstate 5 and on terminal access roads.
    - Terminal gate hours and procedures, and container drop off and pick up schedules.
    - Vessel schedules and status, earliest receiving dates, and cutoffs.
    - Turn times at Tacoma, Seattle, Portland, and Northwest Container Service terminals

- **Truck Driver Training.** Nationally and in Oregon, there is a persistent shortage of truck drivers needed to move international container cargo which is expected to worsen due to retirement and turnover. Recruiting and training new truck drivers would help take immediate steps toward addressing this long-term freight logistics challenge. Truck driver training would add capacity to the truck driver pool to serve Oregon importers and exporters, add jobs (particularly in rural Oregon), and create a new generation of well- trained truck drivers. It would also provide a career pathway for Oregon's workforce in the growing transportation logistics industry.

- **Mid-Willamette Valley Container Reuse Pilot.** In the Mid-Willamette Valley, there may be an opportunity to establish a container reuse pilot program (sometimes referred to as "match-back") where empty import containers from regional import distribution facilities (e.g., Lowe's) could be reused for export loads from some Mid-Willamette Valley shippers. Such a reuse program would reduce the number of empty container truck movements and improve the efficiency and utilization of the local supply of containers for participating export shippers. By reducing truck trips, a reuse program could reduce congestion on Interstate 5 and feeder routes. The state supports current Port of Portland and private sector efforts to identify and carry out container reuse opportunities for exporters in the Valley. To be successful, a match-back program would need to address ocean carrier permissions, inspections, documentation, and Equipment Interchange Reports.

- **New Intermodal Rail Yard Feasibility Study in the Mid-Willamette Valley.** There has been interest among shippers, legislators, and other stakeholders in exploring the establishment of a new rail intermodal yard in the Willamette Valley to reduce transportation costs and truck congestion. Possible locations mentioned for such a facility include Albany, Springfield, Eugene, and Lebanon. Northwest Container Service was actively considering a Willamette Valley service as far back as 2005. Initial analysis of this concept was undertaken as part of the Trade and Logistics Initiative. The analysis provided case studies that offered valuable insight into historical issues associated with the creation of new intermodal yards. Additional analysis and discussion with key stakeholders is recommended. State funding could be used to conduct a feasibility study for a new intermodal terminal in the Mid- Willamette Valley. This analysis should include a robust business case and operations plan which identifies potential operators, the possible roles of Class I railroads, short lines, potential cargo volumes, import container opportunities, and financial support for the service from carriers and/or others.

- **New Metro Area Satellite Container Yards.** Establishment of truck container drop yards in the Portland metro area for temporary storage of full and empty containers en route to the ports of Seattle and Tacoma could help improve the flow and predictability of freight transit, address truck driver hours-of-service issues, and improve the supply of empty containers for Oregon exporters. Drop yards located in the Portland area would allow Mid-Willamette Valley and Central Oregon shippers to drop loads for pick-up by a second truck driver for transit to the Puget Sound container terminals. Major concerns for Oregon truckers and shippers include congestion on Interstate 5 and wait times at the Port of Seattle, and the impact of both on federal hours-of-service limitations. Portland area drop yards could allow daily turns for Willamette Valley shippers. Drop yards would also enable containers to be moved at night when Interstate 5 is less congested. Currently, there is one Portland container drop yard operated by Portland Container

Repair in Rivergate, providing a yard for loaded export containers for monthly Terminal 6 Westwood carrier calls. State assistance could help a private operator establish a second drop yard for Oregon exporters in the Portland area with close proximity to Interstate 5. Funding could assist with acquisition of property and infrastructure (e.g., gravel, fencing, administration building).

- **Return of Columbia River Container Barge Service to Terminal 6.** With the suspension of Hapag-Lloyd and Hanjin service at Terminal 6, container barge service on the Columbia River ceased because they could no longer connect to ocean-going vessels. The loss of barge service resulted in the closure of the Port of Lewiston container yard, impacting shippers in southern Washington, and Lewiston, Idaho that helped provide the cargo volumes to sustain Terminal 6 container service. The barge/rail service was restarted in November 2015 with assistance from key stakeholders. This service is important in getting cargo back onto the barge feeder service along the Columbia River in an area hit hard by truck equipment availability and alternative transportation cost increases.

- **Portland Cold Storage and Transload Opportunities.** Portland's Terminal 6 container shipping market is a relatively small market compared to other West Coast ports. This is especially true for import cargo, which is the primary driver for container shipping lines when making Port call decisions. Portland has the smallest population of the West Coast port cities and offers relatively few "anchor" businesses with large import container volumes. In tandem with the resumption of Terminal 6 carrier service, the Port of Portland should continue its work to grow the Terminal 6 market by identifying the potential for pharmaceutical and cold storage imports and exports of food products and frozen poultry, beef and pork products from the Midwest. A broader cargo market would help anchor and improve cold storage and transload services in the Portland area, including rail service. Port business development staff has been engaged in promoting development of such services over the years. The Port of Portland should enlist the support of other public agencies, as needed, to support these efforts. Expansion and recruitment of cold storage and transload services would require regular TransPacific service through Terminal 6, but would be important to building the Portland container service market in the long term.

- **Governor's Transportation Vision Panel Recommendations.** The Governor's Transportation Vision Panel was created to provide a comprehensive look at Oregon's transportation system and define a long-term vision and short-term action items for moving people and goods and how to pay for that system. Preliminary recommendations dovetail well with those of the Trade and Logistics Initiative Steering Committee and should be folded into the state's transportation funding package. This includes:
    - Bottleneck Elimination
    - Freight Network Alternatives
    - Intermodal Freight Facilities
    - Permanent *Connect*Oregon Fund

- **Freight Bottlenecks.** Highway freight bottlenecks in Oregon limit shipping reliability and negatively impact shippers' ability to get products to market while meeting driver hours-of-service requirements. Bottlenecks cost shippers money through loss of time from delays or travel along alternate indirect routes. Highway bottlenecks also impact local communities by creating increased traffic congestion on local roadways connecting

to state and federal highways. Both the Oregon Freight Plan and the federal FAST Act stress the importance of identifying highway freight bottlenecks. ODOT should continue its efforts to identify and prioritize highway freight bottlenecks along key freight routes throughout the state. Current efforts to do so will be completed in fall 2016. Oregon decision makers should consider addressing critical highway freight bottlenecks as part of future transportation funding packages and options. In addition to highway freight bottlenecks, Oregon should investigate and invest in non- highway transportation infrastructure and programs in order to improve its multimodal freight transportation system.

- **Investment in Oregon's Multi-Modal Freight Transportation System.** International trade is critical to Oregon's economic vitality, yet Oregon's transportation system is not keeping pace with other West Coast states. Congestion in major markets is creating multiple hours of delay and impacting the state's economy. Investment in the state's transportation system has the potential to generate $1.1 billion in economic benefits. Oregon's transportation system lacks sufficient infrastructure to meet Oregon business market access needs. As shippers try to reach other international gateways, the constrained system increases cost and transit time. Due to constrained transportation funds, Oregon has few projects in the pipeline, limiting the state's ability to compete for funding in FAST Act. For Oregon to maintain its economic competitiveness in the West, it needs to invest in the state's multi-modal transportation system. This includes but is not limited to state highways, freight corridors, rail, and port infrastructure.

- **Monitoring of International Trade and Transportation System Performance.** While the work of the Trade and Logistics Initiative is nearing completion, there is a need for continued focus on the movement of Oregon marine cargo by rail or ship through the ports of Portland, Tacoma and Seattle, as well as ensuring implementation of recommendations included in the Governor's Trade and Logistics report. OFAC is a logical entity to assume this role as it also includes members of the Steering Committee. This monitoring work should include annual progress reporting on the implementation of the recommendations and monitoring of system performance. The potential system performance issues include: customs processing of Oregon shipments at Puget Sound ports; use of third-party logistics providers, cooperatives, and shipper associations for small shippers; existing rail intermodal linkages in Portland and to Puget Sound; chassis supply; and Terminal 6 service.

- **Sustaining Stakeholder Engagement.** Stakeholder engagement is an indispensable part of ensuring an ongoing focus on the competitiveness and functionality of Oregon's trade and transportation system. In conjunction with OFAC's monitoring of implementation of recommendations from the Trade and Logistics Report, the state should convene an annual stakeholder forum to stay engaged with current trade and shipper issues. As part of the Port of Portland and state's efforts to recruit new Terminal 6 container service, it should engage a small group of larger shippers providing the base volumes needed to anchor this service.

- **International Trade Initiatives.** The state of Oregon supports international trade through a collaborative multi-agency effort. Business Oregon, ODA, the Port of Portland, and Travel Oregon engage in Governor's and other outbound trade missions, inbound foreign buyer missions, and industry missions supporting international trade. The Oregon Legislature invests in international export promotion grant programs to assist

small and medium-size companies with export sales efforts, leveraging significant federal funds. Export competitiveness is tied to their ability to deliver their products on time and at a competitive price. Export growth can also lead to increased foreign direct investment opportunities bringing new jobs and wages to the state. A continuation of these state investments is recommended given the importance of international trade to Oregon's economy.

Freight Analyses, Plans, Strategies and Studies in the Region

Portland Harbor: Industrial Land Supply Analysis (May 2012)

This evaluation starts from the assumption, embedded in the economic development policies of all local governments in the region, that the retention, expansion, and relocation to the region of industrial sectors is something that the region desires. It addresses the capacity of industrial land in the Portland Harbor area to accommodate future development, both for new public marine terminals and private marine-dependent businesses. It addresses *four questions posed by the City*:

1. Are the methods the City used to estimate the location and amount of vacant, partially vacant, and potentially buildable industrial land in the Portland Harbor area likely to yield reasonable estimates?

2. Given the estimated land supply in the Portland Harbor area, how suitable for a public marine terminal are the few sites identified by the City as having the best potential to accommodate such a terminal?

3. If those sites do not develop as marine terminals (for whatever reasons) to what extent can the Port of Vancouver play a role in accommodating forecasted cargo demand in the Portland region?

4. Finally, if existing vacant land in the harbor area and in Vancouver is estimated to be insufficient to accommodate forecasted or desired transshipment or industrial activity, what is the potential for more efficient use of industrial land in the Portland Harbor study area? That question implies answering the question: What does more efficient use of industrial land mean, and how would it be measured?

Summary of Findings

This report focused on issues related to the demand for and supply of land for water-dependent industrial employment in the Portland Harbor (about 4,000 acres of land along the Willamette River, from approximately the I-405 Bridge north of downtown to the confluence of the Willamette and Columbia Rivers). Its main conclusions are:

· The City and its partner agencies have spent years in study and data development for the study area. The City's mapping of vacant parcels is detailed and support its conclusion that outside of land already in Port of Portland Terminals, the best potential sites in the study area of a location and size that a new marine terminal would require are Atofina and Time Oil.
· These two sites meet mandatory criteria for minimum size (more than 50 acres) and location (frontage on the Willamette River) for a new marine terminal. That makes them possible sites, but not necessarily likely sites. The analysis in this report reconfirms findings of previous studies: small size and a lot of site constraints (especially the need to deal with the legal liabilities of prior soil contamination) make development of these sites for a marine terminal challenging.
· Even using the most detailed and recent data available, it is difficult to predict future land needs for public marine terminals with precision. While the potential land need through 2040

varies greatly depending on key assumptions, the medium scenario shows that the Port of Vancouver may, in theory, have enough developable land to accommodate regional growth in cargo volumes through 2040. In practice, however, competing demands for Port of Vancouver lands, competition among and public policies of affected jurisdictions, and the potential for higher growth in cargo volumes all make it possible, if not likely, that the land controlled by the Port of Vancouver would not be able to accommodate all of the regional demand for marine cargo.

· Regarding the efficiency of land use, for the time periods evaluated, we found a decline in employment, modest growth in real market value and value added (though less than the rate of inflation), and stronger growth in cargo volumes per developed acre of industrial land. The mixed results of the various measures of economic activity prevent us from drawing a strong conclusion. The region should continue to track these measures, and adopt policies with the intention of increasing measures of economic output faster than vacant land is converted to developed land. This seems like an objective that could appeal to people with different interests: economic development, environmental amenity, or smart growth.

City of Portland – Central City Sustainable Freight Strategy (October 2012)

In 2009, the Portland City Council adopted the Climate Action Plan which sets targets for reducing carbon emissions to 40 percent below 1990 levels by 2030. Recognizing that moving goods and people accounts for nearly half of the greenhouse gas emissions in Multnomah County, the Climate Action Plan highlights the importance of improving the efficiency of freight movement in the Portland region. The goal of the Climate Action Plan to reduce greenhouse gas emissions runs parallel to operating an efficient freight business. Using more fuel increases carbon emissions; using less fuel saves money for the freight company.

In addition, the anticipated increase in urban density supported by current City and regional land use policies will create a much more diverse and mixed use Central City area. One of the challenges of an increasingly dense Central City will be delivering groceries, clothing, office supplies and on-line products to consumers while garbage, packages and locally manufactured products need to be shipped out. Not only will the amount of freight movement increase, Portlanders will prefer that it moves with less noise, parking space and fuel consumption.

In developing potential strategies for implementing the Climate Action Plan and accommodating freight movement within a denser Central City environment, the Portland Bureau of Transportation (PBOT) initiated a planning process in 2010 to identify sustainable freight practices implemented in other urban areas and their applicability in Portland.

Key Findings:

- Greater density will increase the overall volume of goods delivered in the Central City and the continued demand for efficient and reasonable priced freight delivery services to meet customer needs.
- Three core and interrelated elements of sustainability: Economy, environment and equity.
- The private sector selects the most cost-effective mode of transport based on cost, reliability and customer needs. Trucks typically offer the most flexibility making many goods dependent on truck movements.
- The public sector also has two primary means to improve freight delivery:
    - Allocation and use of public right-of-way space
    - Regulatory authority over land use and development
- There is no Single Simple Silver Bullet Sustainability Solution – private sector logistic providers will continue to seek the most cost-effective solutions based on economic efficiencies and customer needs. The public sector, through its regulatory authority over public right-of-way and land use, can help create the environment for private entities to capitalize on system efficiencies.

Research Results:

- Electric/hybrid delivery vehicles are most applicable for small package "last mile" deliveries due to high capital cost and limited payload capacity and delivery range.
- The Central Eastside Industrial District already serves as an Urban Consolidation Center by providing a centralized location for private warehousing and distribution companies to operate and serve the Central City area.
- Low emission zones: Air quality is already regulated by the EPA and existing federal regulations have significantly improved diesel emissions and will continue over time.

- Carrier savings are typically not large enough to compensate for the additional cost imposed on receivers for implementing off-hour deliveries and customer needs are the determining factor for deciding where goods are delivered.
- The last mile delivery accounts for 28 percent of all transportation costs. Private sector logistic companies (i.e., FedEx, UPS) usually provide these services but there are opportunities for the city to facilitate their operations through the zoning and development code.

Stakeholder Input:

- Sustainability is directly associated with productivity; fewer trips and delivery miles are achieved with full loads.
- Freight carriers reduce their carbon footprint by improving fleet performance .
- Customers already adapt their shipping/receiving schedules to avoid peak hours of traffic.
- Existing inadequate supply of on-street loading and unloading spaces erode efficiency.
- Central City redevelopment can have significant impacts on the operating needs of close-in industrial manufacturers and shippers – those close-in industries enhance Portland's livability.
- Restricting truck size does not necessarily lead to efficiency; one large truck can be more sustainable than multiple smaller trucks with respect to fuel use, emissions produced and the number of on-street loading areas needed.

Achieving the Climate Action Plan goals and challenges of accommodating freight movement within an increasingly dense Central City environment requires ongoing partnerships among the business community, local governments, community interests and the other stakeholders. The *Central City Sustainable Freight Strategy* is designed to address these issues and our ability to reduce emissions and fuel usage even further.

Recommendations:

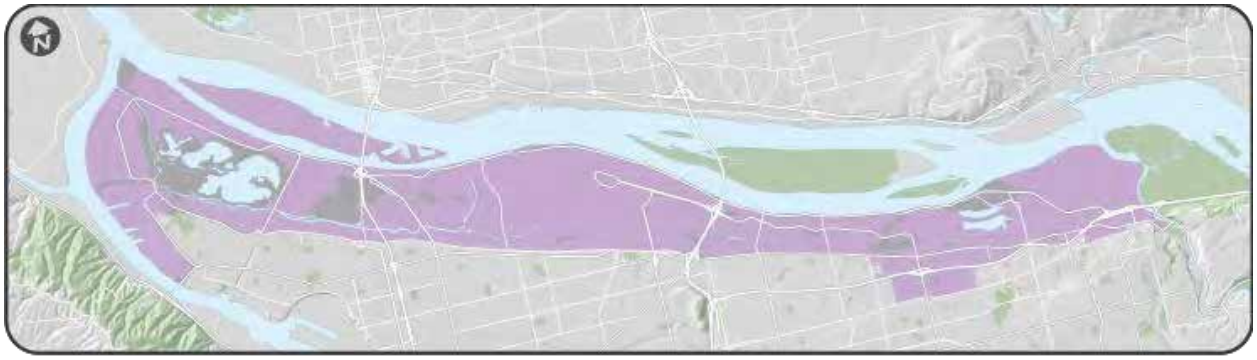
The following actions were recommended by city staff, the Sustainable Freight Working Group and the Portland Freight Committee for implementing the *Central City Sustainable Freight Strategy:*

- Prepare a comprehensive truck loading and parking plan to increase the efficient use of public right-of-way space.
- Develop a best practices street design guide for the safe and efficient movement of delivery vehicles.
- Identify incentives to encourage unattended delivery depots and other "last mile" delivery solutions.
- Apply zoning provisions to allow centralized freight distribution districts to freely operate and to increase industrial-based employment densities.
- Implement an off-hour delivery pilot program for the Central City.
- Explore partnership opportunities to provide financial and other incentives to purchase/lease electric hybrid delivery vehicles and install charging stations.
- Coordinate with other city bureaus and outside agencies to develop strategies to increase the use of rail, barge and other multi-modal freight options.

Columbia Multimodal Corridor Study - Final Report (December 2012)

This report focused on providing an overview of the existing transportation conditions within the Columbia Corridor and the best improvements for the coming twenty years. Below is a map showing the corridor boundary area. Businesses surveyed as part of this study indicated that access to efficient, multimodal transportation facilities is the reason they are located here. The study examined current and future congestion and travel times in order to identify bottlenecks that will erode the Corridor's transportation advantage.

Columbia Multimodal Corridor Study Area



-The Corridor Boundary Area

The Corridor area is serviced by a number of major transportation gateways including Interstate 5, Interstate 84, Interstate 205, Columbia Boulevard, Marine Drive, Sandy Boulevard, Martin Luther King Jr. Boulevard, and Airport Way. Other gateways in the Corridor are marine terminals, rail lines, and international airport (airport and cargo) facilities.

Businesses and Interviews

Within the Corridor boundary, there are numerous businesses that make a large impact on the regional and state economy. There are approximately 2,600 total businesses within the Corridor area, and roughly 65,000 total jobs. This equates to about 8 percent of the total Portland metropolitan business inventory. The top three types of businesses in the CCA boundary are manufacturing (21%), transportation/warehousing (18%), and wholesale trade (12%).

As part of the study, surveys were conducted with 10 businesses within (or in close proximity to) the Corridor boundary. Businesses were selected to help represent a wide variety of geographic, type of business, and use of the transportation system. Survey responses indicated the primary reason many of these businesses located in the Corridor is easy access to regional facilities such as Interstate 5, Interstate 205, and Interstate 84. In addition, they feel the area provides access to other non-motorized modes of transport like heavy rail, marine and air cargo facilities. Company representatives note congestion as the number one problem facing business operations now and in the future. Congestion and the reliability of roadways limit their ability to have on-time deliveries

and receive/ship goods. Much of their delivery time is incurred in the "last mile" which references the last segment of roadway in and out of their business.

Project Summaries

There are a number of projects identified by both the Regional Transportation Plan (RTP) and the Port's Transportation Improvement Plan (PTIP) within the Corridor. Approximately 70 projects were identified but not all projects may have an expected benefit of freight movement, or mobility and access. Based on current (and future) congestion plots, approximately 30 projects were selected for additional analysis and focus with individual project sheets.

The projects range from localized intersection improvements to longer corridor improvements. The total estimated cost for the shorter list of projects that detailed sheets have been developed for is approximately $290 million dollars.

These projects were selected to have more detailed information developed to provide background information, problem statement, project description, forecasted growth and user origin/destination information. The following is a list of the projects that have more detailed information that can be found in the final report; and a status of each project as of the end of 2015:

Burgard-Lombard North Street Improvements: Status: Project was re-scoped and is now fully funded. Time Oil Road and N. Burgard intersection will start construction in 2016.

North Columbia Blvd/North Portland Road Intersection Improvement: Status: Is funded through the STIP (as part of the St. Johns Truck Study Phase 2). Design in 2016 with construction in 2017 or 2018.

Marine Drive ITS: Status has not changed since 2012.

NE Martin Luther King Junior Blvd/NE Columbia Blvd Area Improvements: Status: Mostly unchanged from 2012. RTP project #10339 "Columbia Blvd. N/NE Bikeway is funded. Currently in right of way purchase. Construction scheduled for 2017 or sooner.

SW Quad Access: Status has not changed since 2012.

NE Cornfoot Road Improvements: Status has not changed since 2012.

NE Columbia Blvd Improvements: NE 60th Ave to NE 82nd Ave: Status has not changed since 2012.

NE Airport Way/NE 82nd Avenue Grade Separation: Status has not changed since 2012.

NE Airport Way ITS Improvements: Status has not changed since 2012.

NE 122nd Avenue Improvements: Status has not changed since 2012.

NE 181st Avenue Improvements: Status has not changed since 2012.

NE Sandy Boulevard Improvements: Status has not changed since 2012.

NE 207th Avenue Arterial Corridor Management: Status has not changed since 2012.

NE Sandy Boulevard Reconstruction: Status has not changed since 2012.

Troutdale Interchange Improvements: Status: Project is completed.

NW Graham Road Improvements: Status has not changed since 2012.

NE Airport Way Braided Ramps: Status – this project may have been re-scoped.

I-205/NE Airport Way Interchange Improvements: Status – Project is completed.

I-5 Interchange Improvements at Marine Drive and Hayden Island: Status has not changed since 2012.

Rail Crossing Improvements:

(A) Rivergate Boulevard Status: Rivergate Boulevard is mostly funded but still has a funding gap**. (B) Cathedral Park/St. Johns Lead Whistle Free Zone. (C) Marine Drive Grade Separation. (D) Peninsula Junction. (E) 11th /13th rail crossing. (F) Cully Grade Separation. (G) Graham Line - at 112th.** Status of projects B to G has not changed since 2012.

Regional ITS Projects: (A) Rivergate ITS (B) MLK Jr. - N Columbia Blvd. – CEID (C) PDX ITS. Status of projects A to C has not changed since 2012.

Port of Portland Rail Plan (September 2013)

Introduction, Purpose and Need for the Rail Plan

A decade ago, the I-5 Rail Capacity Study (2003) provided the region with a road map for directing freight rail investment for both the public and private sectors. As trade expanded and volumes grew during the boom years, the railroads, the states of Oregon and Washington and local agencies, and the Ports of Portland and Vancouver invested heavily in port-serving rail infrastructure. The region has collectively built a resilient and increasingly efficient rail system as projects from the Study have been undertaken along with other improvements. A decade has passed since the 2003 study. Unforeseen economic currents have vastly changed the nation's collective business model since 2008. New strategic initiatives are changing the way transport and railroads operate in the Pacific Northwest (i.e. "high"-speed rail in the I-5 corridor, the implementation of Positive Train Control technology, or the maturation of the West Hayden Island planning process). It is an appropriate time to revisit the strategies and rationalizations that have driven rail transportation investment in the region.

With the economic recession of 2008, industry saw container ships and railcars mothballed throughout the world. Locally, businesses were shuttered as neighbors lost their jobs, savings, homes and security. Although the recession officially ended in December 2009, above average unemployment, low home prices, and the slow economic rebound signal that the Pacific Northwest continues to struggle.

In order to ensure the efficient movement of this cargo, to spur on economic recovery, and to take advantage of upcoming opportunities, the Port of Portland has prepared this update of its 20-year Rail Plan. The Plan identifies facility improvements both within the Port and around the region that will help the Port retain its competitive advantage. The Port formed a Rail Plan Working Group (RPWG) to assist in developing a pragmatic conceptual approach to rail system improvements for the next 20 years.

Rail Plan Goal: Implementation of Strategic Port of Portland Rail Projects

The goal of this rail plan is to create and build consensus around a set of rail infrastructure projects that will serve the Port of Portland and the region by solving existing and future capacity and through-put problems. Solving these issues proactively will aid the Port in taking advantage of emerging opportunities in the coming years.

With the Greater Portland Export Plan as background to the Port's overall economic development approach, the following section summarizes the numerous aspects of technical, business, community and environmental concerns that have been incorporated into the development of the recommended projects that form the practical heart of this Rail Plan:

A Results-Oriented Planning Process

1. It builds off stakeholder-vetted visions for both local and regional rail solutions for identified problems.

2. It is in alignment with overall growth in capacity requirements, given increased reliance on freight rail as a desired transportation mode and desired growth in passenger rail.

3. It leverages enthusiasm and interest in and supports the objectives of the Greater Portland Export Plan by building support for needed port rail infrastructure.

4. The Plan continues the tradition of Port of Portland leadership in green technology and emission reduction by supporting the movement of freight via rail whenever possible.

5. Infrastructure projects will be implemented in the context of technology-related capacity improvements.

The list of projects considered in the Plan was developed with the following goals in mind:

1. Maintaining and improving the relative advantage of the Port's landside connections by making railroad infrastructure improvements that are both locally and regionally significant. This plan recognizes that improvements up and downstream on the rail system have a direct impact on the efficient movement of trains to and from the Port, as well as the number of trains that ultimately can be moved to the Port.

2. Projects were also identified through interviews with key stakeholders such as the Port, Class 1 and short-line railroads, major rail shippers, and terminal operators.

3. Identifying sections of rail lines near Portland-Vancouver that are candidates for expansion to stage trains waiting to enter the terminal area or move east through the Gorge. This can be accomplished through a combination of eliminating at-grade crossings, expanding sections of double-track, improving crew-change locations, etc. This is particularly applicable to the BNSF Fallbridge and UP Kenton lines between the metro area core and the entrance to the Columbia River Gorge.

4. Identifying projects that improve the multi-modal flow of goods and people near the harbors and the rail corridors. As the numbers of trains increase and as the average length of trains increases, the Port and the community will need to implement projects that diminish conflicts between trains, vehicles, and other modes (i.e. grade separations, re-routing infrastructure to disentangle it).

5. Consideration was given to rail industry developments that are somewhat external to the Port. Examples would be:

a) How does the Port maintain its access to the rail infrastructure given the possibility of coal traffic passing through the Columbia Gorge in the next few years]
b) How is main line capacity maintained for freight movements in light of plans to expand daily Amtrak service north and south?

Environmental Baseline Conditions

As part of the rail planning effort, the Port has sought to identify the known environmental conditions and constraints with regards to its internal rail facilities.

The following types of environmental and natural resource constraints were identified within the environmental study area:

- Wetlands and Waters
- Wildlife
- Contaminated Land
- Stormwater
- Floodplain Development
- Land Use and Zoning
- Noise
- Air Quality

Class 1 Railroad System Service

The Port of Portland's excellent access to the national railroad network through two Class 1 carriers is a major advantage that helps offset the Port's location 105 miles upriver along the Columbia River navigation channel. The Port of Portland is served by two Class 1 railroads, Burlington Northern Santa Fe Railway (BNSF) and Union Pacific Railroad (UP). BNSF connects the Port to the national rail network via its primary main line that follows the north bank of the Columbia River east from Portland-Vancouver into eastern Washington.

At a local level, BNSF enters the Port of Portland by crossing the Columbia River from its east-west main line on the north bank of the Columbia River at Vancouver, Washington. The Port is immediately west of BNSF's north-south main line that extends from Portland Union Station through Vancouver, Washington, to Tacoma, Seattle, and Vancouver, B.C. This affords BNSF direct access to the Port's North Rivergate (T-6) facility and, via the Columbia Slough Bridge, the T-5 facility in South Rivergate and West Hayden Island in the future.

Rail access and switching at the Port's marine terminals is divided among the rail carriers as follows:

- BNSF is the managing carrier in North Rivergate, providing train unit delivery and switching service for the entire T-6 terminal and all nearby industry shippers.
- UP is the managing carrier in South Rivergate, providing unit train delivery for itself and general switching service at T-5 and the other nearby industrial shippers for both Class 1 carriers. BNSF does have the rights to deliver a Columbia Grain unit train direct to South Rivergate. Numerous tenants in the T-5 area provide their own internal switching (Evraz, Canpotex and Columbia Grain, for example).
- UP is the managing carrier at T-4 and provides unit train delivery, switching, track maintenance, dispatching, etc., for all rail traffic.
- BNSF is the managing carrier for the Ramsey Lead that connects BNSF's Rivergate "A" yard to the UP system at Bonneville. Ramsey Yard adjacent to Bonneville is operated by UP.
- Portland Terminal Railroad provides switching for T-2, supported by Guilds Lake Yard.
- The lone rail customer on Swan Island provides its own switching after UP sets cars out from the Albina Rail Yard.

Port/Rail Interface at Terminals 2, 4, 5 & 6 and Key Rail Yards

Overview: The Port of Portland's marine terminals are located along the Willamette and Columbia Rivers, each having direct road and railroad landside connections. These terminals serve different functions including bulk, break-bulk, autos, and containers. Depending on the commodity shipped, the Port has worked closely with both BNSF and Union Pacific to enhance the existing rail infrastructure that provides access to each terminal. In many cases, the Port has facilitated the implementation of rail infrastructure specific to each commodity shipped. This public-private partnership has had the effect of reducing overall shipping costs for Port tenants by improving the rail/port interface and greatly increasing rail efficiency.

Terminal 2: Located on the west bank of the Willamette River, Terminal 2 is devoted to the break-bulk market. An array of commodities and products (for example: railroad rails, bulk cotton seed, steel plate, bulk urea, bulk ores, etc.) are trans-loaded from ship to shore to land transportation. The Terminal provides on-dock warehousing as well. Volumes are relatively low through Terminal 2 compared to the Port's other terminals and the existing rail infrastructure has been sufficient. The rail layout of the terminal consists of a "balloon" loop that connects to a running track alongside the main line (trains enter the Terminal from the south and exit to the south). Spurring off from the loop are several storage tracks, dockside track that runs the length of the berth, and loading dock spurs to one warehouse. The Portland Terminal Rail Company provides switching in the Terminal. The tracks are fully embedded in pavement throughout the terminal, allowing for easy loading from almost any point. Much of the rail in the Terminal is lighter 90-lb rail and the curves of the balloon track tend to be much sharper than current railroad standards of curvature. However, 90-foot flatcars are brought into the terminal nonetheless. If the Terminal sees a significant rise in rail traffic over an extended period of time, the embedded light 90-lb track and switches should be upgraded to a minimum of 115-lb rail or larger. Replacing the rail would most likely also necessitate a 100% crosstie replacement program as well.

Terminal 4: Major Port tenants including Toyota and Kinder Morgan are located at Terminal 4 on the east side of the Willamette River near its confluence with the Columbia River. Terminal 4 lies adjacent to Union Pacific's Saint Johns Industrial Lead which connects north to Barnes Yard and south to Albina Yard. The railroad and Port have developed an extensive rail physical plant adjacent to Terminal 4 to quickly deliver and depart loaded/empty rail cars to these shippers for handling. Recently, Union Pacific completed a siding project so that there are presently two siding tracks running nearly the full length of Terminal 4 along the Industrial Lead to support its customers there. A recent project rebuilt the soda-ash unit train yard that serves Kinder Morgan. New tracks were constructed with heavier rails and concrete crossties to modernize the facility. Toyota also relocated its railcar loading ramps closer to the ship berth and constructed an 8- track loading ramp capable of holding about 48 auto-rack railcars. Formerly, Cargill operated a grain facility at Pier 1. However, the nation-wide transition from carload to unit train grain shipments was a disincentive in using T-4 as a grain export facility. The facility shut down and the Port eventually demolished much of it to clear the way for future redevelopment. IRM and Cereal Food Processing are still rail served T-4 tenants on Pier 1. Much of the rail on Pier 1 that served the former grain terminal is lighter 90-lb rail. This rail should be replaced with heavier rail (115-lb or greater) if future development plans call for heavy rail use. The McDermott Lead that heads south from the soda-ash yard to connect to the Saint Johns Industrial Lead is also constructed of lighter rail and should be replaced if train traffic picks up substantially on the track. BNSF "accesses" Terminal 4 shippers by trucking commodities and product (including autos) to nearby railheads.

Terminal 5: Just north of T-4 is South Rivergate's Terminal-5 and adjacent Port-facilitated industrial areas. The area has been extensively developed over the years for rail transportation and delivery of unit trains. Long term tenants include Columbia Grain, Land-o-Lakes, Canpotex, and EVRAZ (Oregon Steel), among others. ADM is the most recent rail-served customer to land in the area with a new facility set to open in 2013. The Terminal 5 rail physical plant connects to the rest of the rail network via a Union Lead running south to Bonneville Yard. From Bonneville Yard, trains can head north through Ramsey Yard to BNSF territory or southeast to UP's Barnes Yard. The central piece of rail infrastructure at Terminal 5 is the South Rivergate Yard. It serves both manifest traffic and can be used to stage unit trains for the export terminals at T-5. It is critical in terms of providing near-dock rail capacity and simultaneously serving to expedite rail traffic away from the main lines of the Portland area. The Yard was recently expanded by the Port using a ConnectOregon grant by adding 5 tracks that can hold on the order of 330 62-foot railcars. The expanded capacity is primarily used to stage bulk unit trains to either Canpotex or Columbia Grain (the trains must be stored in halves on two tracks). Union Pacific provides switching for this yard and spots/pulls local area industry. BNSF has the right to deliver a unit train directly to the South Rivergate Yard with UP then spotting the commodity to the shipper (because BNSF must cut each train in half in order to fit the yard tracks; once broken, UP needs to complete the switching moves necessary to deliver the cuts of cars to the shipper). BNSF delivers unit trains via the CMAQ-funded Slough Bridge. The potash facility operated by Canpotex was recently expanded to a total of three loop tracks, each capable of holding a full unit train. The facility has its own locomotives for moving the trains through the loading pits. The Columbia Grain facility has five semi-circle tracks, each capable of holding a portion of a train and the facility also performs its own internal switching. The Evraz-Oregon Steel facility has a myriad of internal tracks that that serve as storage or as access to the various process buildings on their site. Evraz operates its own fairly extensive switching operation internally.

Terminal 6: Terminal 6 is served by BNSF via a primary rail corridor that bisects the Terminal, seated halfway between the Columbia River shoreline on the north and Marine Drive on the south. The east end of this corridor connects to the BNSF main line via a "wye" track arrangement, allowing trains to head north or south from the area. At the east end, BNSF operates the "A" and "B" yards, each having 4 tracks and situated in-line with one another. The yards support local customers in and around T-6. Running around both yards are four additional tracks some 5,800' long used for building and storing trains. Around the outside of those tracks is the Port's T-6 lead, a dedicated track that bypasses the yard area and allows an intermodal train to proceed straight from the main line to the container terminal at T-6. A lead track heads south and west from the "A" yard to connect to Bonneville Yard and serves as the BNSF's unit train route to South Rivergate. Towards the west end of the T-6 trackage lies the 8-track intermodal railcar yard with intermediate strips for sorting chassis and containers. The primary container storage yard is immediately north of the rail yard. A BNSF track continues past the intermodal yard to service the Hyundai auto import facility. There are two other auto import rail loading ramps as well as numerous other rail customers in and around T-6.

Ancillary Port Rail Facilities

Ramsey Yard: Ramsey Yard sits due east of South Rivergate and was completed in 2011 with Connect Oregon funds. It is parallel to a lead track constructed by the Port in 1997 to facilitate BNSF unit train movements to South Rivergate. The yard is six tracks across (including the running lead) and boasts a capacity of about 185 62-ft long railcars. The project that

constructed the yard also constructed a second lead track some 13,000 feet long headed north out of the yard.

Swan Island Lead: The Port owns the lead track that runs out from the north end of the UP Albina Yard and parallels N. Going Street to the west end of Swan Island. The track is composed of 90-lb rail which is likely adequate at the current time given the demand for rail service on Swan Island. The sole rail customer on Swan Island is an operation at Shipyard Commerce Center (the dry-dock and associated facilities at the westerly tip of the Island) that receives tank cars of waste oil products for reprocessing. The customer uses a track-mobile to fetch railcars from the UP near Albina Yard and pulls them the entire length of the lead to the customer's facility and then returns the railcars when finished. If demand for rail service picks up substantially on the Island, the rails should be replaced with heavier sections (115-lb or greater).

Reynolds Lead: After the Port purchased the former Reynolds Aluminum site in Troutdale, it also took over the 1.3-mile lead track connecting the plant site to the Union Pacific's Kenton Line. Although the track has been disconnected at the Union Pacific main line and all the internal plant tracks removed, the lead track itself remains. The Lead is disused at present, but could be reactivated if need be (as there is developable industrial land available at the Reynolds site). The Lead includes a 1,500' siding and signalized crossing equipment at NE Marine Drive. The track itself is 100RE rail, which is adequate for low- to moderate levels of rail traffic at lower speeds. The Lead track will require some investment to be returned to service (vegetation control, some crosstie replacement, etc.).

General Findings of Track Inventory and Conditions in the Marine Terminals

Terminal 6: Heavy investment in the late 1990's and 2000's in track at T-6 has left the terminal in good general condition. The tracks are constructed to modern rail standards for such a facility and no significant recommendations are made.

Terminal 5: Terminal 5, consisting primarily of a 3-track potash unloading loop and connections, is in generally good condition. The terminal's tracks underwent major renovation and expansion in the late 2000s and are up to modern standards for the level of traffic handled at the Terminal. No significant recommendations are made.

Terminal 4: Terminal 4's tracks are a mixture of modern and antiquated construction and materials. The Terminal has been in operation for many decades and has been divided into a multitude of uses during that time. At present, the terminal's tracks are broken down into sub-areas. The tracks comprising Toyota and the soda-ash unloading areas are mostly modern construction and adequately serve the those business lines. Much of the track that serves the Pier 1 area of the Terminal (including Cereal Foods, International Raw Materials, the former Cargill site) is in poor condition and is inadequate to serve high volumes of modern railcars. Moreover, some of the track does not reliably serve the rail traffic that presently uses it.

Terminal 2: T2's track and its configuration is typical of a World War II (or prior) port facility. The majority of the track at T2 is undersized by modern standards, has very tight curvature, and track lengths are not long enough to efficiently support modern railcars. The Terminal's track infrastructure would be hard-pressed to serve medium-to-high volumes of railcars daily, due both to internal factors and external railroad factors (i.e. efficient staging for railcars). The

terminal could be reconstructed to serve a use with higher-volume rail demands, although it would require a near 100% rebuild of tracks inside the terminal and a siding expansion project outside the Terminal to stage railcars for it. Nevertheless, the present rail infrastructure is in need of substantial refurbishment to continue supporting the rail needs of the terminal's break-bulk business. PRP-1 proposes a maintenance project to modernize the existing trackage while PRP-22 explores the possibility of reconstructing the Terminal to serve unit-train traffic volumes.

Swan Island: The Port-owned Swan Island Lead track is of light-duty construction and will soon need a substantial investment in maintenance to ensure that it will continue to serve rail traffic on the Island. Also, there are recommended safety improvements in PRP-1F to two North Channel Avenue crossings to maintain public safety. All total, nearly $700,000 in maintenance and safety improvements are recommended on Swan Island.

Ramsey Yard: Ramsey Yard is a modern rail yard constructed in 2010 and no maintenance recommendations are given.

Reynolds Lead: This track was not evaluated since it is not operational and no operations are foreseen. However, aerial photo observation suggests that a vegetation control program is warranted to keep the track in near-ready condition and preserve the value of the track materials. If no strategic purpose in leaving the track in place is identified, the Port might consider removing the track and using the materials elsewhere to modernize track (depending on the type and condition of the track materials). New rail, plates, bars, and anchors (but not ties or ballast) can cost on the order of $65 per foot of track for those materials alone. At roughly 8,000', this would potentially be a savings on the order of $0.5M in lieu of purchasing new track materials (less the cost of reclaiming and moving the materials). The signal crossing equipment at NE Marine Drive, depending on type and condition, could also be used elsewhere.

Current Volumes and Expected Growth in Port Rail Traffic

As of 2013, over 17 million tons of cargo moved through Portland each year. Twelve million tons of this cargo moves through the Port of Portland-owned facilities. The Port's major exports are wheat, soda ash, potash and hay. Major imports include automobiles, steel, machinery, mineral bulks and other varied products. Annual imports and exports at the Port total approximately $15.4 billion. The Port estimates that over one thousand logistics and marine-related businesses use the Port's marine facilities.

In 2012, the Port exported the largest amount of wheat in the United States, and is the third largest wheat port in the world. It is the fifth largest port for overall tonnage in the United States, 3rd largest automobile import port, the largest mineral bulk port on the West Coast, and the 17th largest U.S. port handling cargo containers. Seven container ocean carriers service the Port, including:

- COSCO
- Hamburg Sud
- Hanjin
- Hapag-Lloyd
- K-Line

- Westwood Shipping Lines
- Yang Ming

Currently, the major port-related cargo types that are transported by rail include international containers, import and export automobiles and export dry bulk commodities (including grain and oilseeds, potash, soda ash, coal, and others) as well as various other commodities. Key domestic cargo types include containers, automobiles, forest products, chemicals and petroleum products, and frozen commodities.

To help pinpoint and quantify local and regional rail needs, this plan developed a forecast of rail traffic in the Portland region. Forecasts for Amtrak passenger trains (Cascades, Coast Starlight, and Empire Builder), "Z" trains, and other freight trains were developed and allocated to key main line rail segments. Z trains are high-priority freight trains, including those carrying containers, trailers, and automobiles. Freight trains include all other train types such as manifest freight (multiple car types and commodities), dry bulk unit trains (grains, metal ores, minerals, fertilizers, coal and others), liquid bulk trains (crude oil, petroleum products, and chemicals).

The following shows forecasts of passenger trains, and the moderate forecast for the average annual growth rate for rail cargo by train type in the Portland area (2011 to 2030):

- Amtrak Seattle to Portland daily passenger trains increase from 10 to 14 in 2020, and to 26 in 2030.
- Amtra Portland to Eugene daily passenger trains increase from 6 to 10 in 2020, and to 12 in 2030.
- Z-Train International Containers increase by 2.5% annually.
- Z-Train Domestic Intermodal increase by 2.5% annually.
- Z-Train Automobiles increase by 2.5% annually.
- Freight – Grains and Oilseeds increase by 1.0% annually.

The First Five Years – Ten Priority Projects

The Rail Plan particularly distinguishes an immediate 5-year work plan because the 10 projects that are needed in that time frame require their first steps to be taken quickly if they are to be implemented by the end of the five years. The result of the performance evaluation and identification of when projects are needed informs as to how a project addresses specific plan goals. The projects identified as being needed in the next five years are intended to be stand-alone with no particular order of priority.

The factors that can help narrow the implementation focus include the following:

1. Numerical performance ranking of the projects;
2. Projects that are part of a needed cluster of projects providing substantial project synergies if implemented together or in a defined sequence;
3. Projects that enjoy current and substantial community, stakeholder or funder support;
4. Projects that can take advantage of newly emerging or unanticipated funding opportunities;
5. Projects that respond to increases in system-level rail volumes, new business needs or changes in economic conditions in the region.

Considering evolving conditions, project performance and the estimated time when projects are likely to be needed, we can begin to target a smaller range of rail projects within the larger list, to work on project implementation in the first five years of this Rail Plan. This section provides additional explanation about the 10 projects selected for prioritization and possible implementation in the 2013 to 2018 timeframe. It represents a starting point where the Port and its partners should focus effort in the first five years of the Rail Plan.

The priority projects are listed by four functional types:

1. **Port Access.** The top three priority projects that improve the ability of the Port's facilities to quickly and efficiently serve inbound/outbound trains from BNSF and UP main lines near the terminals are:

- **PRP-11 UP Barnes Yard to T-4 direct connection.** This project is a priority because it will help to accommodate a new tenant(s) as well as increase use of T-4 facilities.
- **PRP-13 Ramsey Yard utilization.** This project increases unencumbered track capacity to store a T-5 unit train intact. The project also eliminates a conflict between BNSF and UPRR trains arriving or departing T-5.
- **PRP-15 Bonneville Yard build-out.** This project includes two additional storage tracks and double tracking from the Bonneville Yard to the end of the Barnes Yard bypass.
- The full benefits of the Barnes Yard bypass project would be realized with the completion of this project, including the ability to accommodate simultaneous moves from Barnes Yard to both South Rivergate (T-5) and Ramsey Yards. Unit trains destined for South Rivergate (T-5) could be staged on the Barnes Yard bypass track without affecting Barnes Yard switching or servicing of General Motors.

2. **Main Line Capacity.** The top three priority projects that improve main line capacity are:

- **PRP-8 BNSF/UP/Portland Terminal Railroad – Lake Yard Main Line Access.** Improvement increases the efficiency and speed for the BNSF and UPRR to arrive and depart trains resulting in additional BNSF, UP, PNWR, PTRC, and Amtrak.
- **PRP-20 UP North Portland Crossover Improvements.** This project increases the speed at which UP trains enter or depart the heavily congested BNSF north-south main line.
- **PRP-23 UP Main Line Realignment South of Albina (the "6 mph curves").** This project increases the speed of trains on the UP main line. This project would positively affect the majority of the UP trains to, from and through Portland. The project will also aid in freeing up the main line for passenger trains by expediting freight train movements.

3. **Port Rail Operations.** The top three priority projects that improve Port rail operations are:

- **PRP-16 T-4 Soda Ash Storage Tracks.** Increases the ability to store empty and loaded rail cars for bulk commodity customers at T-4. This is likely a new or existing tenant driven project as T-4 storage tracks are at capacity to support existing T-4 tenants. Given the lack of nearby UP storage, new or expanded service would require additional storage and unloading/loading tracks. The storage track to loading/unloading track ratio would be 2 to 1.
- **RPR-1 Port of Portland Rail Terminal Maintenance and Repair Projects.** Improves or maintains safety and service reliability in the terminals, which allows the Port to retain existing tenants and attract new ones. These projects also allow the Port to make most effective use of valuable on-dock and near-dock rail facilities, and avoid more expensive repairs in the future. The individual work elements for this project are:
  - PRP-1A: T-4 Track 701 (Cereal Foods) Rehabilitation
  - PRP-1B: T-4 Track 702 (Cereal Foods) Rehabilitation

- PRP-1C: T-4 Track 401 (Soda Ash) Rehabilitation
- PRP-1D: T-4 Tracks 704-709 (Cargill) Rehabilitation
- PRP-1E: Swan Island Lead Track Rehabilitation
- PRP-1F: Swan Island Lead Track: Channel Avenue Crossing improvements
- PRP-1G: T-4 Track 500 (McDermott Lead) Rehabilitation
- PRP-1H: T-2 Track Rehabilitation

· **PRP-2 T-4 Pier 1 Rail Yard Improvements.** The project maximizes the size of a developable parcel on Pier 1 by relocating redundant railroad track. The project is given priority because there is a high demand in 2013 for developable sites on the West Coast with both marine cargo and rail access. This project should be paired with PRP-11 to create the requisite rail capacity to serve the site.

4. **Mitigation.** The top priority project that needs to be done as a result of current or near term increases in rail traffic is:

· **PRP-12: North Rivergate Boulevard grade separation.** This project will mitigate increased blockage by trains of the North Rivergate Boulevard/UP at-grade crossing, generated by the recent expansion and use of T-5 tenants, including ADM, Columbia Grain, Portland Bulk Terminal (Capotex), and Evraz. This project would improve railroad efficiency and the speed of arriving or departing trains, thus allowing for new Port business.

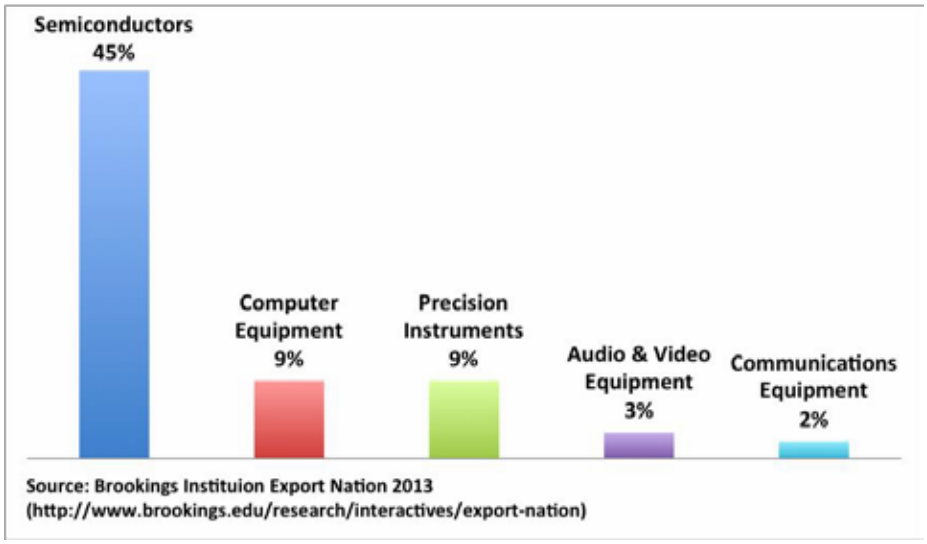
There are other mitigation projects in the Rail Plan (not listed in this summary report) that would be triggered by Port Rail and Operations and Port Access projects and should be considered together. For example, the Marine Drive Grade Separation project (PRP-4), which grade separates Marine Drive over the BNSF lead track to Ramsey Yard and T-6 mitigation for increased blockage of the Marine Drive/BNSF at-grade crossing. The increased rail and road traffic is generated by the recent expansion at T-5 by tenants such as Columbia Grain and increased business at BNSF Rivergate Automotive Facility.

Portland Region Westside Freight Access and Logistics Analysis (October 2013)

Portland's economy has long relied on export industries, serving broad domestic and international markets and bringing outside dollars into the region. Increasingly, Portland's export economy relies on the computer and electronics (C&E) industry, which accounts for over half the total value of the region's exports (Figure 3). This industry is primarily located in the region's Westside (sometimes called the "Silicon Forest") and depends on a tightly managed supply chain to efficiently bring products to markets that are mostly outside of the Portland Metropolitan area. This study provides recommendations on how to improve goods movement from the Westside C&E industry to Portland International Airport (PDX) freight consolidation locations.

While this study focuses on a single sector of the region's export economy, it is important to recognize that the policies and investments that support the C&E industry may support other key export industries such as footwear, apparel, and agricultural products.

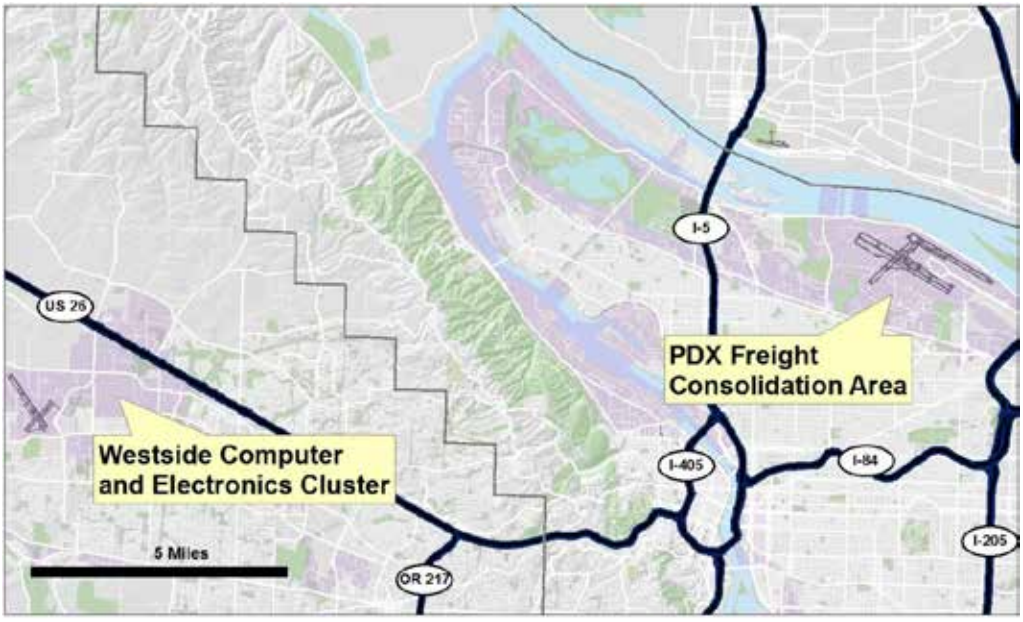
Figure 3: Industries Representing Two Percent or More of the Portland Region's Exported Goods



Study Focus

This study focuses on the outbound movement of goods from Westside C&E manufacturers to the freight consolidation area at Portland International Airport (PDX), as shown in Figure 4. While not all C&E goods fly out of PDX, the freight consolidation area, generally located north of Columbia Boulevard and south of the terminal, is home to several firms that support international and domestic service by handling and combining C&E goods before trucking them north or south of the Portland region for consolidation at other airports. For the purposes of this study, Westside C&E firms are assumed to be clustered south of US 26 in the vicinity of Brookwood Parkway.

Figure 4: Study Area for Westside C&E manufacturers to Portland International Airport



Five industry manufacturers were interviewed along with seven of their freight forwarder or integrators and carriers (trucking). These twelve stakeholders were interviewed to determine the factors that influenced their supply chain/ logistics decisions. The interviews highlighted that the span of control over the movement of products does not reside with any single entity, institution, or supply chain node from end to end. This results in the forwarders and integrators as primarily having the high level routing decisions; determining gateways and mode of travel. The factors driving logistics decisions are:

1) Fastest routing
2) Carrier equipment
3) Carrier qualification
4) Cost

Issues and Considerations

The following summarizes key issues identified through the assessment of how the transportation system is used and how well it performs to move goods from the Westside C&E area.

1) **Limited route choice.** Route choice for vehicles travelling from the Westside to consolidation facilities near PDX is constrained by topography and limited system redundancy. Once east of Cornelius Pass Road, vehicles are typically past the "point of no return" and must generally remain committed to their route.
2) **US 26 travel time reliability.** Average peak period travel time is significantly slower than free flow conditions on US 26. In addition, incidents and other issues can further degrade the performance and cause travel times to be unreliable. Downstream bottlenecks at I-405 cause queues to spill back to US 26 in both the inside and outside lanes as eastbound traffic approaches downtown Portland.

3) **I-5 travel time reliability.** Similar to US 26, I-5 has poor travel time reliability. The variation of travel time is due to downstream bottlenecks such as the Interstate Bridge over the Columbia River.

4) **US 30 to Columbia Boulevard connection.** Traffic using the Cornelius Pass route headed for eastbound Columbia Boulevard must travel a route that is significantly out of direction, both to cross the St. Johns Bridge and to maneuver through the existing street network in and around the St. Johns neighborhood.
5) **Cornelius Pass Road condition.** Due to limited right of way and terrain, this important connection between US 26 and US 30 involves both horizontal and vertical curves that are not optimal for freight mobility.
6) **Freeway Access and Ramp Meters.** From anecdotal information, these queues can frequently spill back onto the arterial streets, and delays can range 10 to 20 minutes.

Project Analysis Results

Projects were grouped into the following categories based on how well they met identified needs:

- **Group 1** – Projects that address specific needs of Westside C&E freight movements to freight consolidation areas
- **Group 2** – Projects that address general Westside freight movements (beyond C&E)
- **Group 3** – Other long-range projects that provide benefits to freight.

Three projects demonstrated the greatest potential for benefits to Westside freight movement and are categorized as Group 1. Each would provide significant travel time benefits and address specific needs identified by the Westside C&E industry. In addition, each project could be implemented as short-term improvements that would immediately benefit freight movement.

Group 2 still provided value to the wider region and has benefits to transportation system users other than those related to Westside C&E goods movement. However, when considering the specific travel needs of the freight routes considered in this analysis, these projects do not provide direct benefits to the same degree as the Group 1 projects.

One project, I-5 Rose Quarter, has been categorized as Group 3. While it does not directly address the two identified routes for Westside freight, it would provide benefits to other regional freight movement. Table 5 lists each project and the evaluation criteria that were applied.

Table 1: Westside Freight Access and Logistics Analysis - Project Analysis Summary Matrix

Project Number	Project Name	Benefits by Evaluation Criteria					Project Group
		Travel Time (Average)	Travel Time (Reliability)	Overall Distance	Corridor Segment	Connection	
GROUP 1							
3	Traveler Information		n				1
6	Ramp Meter Bypass	n	n				1
27	Enhanced Incident Response		n				1
GROUP 2							
1	Green Signals	Ÿ	Ÿ				2
7	Helvetia Widening	Ÿ					2
8	West Union Widening	Ÿ					2
9	US 26 Widening	Ÿ	Ÿ				2
10	Cornelius Pass Safety		Ÿ				2
17	Burgard-Lombard Widening	Ÿ					2
19	Lombard Communications	Ÿ	Ÿ				2
20	Columbia Communications	Ÿ	Ÿ				2
25	Cornfoot Widening	Ÿ					2
26	Airtrans/Cornfoot Improvements	Ÿ					2
28	Century Extension	Ÿ				n	2
29	Columbia Rail Crossing Improvements		Ÿ				2
32	Schaaf Extension	Ÿ				n	2
GROUP 3							
21	I-5 Rose Quarter		Ÿ				3

Legend: (blank) = no benefit, Ÿ= potential for nominal benefit, n = potential for significant benefit

Recommendations

Three strategies emerged from this study that show clear benefit to Westside C&E freight movement and can potentially be implemented in a short timeframe. These strategies are shown in Table 1.

Table 2: Westside Freight Access and Logistics Analysis Recommended Priority Projects

Project Name	Description	Benefits
Enhanced Traveler Information	Provides predictive traveler information at key points on routes approaching US 26, alerting drivers to congestion on US 26, through the central city loop, or on Cornelius Pass Road northbound.	Provides more reliable travel time by alerting drivers of incidents, reducing non-recurring delay.
US 26 Truck Ramp Meter Bypass	Modify select US 26 on-ramps to allow freight to bypass ramp meter queues.	Potential to reduce queue-related delay by 10 to 20 minutes.
Enhanced Freeway Incident Response	Increase incident response and clearing capacity on key US 26/I-405/I-5 freight route to reduce non-recurring congestion impacts.	Reduces delays due to incidents.

Regional Over-Dimensional Truck Route Study Existing Conditions (February 2016)

Introduction and Purpose

Over-dimensional freight movement is a specialized and important type of freight movement. An over-dimensional load can be any combination of per axle weight, height, width, and length that is non-divisible and exceeds legal dimensions. Within Oregon, permits are required for loads that exceed legal dimensions for weight, height, width, and length.

Maintaining access routes for over-dimensional freight movements within the Portland metropolitan region is a priority for transportation agencies. The over-dimensional route network is a key component of a complete transportation system, which serves industry and supports an economically vibrant region.

This report seeks to define the state of the freight transport network in the greater Portland region including Clackamas, Multnomah, and Washington counties. Included in the report are:

- Over-dimensional policies and permitting practices
- Key findings from an analysis of over-dimensional permit data
- Documented conditions on commonly used corridors.

Over-Dimensional Permitting Procedures

ODOT's Motor Carrier Transportation Division (MCTD) issues single-trip and annual variance permits for over-weight, over-height, over-width, over-length, and other unusual truck loads. The permits include routing plans, road restriction information, pilot vehicle requirements, and other permit conditions. Permit routing covers state and federal highways. They can also cover county roads, with county approval.

A permit is needed to haul any single, non-divisible load for which any one of the following conditions apply:

- Width of the load or hauling equipment exceeds 8 feet 6 inches
- Height of vehicle or vehicle combination and load exceeds 14 feet
- Vehicle and/or combination length exceeds those authorized
- Front overhang exceeds 4 feet beyond the front bumper of the vehicle
- Load greater than 40 feet, exceeding 5 feet beyond the end of the semi-trailer
- Load length 40 feet or less, as long as rear overhang does not exceed 1/3 of the wheelbase of the combination, trailer length does not exceed 40 feet, and overall length (including rear overhang) does not exceed 60 feet
- Gross combination weight exceeds 80,000 pounds
- Any single axle weight exceeds 20,000 pounds
- Any tandem axle weight exceeds 34,000 pounds

Analysis of Over-Dimensional Freight Movement

ODOT Permit Data Analysis Findings

The evaluation of permitted over-dimensional moves seeks to identify what types of freight and its over-dimensional parameters are traveling on which routes. For example, knowing ranges of length, height, weight commonly transported along which corridors in order to better plan a network of corridors to meet demand for this freight move.

ODOT provided permit records from permit data from December 2012 to December of 2015. The following analysis of over-dimensional freight movement included 20,611 permit records.

Over-Dimensional Commodities and Routes

Table 1 ranks routes in the study area in order of frequency of over-dimensional freight movement. The most frequent over-dimensional commodity is excavators, followed by cranes and log loaders.

Table 1 - Frequent Over-Dimensional Commodities

Commodity	Permits issued	Percent of total moves
Excavator	2676	13.0%
Crane	1836	8.9%
Log Loader	1426	6.9%
Asphalt Profiler	845	4.1%
Dozer	520	2.6%
Feller Buncher	483	2.3%
Processor	472	2.3%
Air Handling Unit	280	1.4%
Grinder	271	1.3%
Self-Propelled Concrete Pump	266	1.3%
Steel Beams	257	1.2%
Scraper	249	1.2%
Forklift	241	1.2%
Loader	199	1.0%
Shovel	198	1.0%

Table 2 lists roadways used by over-dimensional loads in order of frequency. Over-dimensional loads originate and terminate on city streets and local roads. The majority share common major freeway and arterial segments such as I-5, US26, I-205, Tualatin Sherwood Rd, OR217. The following table is a sampling of the most frequently used road facilities.

Table 2 - Frequent Routes for Over-Dimensional Freight Movement

Route	% of Total Movement	Route	% of Total Movement
I-5	7.6%	OR8	0.6%
City Streets (not specified	5.7%	Boones Ferry Rd	0.6%
US26	5.4%	Evergreen Pkwy	0.6%
I-205	4.9%	US30 Bypass	0.5%
I-84	3.2%	OR224/OR211	0.5%
I-405	3.2%	Sandy Blvd	0.5%
Tualatin Sherwood Rd	2.4%	OR18	0.5%
OR217	2.3%	US97	0.4%
Brookwood Pkwy	1.7%	Day St	0.4%
OR211	1.7%	Mathias Rd	0.4%
OR99W	1.5%	Glencoe Rd	0.4%
OR224	1.5%	US20	0.4%
OR47	1.0%	OR219	0.4%
OR213	1.0%	OR6	0.4%
OR212/OR224	1.0%	Cornell Rd	0.4%
Cornelius Pass Rd	0.9%	OR141	0.4%
US30	0.8%	OR551	0.4%
Grahams Ferry Rd	0.8%	Brookwood Ave	0.4%
OR99E	0.8%	Tonquin Rd	0.3%
OR212	0.8%	238th Dr	0.3%
OR214	0.6%	Columbia Blvd	0.3%

Portland Bureau of Transportation Permit Data Analysis Findings

Portland Bureau of Transportation provided 850 records of over-dimension permit data from April 2014 to December 2015. Table 9 shows the most frequently occurring roadways for over-dimensional permits.

Table 9 - PBOT Most Frequently Occurring Roadways

Route	% of Total Routes	Route	% of Total Routes
Columbia Boulevard	12%	N Denver	1%
N Lombard St	5%	NE MLK	1%
30 BYP	4%	NW 15th	1%
I5	4%	OSM	1%
N Portland Rd	3%	Harborgate	1%
N Marine Dr	3%	99E	1%
Columbia Parkway	2%	N Ramsey Blvd	1%
US 30	2%	NE Columbia	1%
NW Front	1%	N Going St	1%
N Rivergate Blvd	1%	N Richmond	1%
NE Airport Way	1%	N Vancouver	1%
I205	1%	NE 181st	1%
NW 21st	1%	NE Broadway	1%
NW Nicolai	1%	NE 158th	1%
I405	1%		

The following table displays frequency of commodities as a percent of total commodities. Excavators are represent are the single most common over-dimensional commodity, followed by log loaders and cranes.

Table 10 - PBOT Most Frequent Over Dimensional Commodities

Commodity	% of Total Moves
Excavator	19%
Log Loader	4%
Non-Divisible Loads	4%
Crane	4%
Forest Machine/Excavator	2%
Steel Plate	2%
Wheel loader	2%
Skidder	2%
Drill	2%
Steel Plates	2%
Feller Buncher	2%
Modular Building	2%
Grinder	2%

Existing Conditions Analysis of Priority Regional Over-Dimensional Truck Route Corridors

This section details existing conditions for over-dimensional truck route corridors in the Portland tri-county region. The sections are distinguished by Clackamas County, Multnomah County, Washington County and the City of Portland. Each corridor includes a general description, policy review, roadway and operational characteristics, permit analysis, bridge and crossing details, and identified projects on the corridor.

Figure 5 provides a map of the 31 over-dimensional corridors in the Portland tri-county region.

Figure 5 – Regional Map Placeholder

More summary information on existing conditions and a gaps and needs analysis will be added later.

Bottleneck Studies and Congestion Impacts

Corridor Bottleneck Operations Study (CBOS) Project Atlas Summary (April 2013)

Introduction

The project atlas provides a collection of maps, tables and project sheets that can be used in a variety of different ways, depending on the user's needs. The Project Atlas identifies bottleneck locations along the five metro area corridors (I-5, I-205, I-84, I-405 and US 26) and correlate locations of congestion with recommended projects. This study is in response to Federal Highway Administration (FHWA) Localized Bottleneck Reduction (LBR) program. The LBR program focused on relieving recurring bottlenecks (as opposed to non-recurring bottleneck causes) and the operational influences that cause them. The primary purpose is to improve safety and operations at these bottlenecks. This new approach is to seek cost-effective and small-scale improvements to the existing system. The projects recommended are not capacity improvements.

The development of this Project Atlas consists of three steps:

- Corridor-level reconnaissance:

  This step consisted of corridor-level reconnaissance to provide the foundation for specific investigation to identify and validate bottleneck activity and causes.

- Bottleneck analysis, evaluation, screening, and selection of solutions:

  This step focused primarily on design and operations. Bottlenecks were analyzed and potential solutions were developed, evaluated, and screened by an expert multidisciplinary design panel.

- Refinement of solutions:

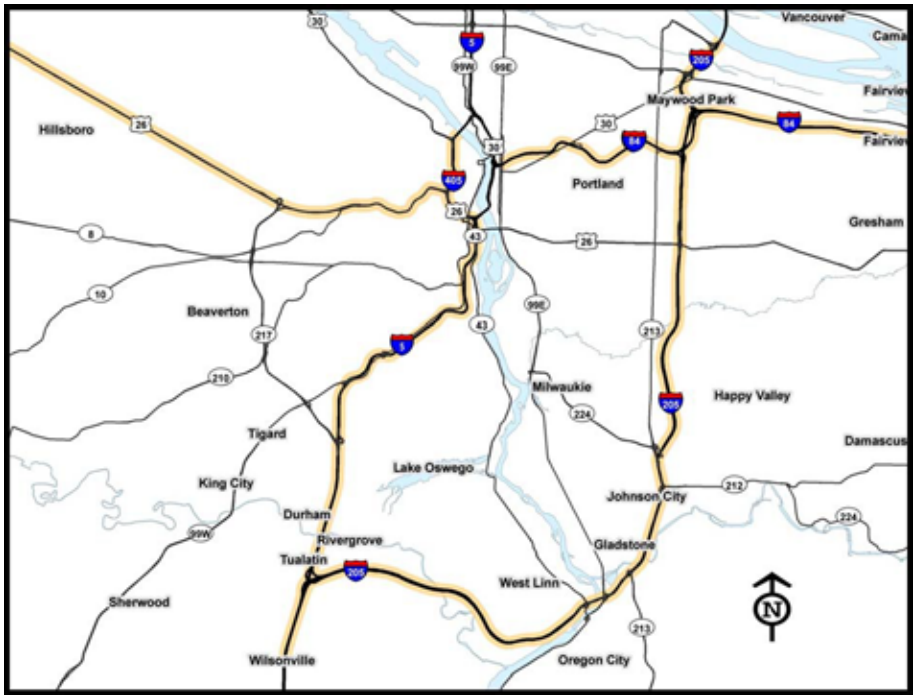
  The final step involved a more thorough operations and design evaluation of potential solutions deemed feasible by the screening panel. The detailed evaluation and refinement included traffic modeling to assess various performance measures, then assessment of project feasibility.

Projects were selected as providing the best value of benefits and cost (primarily $1 million to $20 million range). It should be noted, however, that traffic volumes on these highways are very high, particularly during the peak commute hours, and because these operational improvements do *not* add capacity, the benefits achieved will likely be moderate and incremental. Insofar as bottlenecks along these corridors often meter traffic flow, reducing the queuing and delay at a specific bottleneck may allow more traffic to pass through and move the bottleneck further downstream. Notwithstanding these occurrences, the proposed projects will alleviate congestion at identified bottlenecks, particularly on the peak commute shoulders, and enhance safety by improving the weaves and merges that occur at interchanges.

Study Area

The study area consists of five corridors in the Portland metropolitan area (see **Figure 1**): I-5, I-205, I-84, I-405, and US 26. The I-5 corridor is bounded on the north by the Marquam Bridge (approximately milepost 300) and on the south by the Boones Bridge (approximately milepost 283) in Wilsonville. The I-205 corridor is bounded on the north by Airport Way (approximately milepost 25) and on the south by the I-5 interchange in Tualatin (approximately milepost 0). The I-84 corridor is bounded on the west by I-5 and on the east by 257th Avenue. The I-405 corridor is bounded on the north and south by I-5. The US 26 corridor is bounded on the west by OR 47 and on the east by I-405. The study areas for each corridor includes the roadway mainline as well as the ramp merge/diverge locations. This project does not include evaluation of ramp terminals or other parallel roadway facilities.

Figure 1 Study Area Corridors Map



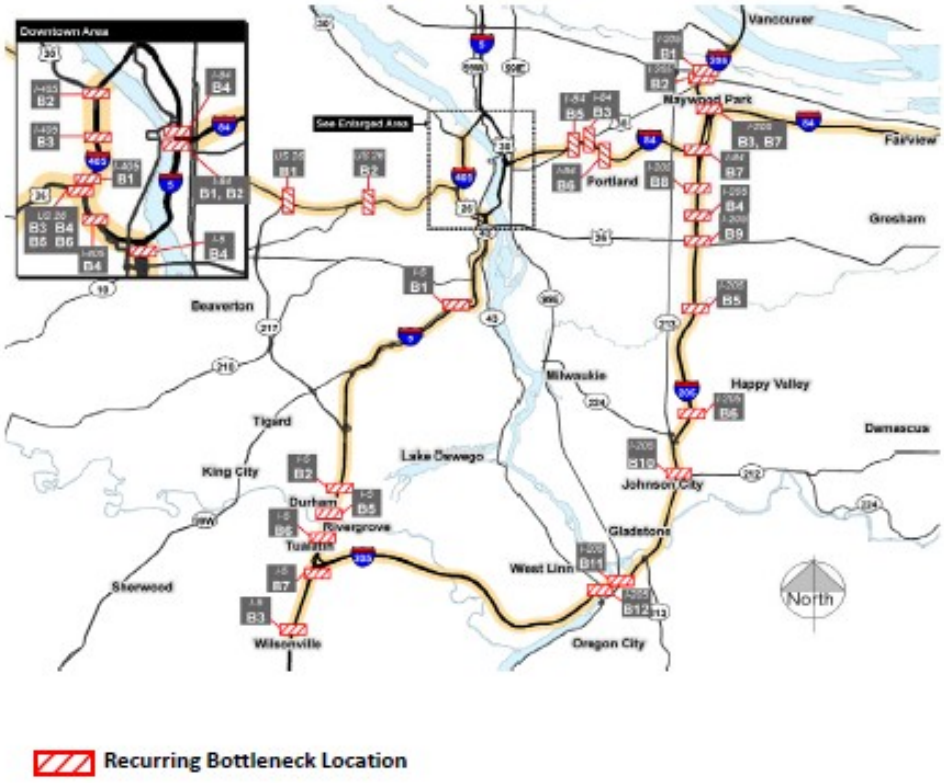
Bottleneck Identification Methodology

The bottleneck identification analysis in this study is intended to provide spatial and temporal evaluation of freeway operations along each of the freeway corridors and to help correlate locations of congestion with potential mitigation measures. For this study, the term bottleneck was used to identify corridor operations that result in a speed of 35 miles per hour or less across all lanes. There were two tiers of analysis used to identify bottlenecks.

The first tier of analysis included a corridor-level reconnaissance utilizing loop detector data from the Portland Oregon Regional Transportation Archive Listing (PORTAL), historical crash data (5 years) from ODOT's Online Crash Database, and a review of Oregon Highway Plan (OHP) mobility standards as they relate to the current operations of each

facility. The PORTAL data is used to identify bottleneck locations for a typical weekday commute during the AM and PM peak periods.

Figure 3-12: Regional Recurring Bottleneck Locations



Recurring Bottleneck ID	Recurring Bottleneck Locations	Cause		Congestion Speed (MPH)	Congestion Duration (Hours)
		Decision Point	Physical Constraint		
I-5 Bottlenecks					
B1	I-5 NB: Terwilliger Boulevard Entrance Ramp (AM & PM)	X	X	20	4
B2	I-5 NB: Lower Boones Ferry Road Exit Ramp (AM)	X		30	1.25
B3 *	I-5 NB: Westbound Elligsen Road Entrance Ramp (PM)	X		*	*
B4	I-5 SB: Hood Avenue Exit Ramp (PM)	X		10	2.75
B5	I-5 SB: Carman Drive Lane Drop (PM)	X		10	2.25
B6	I-5 SB: Nyberg Street Exit Ramp (PM)	X		25	2.5
B7 **	I-5 SB: I-205 Entrance Ramp (PM)	X		**	**
I-205 Bottlenecks					
B1	I-205 NB: Sandy Boulevard/Columbia Boulevard Entrance Ramp (PM)	X		20	3
B2	I-205 NB: Columbia Boulevard/Hwy 30 Exit Ramp (PM)	X		35	Inconclusive
B3	I-205 NB: Westbound I-84 Entrance Ramp (PM)	X		5	5.25
B4	I-205 NB: Division Street Entrance Ramp and Hwy 26/Powell Blvd. Entrance Ramp (AM & PM)	X		10	2.75
B5	I-205 NB: Foster Road Exit Ramp (AM & PM)	X		20	4
B6	I-205 NB: Sunnybrook Road Entrance Ramp (PM)	X		30	2.25
B7	I-205 SB: Westbound I-84 Exit Ramp (AM & PM)	X		5	4.25
B8	I-205 SB: Stark/Washington Street Entrance Ramp (PM)	X		10	3.25
B9	I-205 SB: Hwy 26/Division Street/Powell Boulevard Exit Ramp (PM)	X		25	3.25
B10	I-205 SB: 212/224 Entrance Ramp (PM)	X		35	1
B11	I-205 SB: 99E/McLoughlin Boulevard Exit Ramp (AM)	X		20	1.25
B12	I-205 SB: Hwy 43 Entrance Ramp (AM)	X		30	2
I-84 Bottlenecks					
B1	I-84 EB: I-5 SB Entrance Ramp (AM & PM)	X		10	12
B2	I-84 EB: I-5 SB/NB Merge (PM)		X	5	4
B3	I-84 EB: 39th Avenue Entrance Ramp (PM)	X		Inconclusive	Inconclusive
B4	I-84 WB: I-5 Diverge (AM & PM)	X		20	8+
B5	I-84 WB: 33rd Avenue Entrance Ramp (AM)	X		15	4
B6	I-84 WB: Glisan Entrance Ramp (AM)	X		Inconclusive	Inconclusive
B7	I-84 WB: I-205 SB to I-84 WB Ramp	X		Inconclusive	Inconclusive
I-405 Bottlenecks					
B1	I-405 NB: US 26/12th Ave (PM)	X		5	3
B2	I-405 SB: US 30 Entrance Ramp (PM)	X		5	3
B3	I-405 SB: Everett Street Entrance Ramp to US 26 Exit Ramp Weave (PM)	X		5	3
B4	I-405 SB: US 26 Entrance Ramp to Broadway Exit Ramp Weave (PM)	X		5	3
US 26 Bottlenecks					
B1	US 26 EB: Oregon 217 Entrance Ramp (AM)	X		10	3
B2	US 26 EB: Skyline/Scholls Ferry Entrance Ramp (AM & PM)	X		Inconclusive	Inconclusive
B3	US 26 EB: I-405 Positioning/Curves/Tunnel (AM & PM)	X	X	15	8
B4	US 26 EB: Ramp to I-405 SB (AM & PM)	X	X	5	8
B5	US 26 EB: Ramp to I-405 NB (AM & PM)	X	X	5	7
B6	US 26 WB: I-405 Ramps/US 26 merge (PM)	X	X	10	3

* Construction of NB Auxiliary Lane in 2011

** Construction of SB Auxiliary Lane in 2010

The second tier of bottleneck analysis included validation of the PORTAL observations by means of existing documentation, or further investigation in the form of ODOT video camera footage, field travel time data, and traffic volume collection (to determine saturation flow rates). After validation, the bottleneck locations, activation and deactivation times, duration, and average queue lengths were verified and translated to graphics to combine and visually assess correlations between crash frequency and lane geometry on the facilities.

Common Causes and General Locations of Bottlenecks

Previous traditional transportation solutions for freeway congestion bottlenecks were large-scale extensive, corridor-wide mega-projects. The recent economic downturn has resulted in a re-evaluation of developing congestion relief. Transportation agencies are now looking to understand and identify specific causes of freeway bottlenecks and develop the "best fit" solution to address congestion and safety concerns.

Recurring, localized bottlenecks occur any time the rate of approaching traffic is greater than the rate of departing traffic. The causal effect can usually be attributed to the existence of at least one of two factors:

- **Decision Points,** such as entrance and exit-ramps, merge areas, weave areas, and lane drops; or
- **Physical Constraints,** such as curves, underpasses, narrow structures, or absence of shoulders.

Over 30 recurring bottleneck locations were identified by a design panel of experts. The locations of these bottle necks are shown on the map and table in Figure 3-12.

The table above also shows the cause, average speed during congested periods and the duration (in hours) of the congestion for each of the recurring bottleneck locations.

What and Where are the Bottlenecks

Based on the review of Bottleneck Operations Detail Figures including PORTAL data, ODOT cameras, and field travel time data, thirty-six (36) bottlenecks are identified along the I-5, I-205, I-84, I-405, and US 26 corridors. The study corridor bottlenecks are classified by direction, time of day, (AM Peak or PM Peak) and location.

I-5 Corridor Bottleneck Operational Detail Findings

A total of seven (7) bottlenecks locations are identified within the I-5 study corridor; three bottlenecks are in the northbound direction and four in the southbound direction. Bottleneck numbers B-3 and B-7 have been removed. B-3, a southbound auxiliary lane was built in 2011 and for B-7 a northbound auxiliary lane was built in 2010.

I-205 Corridor Bottleneck Operational Detail Findings

A total of twelve (12) bottleneck locations are identified within the I-205 study corridor; six bottlenecks are in the northbound direction and six in the southbound direction.

I-84 Corridor Bottleneck Operational Detail Findings

A total of seven (7) bottleneck locations are identified within the I-84 study corridor; three bottlenecks are in the eastbound direction and four in the westbound direction.

I-405 Corridor Bottleneck Operational Detail Findings

A total of four (4) bottleneck locations are identified within the I-405 study corridor; one bottleneck is in the northbound direction and three in the southbound direction.

US 26 Corridor Bottleneck Operational Detail Findings

A total of six (6) bottleneck locations are identified within the US 26 study corridor; five in the eastbound direction and one in the westbound direction.

Recently Completed Improvements

I-5 Southbound auxiliary lane built in 2010. This auxiliary lane is 1.5 miles long from I-205 to Elligsen Road. This section of I-5 was ranked 125th on the national freight congestion list. The construction coast was approximately $5.0 million.

I-5 Southbound exit ramp to Nyberg Road built in 2010. The improvement widened the southbound Nyberg Road exit ramp from one lane to two lanes. The ramp widening resulted in significant crash reduction and operational improvement. The construction cost was approximately $500,000.

I-5 Southbound Phase 1: Carman Drive entrance ramp to Lower Boones Ferry exit ramp – auxiliary lane completed in 2012. This project extended the current lane drop just south of the Carman Drive exit ramp to Lower Boones Ferry Road exit ramp, where it would become a drop lane. The construction cost was approximately $1.25 million.

Potential Solutions and Potential Regional Projects

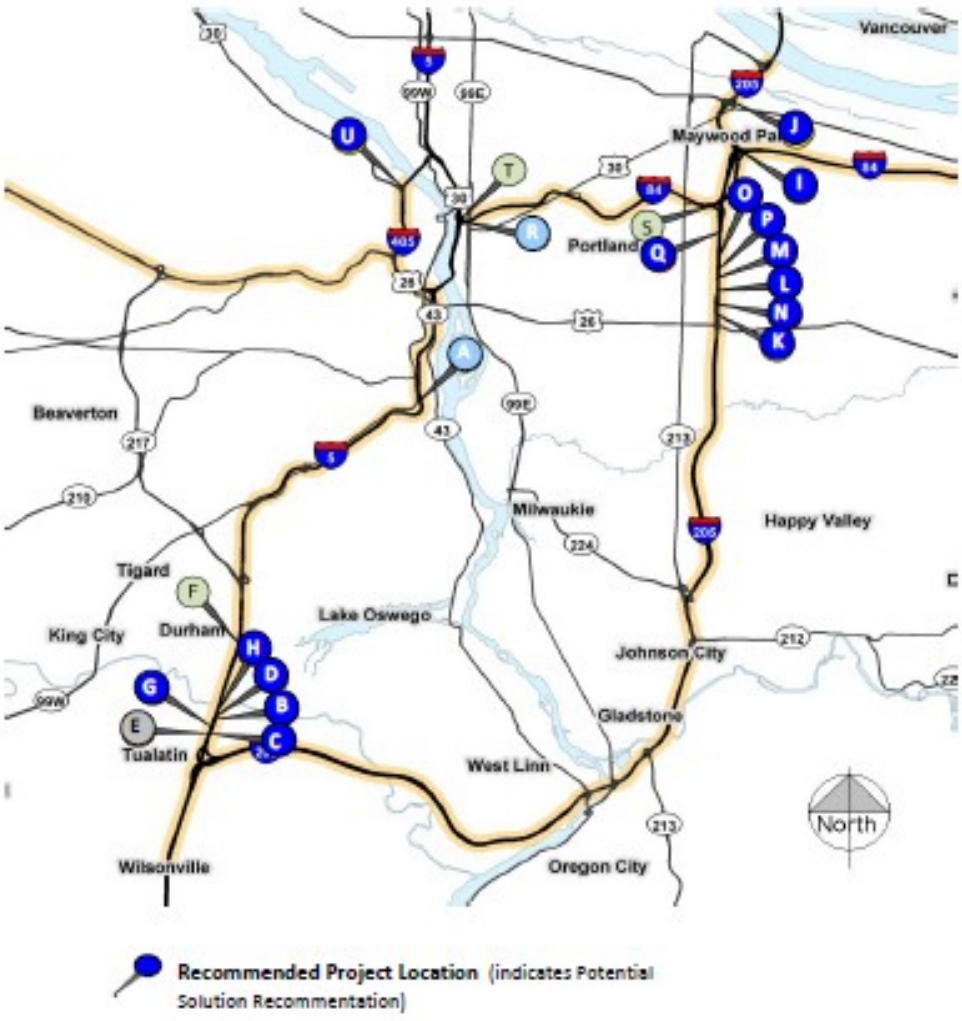
The majority of the projects were identified for the I-5 and I-205 corridors. No projects were selected for advancement along the US 26 corridor. Overall, there are four recommended actions:

- Bottleneck solution is recommended to move forward to develop a project. The project solution is recommended to move forward if analysis indicates that solution provided an operational or safety benefit and the estimated cost fit the $1.0 million to $20.0 million range.
- Recommendation for the solution is for additional analysis to determine the project. The additional analysis is required to develop a potential solution that will provide operational or safety benefit and an estimated cost that fits in the $1.0 million to $20.0 million range.
- Recommendation is that the bottleneck solution should be dropped.

· The final recommendation is that the solution has been constructed or is planned/programmed for construction.

Figure 3-13 (below) provides a list of potential projects by corridor.

Figure 3-13: Potential Regional Projects



CBOS Projects with Current Project Status (in 2016)			
Potential Regional Project Summary			
Map ID #	**Potential Solution and Current Status**	**Description of Potential Regional Projects**	**Est. Cost**
I-5 Potential Bottleneck Projects			
A	Further Analysis	I-5 NB: Terwilliger Blvd. Entrance Ramp Extension	$30-$40 M
B	Yes, Project Funded for Construction	I-5 NB: Phase 1 - Lower Boones Ferry Road Exit Ramp Reconfiguration	$1-$2 M
C	Yes, but Not Funded	I-5 NB: Phase 2 - Nyberg Rd. Interchange to Lower Boones Ferry Rd. Interchange - Auxiliary Lane Extension	$11.5-$13.5 M
D	Yes, but Not Funded	I-5 NB: Phase 3 - Lower Boones Ferry Rd. Interchange to Carman Dr. Interchange - Auxiliary Lane Extension	$17-$21 M
F	Project Constructed in August 2012	I-5 SB: Phase 1 - Carman Dr Entrance Ramp to Lower Boones Ferry Exit Ramp - Auxiliary Lane	$1.25 M
G	Yes, Project Funded for Construction	I-5 SB: Phase 2 - Lower Boones Ferry Rd. Exit to Lower Boones Ferry Rd. Entrance Auxiliary Lane	$7.5-$8.5 M
H	Yes, Project Funded for Construction	I-5 SB: Phase 3 - Lower Boones Ferry Rd. to I-205 Auxiliary Lane Extension	$10-$18 M
I-205 Potential Bottleneck Projects			
I	Yes, Projects combined into one project. Project under development	I-205 NB: Phase 1 - I-84 WB Entrance Ramp to Sandy Blvd. Exit Ramp - Auxiliary Lane	$10-$15 M
J		I-205 NB: Phase 2 - Sandy Blvd. Exit Ramp to Columbia Blvd. Exit Ramp - Auxiliary Lane Extension	
K	Yes, but Not Funded	I-205 NB: Powell Blvd. Entrance Ramp to Division St. Entrance Ramp - Auxiliary Lane Extension and 2-Lane Exit at Washington St.	$6.5-$7.5 M
L	Yes, but Not Funded	I-205 NB: Phase 1 - Powell Blvd Entrance Lane to Washington St. Exit Ramp - Auxiliary Lane Extension	$6.0-$6.9 M
M	Yes, but Not Funded	I-205 NB: Phase 2 - Washington St. Exit Ramp to Glisan St. Exit Ramp - Auxiliary Lane Extension	$2.4- $2.8 M

Map ID #	Potential Solution and Current Status	Description of Potential Regional Projects	Est. Cost
N	Yes, but Not Funded	I-205 NB: Phase 3 - Glisan St. Exit to I-84 WB Exit Ramp - Auxiliary Lane Extension	$2.2-$2.5M
O	Yes, but Not Funded	I-205 NB: Phase 4 - Division Street Entrance Ramp to Stark St./Washington St. Exit Ramp - Auxiliary Lane Extension w/ 2-lane Exit at Washington Street	$1.7-$2 M
P	Yes, but Not Funded	I-205 NB: Division St. entrance ramp to I-84 WB Exit Ramp - Auxiliary Lane Extension w/2-lane Exit at Washington St.	$7.6-$8 M
Q	Yes, Project under development	I-205 SB: I-84 EB Entrance ramp to Stark St./Washington St. exit Ramp - Auxiliary Lane	$7-$8.5M
I-84 Potential Bottleneck Projects			
R	Further Analysis	I-84 EB: Grand Ave. Entrance Ramp Extension	$4.4-$5 M
S	Project Constructed in 2013	I-84 EB: Halsey St. Exit Ramp to I-205 NB Entrance Ramp - Auxiliary Lane	$5.9 M
T	Project Constructed in 2013	I-84 WB: I-5 NB and I-5 SB Diverge Re-striping	$0.5 M
	TIGER Grant funding for construction	I-84 EB/WB Active Traffic Management (I-5 to I-205)	
I-405 Potential Bottleneck Projects			
U	Yes, New signage on Bridge, most of project not funded	I-405 SB/US30 EB: Entrance Ramp Lane Re-arrangement	$0.5-$1.0 M
US 26 Potential Projects			
	TIGER Grant funding for construction	US26 Active Traffic Management OR217 to I-405 EB)	

Economic Impacts of Congestion in Oregon (February 2014)

This study examines the effects of congestion and resiliency on the entire state of Oregon. It does so by using statewide data when possible, and by compiling information from various metropolitan planning organizations throughout the state. Particularly, this study focuses on four metropolitan planning organization (MPO) regions for their congestion impacts: Mid-Willamette Valley (Salem); Bend; Corvallis; and Portland. The analysis on seismic resiliency explores those issues for a different set of geographies, however, focusing on all of Western Oregon.

This study is a continuation of a series of studies that have explored the issue of transportation congestion in Portland and Oregon. The first such study, The Cost of Congestion to the Economy of the Portland Region (2005) looked at exclusively the Portland region and considered the issues of investing or not investing from the perspective of a 2004 and 2005 transportation system.

Overview

Oregon's transportation system is the backbone of the state's economy. A well-maintained, resilient, and efficient network of highways, rail and waterborne transportation is essential to support the businesses that provide the jobs and revenues needed to underpin the resource-based, traditional manufacturing and advanced biotech and computer/electronics technologies that characterize the state's economy. Oregon's ability to retain its quality of life in an increasingly global economy rests to a great degree on its ability to provide well-paying jobs in the diverse array of industries that trade with the rest of the US and the rest of the world. To maintain its leadership as an attractive destination for workers of all types – including those in the industrial sectors that are most sought-after for their skills, talents and creativity – Oregon must support, retain and attract kinds of labor and the types of businesses best suited to the emerging demands of the domestic and international marketplace.

New investments are needed to maintain Oregon's connections with global and domestic markets, and to remain competitive with other states that are planning large investments in their transportation infrastructure. This report finds that:

1. Oregon's competitiveness is largely dependent on efficient transportation. Over **346,400 jobs** are transportation related, or transportation- dependent, meaning that system deficiencies threaten the state's economic vitality.

2. Businesses are reporting that traffic congestion and travel delay is costing money, forcing changes in business operations and location decisions.

3. Investments would generate 8,300 jobs by 2040, $1.1 billion in benefits, and a $2.4 return for every $1 of investment.

Role of Transportation in the State's Economy

The state's economy and job base are transportation-dependent, especially on highways, for the connections they provide to domestic and international markets.

Oregon's geographic location makes it a key component of US West Coast logistics, serving as a major hub for domestic and international freight. The state provides key international air and maritime gateways, as well as an important junction of critical transcontinental highways. Oregon is served by 23 port districts including nine with inter-modal freight terminals, 23 railroads including high capacity transcontinental main lines of both western Class 1 railroads, and 97 public use airports including seven with commercial airline service. The Portland region in particular ranks fifth among Western metropolitan regions in international shipments. However, all of these modes depend on efficient and reliable highway access for freight shipments, business deliveries, and as passenger travel for business.

"Traded industries" – those industries that provide goods and services outside of Oregon and bring money back into the state economy – are particularly reliant on an efficient transportation network. Exports from these industries are shipped through most major ports on the US West Coast. These industries are also critical to statewide economic growth and job creation. In Oregon, the top traded industries include wood product manufacturing, forestry, agriculture, computer and electronics manufacturing, beverage production, and metal manufacturing.

The statistics clearly indicate how important these traded industries, and especially freight, are to the Oregon economy. Overall, the Oregon transportation system carried $300 billion of goods in 2012, more than the entire Oregon GDP of $205 billion. When considering transportation-related and transportation-dependent jobs in the traded industries, over **346,400 jobs are reliant on an efficient transportation network** – or nearly **20 percent of all statewide jobs**.

The Transportation System's Impact on Business Competiveness

Congestion and travel delay due to deficiencies in the transportation system are already impacting businesses throughout the state, hurting their competitiveness.

Direct interviews with businesses were conducted as part of this study, and the results underscore the fact that transportation is critical to business competitiveness and sustained business growth in Oregon. Due to increasing congestion, businesses report that they are drastically altering operations in order to keep a competitive edge.

Changes in business operations are nearing the limits of what a business can do to overcome transportation congestion before it becomes a severe issue. Many respondents reported that they have implemented staggered shifts, evening and overnight operations, and are increasingly operating during "off-off-peak" hours– with some delivery shifts now starting at 2AM. However, the businesses do so at the boundaries of regulatory limits on hours, concern about driver safety, and limits as to when they can feasibly deliver to customers. For those businesses that cannot shift to off-off-peak hours, businesses report "lost turns" on truck deliveries due to congestion – meaning that a truck can take on fewer delivery routes in a day compared to the recent past when there was not as much congestion. Moreover, businesses reported that they do not face these issues in other regions that they operate in, suggesting a competitive disadvantage of operating in Oregon.

New issues emerging for businesses also highlight the importance of transportation infrastructure investments. Businesses are focusing on exports for business growth, requiring access to all US West Coast international gateways, and reliable service to ports and airports

outside of Oregon. Furthermore, businesses are optimizing costs by relying more on transportation service providers such as third-party logistics companies and for- hire transportation services, thereby minimizing direct operating risks.

Businesses were also asked to comment on any concerns or plans they have regarding the resiliency of the transportation system to seismic events. Many businesses reported high vulnerability to a seismic event if major transportation links were disrupted; with some more localized businesses reporting an inability to sustain themselves in the event of long- term transportation system failure. Thus, in addition to the reliability of the transportation network, the resiliency of the network is also of concern to Oregon businesses.

Overall Impacts of Congestion and Travel Delay on the Economy

Failure to adequately invest in the transportation system will result in significant losses to Oregon's economy, job base and quality of life.

Transportation system assessments for the metropolitan regions included in this study (Portland, Salem/Mid-Willamette Valley, Bend, and Corvallis) suggest that congestion is becoming an increasing problem statewide, and that investments in infrastructure can strongly mitigate these conditions.

Over time, as more trips are generated in the state, traffic increases cause additional congestion and reduce reliability on the highway network for both passenger cars and trucks. For example, in 2010, 5 percent of all travel time in the Portland region took place in congested conditions (i.e. in slow, stop-and-go traffic). This is expected to triple to 15percent of all trips by 2040. Put another way, by 2040, over the course of a year the average Portland region household will experience 69 hours of severe congestion; or nearly 2 work- weeks spent in congested conditions on the road if only the currently programmed improvements are made. Adequate future investments would reduce this amount to 37 hours per household. In other Oregon metropolitan areas, congestion would increase to 18 hours per household by 2040 without new investments. That figure could be reduced by two-thirds to 6 hours per household with adequate investments. In total, new transportation investments—referred to in this study as the "Improved Future Scenario"— would save Oregonians 36.9 million hours of travel time, or an average of 27 hours per household.

These travel time savings from new investments translate to significant economic impacts. With transportation investments in the "Improved Future Scenario," these savings would generate an additional 8,300 jobs by 2040; $928 million in output; $530 million in GDP or value added; and $380 million in wages and compensation to employees.

This study also finds that, by 2040, improving the transportation system to investment levels specified in current state and metropolitan area long-range regional transportation plans would generate economic benefits for the state growing to $1.1 billion per year in by 2040. Cumulatively, Oregon would receive over $24 billion benefits from these transportation investments, returning over $2.40 for every dollar spent on improving the transportation system.

Vulnerability to Earthquakes

Seismic events like those evaluated in Oregon Department of Transportation's Oregon Highways Seismic Plus Report could seriously impact the State's economy – particularly small and medium sized businesses.

The economic impacts that would result from a major seismic event in Oregon are significant – producing a greater, longer-lasting impact on the Western Oregon's economy than Hurricane Katrina produced in New Orleans in 2005. This report builds on Oregon Highways Seismic Options Plus Report to assess the impacts of a 9.0 magnitude earthquake on jobs by region as well as updating the GDP effects. Interviews with businesses provided insights into how they would be impacted by both short- and long-term effects of such an event.

Based on this analysis, a major seismic event occurring in 2014 would cost Oregon's economy $405 billion in GDP over a 7-year period. This would translate to an average annual employment loss of over 462,000 jobs. Based on building the full program of investments recommended by Oregon DOT ($1.8 billion), the State could avoid a loss of $92.2 billion in statewide GDP from 2015 to 2021.This is equal to about 23 percent of the total estimated GDP loss in a major seismic event. The same investment package would avoid the loss of over 111,000 jobs over the same period.

Although all businesses interviewed for this study indicated that they would feel significant impacts from such an event, medium and small businesses would be disproportionately affected since they typically have limited options for shifting production out of the state, and have limited capital resources to cope with long-term disruptions in their supply chains.

Next Steps

The rewards are great if new investments are made in greater highway capacity and in seismic retrofit of existing facilities. However, the risks are also great for the economy and quality of life in Oregon if new investments are not undertaken soon. Oregon risks erosion of its competitive position in domestic and international markets as the costs to move goods increase due to congestion. This means thousands of jobs and billions of dollars for the Oregon economy. Many other states, including Washington and California, are taking action to address their transportation infrastructure, demonstrating the need for Oregon to act now to reduce the impacts of congestion, travel time delay, and catastrophic loss of key transportation infrastructure. These investments are necessary to preserve Oregon's continued economic competitiveness.

Understanding both the benefits and potential risks of transportation infrastructure investment decisions facing the state are important. This study provides useful information to the public, the business community and government decision-makers as they work to reach consensus on transportation policy, project prioritization and funding decisions. This study is designed to be used as a platform for future discussions about planning for and investing in the state's transportation system. Business, civic and government leaders should engage in a discussion about the impacts of transportation system deficiencies, in terms of congestion and seismic resiliency. Investments to address these concerns can impact the costs to business and the effects on job opportunities, wages and key business competitiveness. Therefore, practical solutions must be found to make the transportation

infrastructure investments needed to protect and enhance the state's economy and quality of life.

Highway Over-Dimension Load Pinch Point Study (ODOT Region 1 April 2016)

Pinch Point Report – Introduction

The ODOT Freight Planning Unit, Transportation Development Division, conducted the Highway Over-dimension Load Pinch Points (HOLPP) study. The purpose of the study is to identify, analyze and rank highway pinch points that restrict the movement of over-dimension loads. A pinch point report was developed for each of the 14 maintenance districts. The Oregon Freight Advisory Committee and other freight stakeholders will review the pinch point reports. The study goal is to develop a list of key pinch points that will be presented to the ODOT Region and Area Commission on Transportation (ACTs) so that they may recommend projects that will remove some of these pinch points.

Pinch points are due to width, length, vertical clearance (VC) or weight constraints and can include low overpasses, narrow roadways, sharp curves, weight-restricted bridges and other features. Since the daily routing for over-dimension loads is coordinated between the Motor Carrier Transportation Division (MCTD) and the ODOT maintenance districts, both of these groups were actively involved in this study.

Definitions

Heavy Load (HL) Pinch Point

Pinch points for heavy loads are bridges along the highway that cannot support the weight of over-dimension loads. The most current list of weight-restricted bridges provided by the ODOT Bridge Program shows that none of the weight-restricted bridges can handle a weight in excess of 60,000 lbs. Since the MCTD's definition of an over-dimension load includes vehicles and/or combination weight that exceed 80,000 lbs., pinch points for heavy loads are weight-restricted bridges.

High Routes

High routes are state highways designated as the routes used to move over-dimension loads that need a high vertical clearance. A map showing the High Routes in District 3 is located on the next page after the definitions.

Over-dimension Load

This study used the definition in ORS 818 to define what an over-dimension load is. Drivers need a permit when a vehicle combination exceeds any of the following dimensions:

1) Width of the load exceeds 8 feet 6 inches
2) Height of the vehicle or vehicle combination exceed 14 feet
3) Front overhang exceeds 4 feet beyond the front of the bumper
4) Load is greater than 40 feet and extends 5 feet beyond the end of the semi-trailer; or load less than or equal to 40 feet exceeds 1/3 of the wheelbase of the combination, whichever is less
5) Vehicle combination length that exceeds those authorized on the reverse of MCTD Group Map 1.

6) Any single axle weight that exceeds 20,000 lbs. Tandem axle weight that exceeds 34,000 lbs. and gross combination weight that exceeds 80,000 lbs.

Examples of over-dimension loads include cranes, excavators, steel plates, modular/manufactured homes, steel beams, generators, bulldozers, wheel loaders, forklifts, boats, feller bunchers, scrapers, dump trucks, backhoes, drillers, transformers, windmill turbines and other industrial equipment.

Reduction Review Routes (RRR)

Reduction Review Routes (RRR) are the highways associated with ORS 366.215 and OAR 731-012-0010. The statute states that the OTC may not permanently reduce vehicle-carrying capacity of identified freight route. Exceptions are allowed if safety or access considerations require the reduction.

These highways were selected as the routes to be analyzed in the HOLPP Study because most of the truck freight moves on these highways, it includes all of the Oregon Highway Plan Freight Routes and the freight stakeholders identified these as the highways critical to the movement of freight in the state.

Vertical Clearance (VC) Pinch Point

Vertical Clearance (VC) pinch points are based on the vertical clearance design standards in the Oregon Highway Design Manual: 17'-4" on High Routes, 17'-0" on NHS Non-High Routes and 16'-0" on Non-NHS and Non-High Routes. The MCTD Over-Dimension Permit Unit is providing the data for VC pinch points.

The VC measurements in this report are the actual VC measurements used for ODOT Bridge data. The MCTD takes the actual VC measurement from the Bridge Unit and adds a 4" buffer when routing over-dimension loads as a safety buffer. For example, if an overpass has an actual VC of 16'-4", the MCTD will not route any truck under it that has a load that is taller than 16'.

If there is at least one travel lane with the minimum clearance then it is NOT a VC pinch point in that direction. Each direction is reviewed separately in this determination.

Wide and Long (WL) Pinch Point

Pinch points for wide and long loads are specific locations along the highway where it is difficult or impossible to move some over- dimension loads due to horizontal constraints. This study does not define any minimum dimensions of an over-dimension load. ODOT Maintenance District staff has identified Wide and Long pinch points based on their experience and knowledge of routing over- dimension loads on the highways within their district.

Examples of pinch points for wide and long loads may include narrow horizontal clearance (due to rock faces or slopes), guard rails, sharp curves, narrow bridges, diamond interchanges, curbs, non-removable signs, medians, enhancements at pedestrian crosswalks, intersections and other horizontal constraints.

High Priority Pinch Point Criteria

High Priority Pinch Points for Wide and Long Loads

1. All High Priority WL Pinch points on the same RRR segment (See "RRR segment" definition in Appendix) must be separated from any other WL pinch point on that RRR segment by at least 15 miles (either direction). This criterion may help focus on situations where by removing one pinch point can open up a RRR segment to wider and longer loads.

2. All High Priority WL pinch points must be less than one mile in length.

High Priority Vertical Clearance Pinch Points

3. All High Priority VC pinch points must be at least 6" less than the design standard for that type of highway.

4. All High Priority VC Pinch points on the same RRR segment (See "RRR segment" definition on page 14) must be separated from any other VC pinch point on that RRR segment by at least 15 miles (either direction). This criterion may help focus on situations where by removing one pinch point can open up a RRR segment to taller loads

High Priority for Combination Pinch Points

5. Combination pinch point types (like a WL/VC pinch point) only have to meet the criteria for one type of pinch point listed above. For example, if a WL/VC pinch point meets the criteria listed above for WL pinch points, then it does not need to meet the criteria for VC pinch points in order to be categorized as a High Priority pinch point.

High Priority Heavy Load Pinch Points

6. All HL pinch points are categorized as High Priority pinch points since there are very few weight-restricted bridges on the RRR.

Other Information

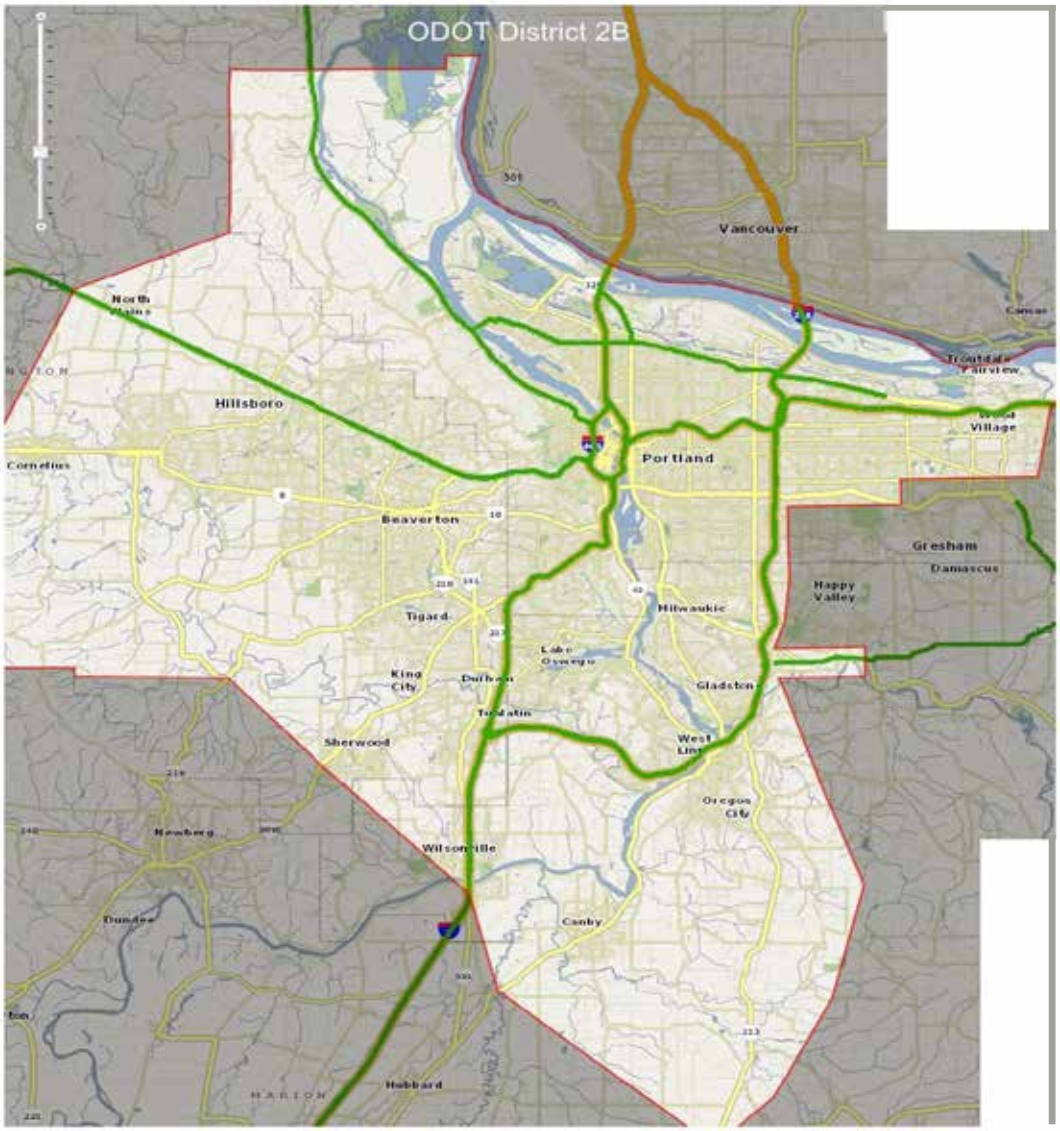
7. Special circumstances can warrant a High Priority ranking of a pinch point and must be documented.

8. All other pinch points not meeting the criteria listed in 1 through 7 above are rated as Low Priority.

Region 1 – District 2B Pinch Points

Region 1 Maintenance District 2B	Wide & Long Load Pinch Point	Vertical Clearance Pinch Point	Heavy Load Pinch Points	Combination Pinch Points	Total
Total	13	67	1	4	85
Low Priority Pinch Points	5	58	0	2	65
High Priority Pinch Points	**8**	**9**	**1**	**2**	**20**

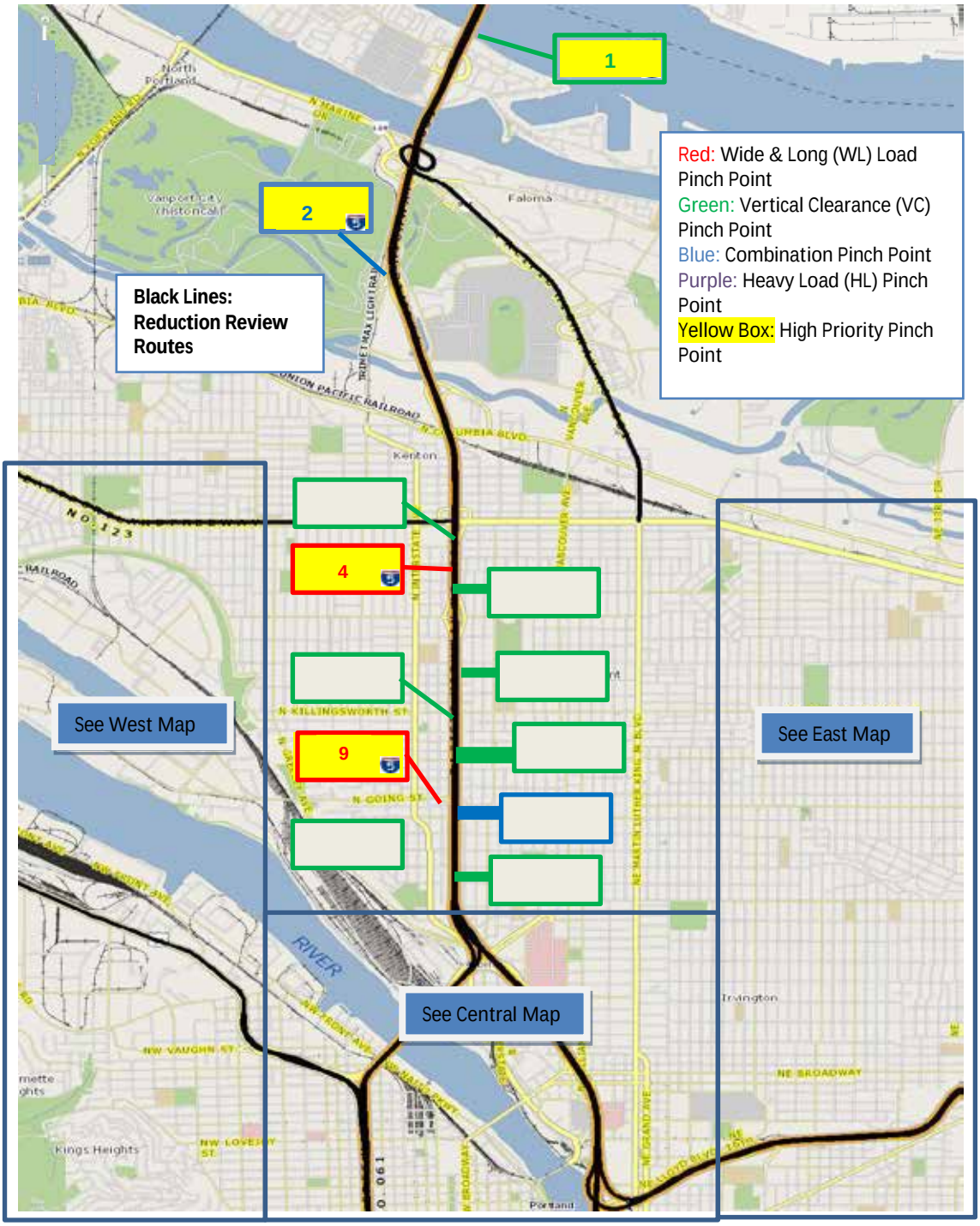
Maintenance District 2B Boundaries



The green highways are the High Routes. All of the High Routes in District 2B are RRR except for US30B.

The maps below show the location and types of pinch points in Maintenance District 2B. Following each of the maps are a Pinch Point Data Table for High Priority Pinch Points, which includes a type, location and brief description; and an analysis and recommendation.

Region 1 – Maintenance District 2B North Pinch Points



District 2B High Priority North Pinch Point Data Table

General Information	Pinch Point Type, Location and Description	Analysis and Recommendation
Pinch Point #1 on I-5 @ MP 308.18 Travel Direction: Both 247 Over-dimension loads/month	Pinch Point Type is VC. This is the Columbia River Bridge. This is a High Route and VC should be 17'04" NB VC is as low as 15'06", SB as low as 16'00"	Pinch point appears to be a significant constraint. Removing pinch point would probably accommodate taller loads.
Pinch Point #2 I-5 @ MP 306.86 Travel Direction: Northbound 260 Over-dimension loads/month	Pinch Point Type is Combination. This is the northbound connection to I-5 on N. Interstate. OD loads are going north under the I-5 structure which is narrow and has a low clearance (15'11") VC should be 16'0".	Pinch point appears to be a significant constraint for both VC and WL. Removing pinch point would probably accommodate wider, longer and taller loads.
Pinch Point #4 I-5 @ MP 304.48 Travel Direction: Southbound 370 Over-dimension loads/month	Pinch Point Type is WL. This is Exit 303 southbound from I-5 to Swan Island and Alberta St. The off-ramp is narrow.	Pinch point appears to be a significant constraint. Removing pinch point would probably accommodate wider and longer loads.
Pinch Point #9 I-5 @ MP 303.93 Travel Direction: Southbound 372 Over-dimension loads/month	Pinch Point Type is WL. This southbound (SB) ramp is located on NE Going Street. This is a pinch point for Eastbound OD loads on Going St that take the on-ramp to SB I-5. The on-ramp right turn connection to I-5 is narrow.	Pinch point appears to be a significant constraint. On ramp provides access to SB I-5 for OD loads from an industrial area. Removing pinch point would probably accommodate wider and longer loads.

More maps and tables for District 2B and 2C pinch points to be provided later.

Future Commodities Movement

Port of Portland Commodity Flow Forecast (March 2015)

The Commodity Flow Forecast and technical memorandum that addressed key questions by task, was completed for the Port of Portland by Cambridge Systematics Inc. The following provides a general summary of the key aspects of this work.

The Freight Analysis Framework (FAF), produced through a partnership between Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA), integrates data from a variety of sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation. FAF incorporates data from agriculture, extraction, utility, construction, service and other sectors. The FAF data was used to help develop a commodity flow database for this project.

The overall purpose of the Port of Portland Commodity Flow Forecast project is to develop a commodity flow database with future forecasts for the Portland-Vancouver region using baseline FAF data. However, the Portland study area from FAF data consists of an area much larger than the region; and includes Columbia, Clackamas, Multnomah, Washington and Yamhill counties in Oregon. With the help of additional data from the TRANSEARCH database, Clark County Washington was also added to the study area.

Changes to the Portland Region's Key Industries

Forest Products Industries - Traditionally, forest products have been most important in the region. Currently they are experiencing a decline domestically, but and increases in overseas shipments. Timber production and jobs in the forest products industries has declined, due to a reduction of logging on Federal lands. The movement of forest products is dependent on US housing and construction markets, and increasingly on exports of these products to China.

Manufacturing - High-tech electronics has become a highly significant sector in manufacturing. High-tech manufacturing drives growth in manufacturing activities in Portland, especially from Intel's semi-conductor production. The percentage of Oregon's gross domestic product (GDP) that is in Computers and Electronics grew from about 5% in 2003 to about 20% in 2012. The recent large capital investments in the local industry will mean even more high-tech manufacturing activity in the future.

Agriculture - Traditionally, agricultural products have been very important part of freight movement in the Portland region. Significant shares of agricultural products are exported to Asia.

Energy – Energy dependence in the Portland region is shifting from hydroelectric power to other renewable energy sources and natural gas. This creates changes in future demand both in terms of commodities and mode of transport. The sources used for energy consumption in Oregon have shifted over the last twenty to twenty to twenty-five years. From 1990 to 2010 the use consumption of hydroelectric energy is down by nearly one third, and the consumption of natural gas has about doubled. Renewable energy sources for Oregon were

almost non-existent in 2000, but are now a small but rapidly growing part of energy consumption.

The following sections provide a summary of the Freight Analysis Framework that was used in the Commodity Flow Forecast and summaries of three work tasks (technical memorandum) with important findings from the Commodity Flow Forecast that impact freight movement in the Portland-Vancouver region:

Freight Analysis Framework (2007 Base Year Survey)

The Freight Analysis Framework (FAF), produced through a partnership between Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA), integrates data from a variety of sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation. FAF incorporates data from agriculture, extraction, utility, construction, service and other sectors.

The FAF data was used to help develop a commodity flow database that was a key input for the Commodity Flow Forecast that was based on the survey completed in 2007 (FAF3). Surveys are completed every five years, and the survey that was completed in 2012 (FAF4) could not be used for the analysis of commodity movements in the Port of Portland's Commodity Flow Forecast. The results from the 2012 survey will be available in phases throughout 2016.

Task G: Identify Trends/Changes in Transportation Technologies of each Commodity Group

The objective of this task was to look at how changes in transportation technologies could affect transportation network conditions in the Portland-Vancouver region so that plans can be made to either take advantage of opportunities this presents or to plan for mitigation.

New potential transportation technologies/ trends that could affect the Portland/Vancouver region's commodities in the future include:

1. ***Conversion of oil shipments from pipeline to rail (i.e. Crude, oil shale, and tar sands by rail)*** For over a year, the Port of Tacoma has been handling inbound rail containers of Bakken Oil from the Dakotas bound for refineries in California. At present, none of this cargo is moving through the Port of Portland, but it could in the future.
2. ***Increase of less-than-trailer load (LTL) shipments of fast moving consumer goods***
3. ***Increase in trans-loading of imported goods from international marine containers to domestic 53- foot rail and truck containers in a trans-load warehouse near the U.S. gateway port.*** Trans-loading is the service in which the contents of a marine container are transferred directly into a 53-foot rail or truck container in a warehouse near a U.S. gateway port. The loss of container service at Terminal 6 has outweighed any short term trend from trans-loading imported goods from marine containers to 53 foot containers that could impact the Portland –Vancouver region.
4. ***Increased exportation of minerals and bulk products such as cooper ore, LNG and coal*** China, in particular, has stepped up its level of importation of minerals and

energy sources to fuel its manufacturing sector. This could increase the volume of these goods moving through the ports of Portland and Vancouver USA.

5. ***Conversion of fuel used in the transportation of freight from diesel to LNG (trucks and rail)***
6. ***Adoption of electric vehicles for freight movements***
7. ***Continued concerns over security of freight movements***
8. ***Continued pressure to reduce noise, dust, pollution and other environmental impacts in the supply chain***
9. ***Environmental pressure to increase fuel mileage in all vehicles*** This will push automakers and other vehicle manufactures to look at developing not only more efficient engines but also to develop vehicles that have the same safety ratings but are lighter in weight. The manufacturers will have to look to new materials to achieve this weight reduction.

Summary of Findings:

All of the trends will have some effect on cargo movements into and out of the region. The only trend identified in this section that is expected to have limited effect is the conversion of oil shipments from pipeline to rail, due to the expectation that most of the cargo is transported primarily by truck. This trend and the anticipated increase of exportation of minerals and bulks should have the same effect on all the commodities that use rail as a transportation mode.

For those commodities that are transported by rail, there may be an effect on those cargos as congestion on the rail lines increase. When this happens the railroads will prioritize cargos that they would like to come through the region that is most profitable for them to handle. This will be done in two ways. First, the railroads will set commodity transportation pricing for specific commodities in a way that the Beneficial Cargo Owners (BCOs) are influenced either to use this region as a gateway or not to use it as such due to the throughput cost generated by the railroads. Second, the railroads will set a priority for each type of train as it moves through a specific rail network. This will either increase or decrease the delivery times which will also be a signal to BCOs about the railroads' preference for different commodities through a specific location or gateway.

Transloading and LTL will continue and will put additional pressure on communities near ports to provide the land for warehousing and transportation facilities that these services require.

Environmental concerns will continue to be in the forefront for both local communities and the shipping community. This will include the movement of certain commodities through the community as well as the mode on which they are transported. The use of alternative fuels will be a national issue for which all stakeholders in supply chains will need to prepare.

The push for the use of electrification should be easier for the Pacific Northwest to deal with as a majority of the local power is hydro generated.

Task I: List Advantages and Limitations of the Portland Metropolitan Area

The objective of this task is to provide a general assessment of the strengths and weaknesses of the Portland/Vancouver metropolitan area for transportation of the commodities most important to the metro region. This type of information can inform what is traditionally referred to as a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. The SWOT can be used to evaluate options available to be implemented to maximize the benefits of the Portland/Vancouver area as a freight hub for particular types of freight movements.

The section below point out the key strengths, weaknesses, opportunities and threats (a subset from the list in task I) of the region's transportation system as it relates to the products most important to the regional economy.

Strengths

1. The Columbia River barge system provides an economical mode for grain, animal feed, and fertilizer exporters; the domestic construction industry; coal shippers; and companies shipping petroleum products to refineries or gas stations, particularly considering many of the products are low in value.
2. Washington County offers financial incentives for manufacturers of these high-value products to locate and expand.
3. The solid base of high-value manufacturers on Portland's Westside and in the Wilsonville area creates momentum for attracting others in this highly desired sector.
4. Companies with high-energy requirements during manufacturing benefit from plentiful and relatively economical hydropower.
5. The Port of Vancouver USA has heavy-lift cranes to move break-bulk products.
6. The dual mainline rail (BNSF and UP) and short line system in the Portland/Vancouver region enable goods to move economically to domestic and international markets and offer Beneficial Cargo Owners (BCOs) modal choice besides truck.
7. Factories in the region have easy access to rail, and truck modes to reach international and domestic markets.

Weaknesses

1. Increasing highway and road congestion on the West side, in downtown Portland, and near Portland International Airport (PDX) negatively impacts the these sectors, forcing companies to compress manufacturing schedules to account for unreliable, longer transit times when transporting raw materials and components to the factories and high-value, time-sensitive finished goods to international and domestic destinations.
2. Highway congestion increases transit times and transportation costs for time-sensitive perishables moving from the Willamette Valley and Salem region north on I 5 to the Port of Portland and PDX to international markets and via I 84 to eastern domestic markets.
3. Limited direct airfreight service at PDX forces BCOs to transport some perishable, time-sensitive, high-value cargo to Seattle-Tacoma International Airport (SEA) and San Francisco International Airport (SFO), which increases costs and overall transit time.

4. There is a general lack of highway and road redundancy, which adds to transit times and decreases transit reliability when the route is congested and no good alternative is available.

Opportunities

1. The base of companies in these high-value sectors is expanding, providing synergies and economies of scale. Companies benefit from the abundance of skilled labor and easy access to the multimodal transportation system that includes ocean vessels, barges, rail, truck, and air.

Threats

1. Dwindling containerized ocean carrier service at Port of Portland is reducing choices, causing BCOs to look to ports in WA and CA. Once they get used to these alternate ports, it may be difficult to recapture this business.
2. Transportation comprises a large percentage of the total landed cost of these products and sales can hinge on a few cents per pound. It is too expensive for exporters to truck products from the region to the ports of Tacoma, Seattle, or Oakland, so sales can be lost without adequate containerized ocean carrier service at Port of Portland.
3. Land for logistics uses (large-lot industrial land) is scare scarce in the Portland/Vancouver region, especially on or near the waterfront which limits the number of cargo handling facilities and distribution centers that can be built in the future, an impediment to attracting more manufacturing, warehousing, and distribution to the State.

Task J: Identify Potential Global Trends

The objective of this task was to identify global trends that may influence the volume and value of the commodity flow estimates derived in previous tasks.

The following are some of the most important domestic and global trade and transportation trends (a subset of the findings in task J) that are impacting or will likely impact Beneficial Cargo Owners (BCOs) moving goods in, out, or through the Portland/Vancouver region in the next few years. These trends will influence the use of the region's multimodal transportation system depending upon how BCOs adjust their supply chain strategies to deal with these trends and the policies and transportation infrastructure projects that regional policy-makers implement.

Re-shoring of Manufacturing to the U.S.

In 2012, The Boston Consulting Group (BCG) conducted a survey of 106 executives about their manufacturing location plans. "More than a third of U.S. manufacturing companies with sales greater than $1 billion are planning to relocate production facilities to the United States from China or are considering it. The BCG report "identified transportation goods, appliances and electrical equipment, furniture, plastic and rubber products, fabricated metal products, and computer and electronics as prime candidates for in-sourcing as China's cost advantage erodes in the near future.

The Portland/Vancouver region is in a good position to capture some re-shoring of computer and electronics manufacturing since the base is strong and skilled labor is plentiful here, particularly on Portland's West side. Moreover, labor costs are likely less expensive than in Northern California's Silicon Valley or New York's Silicon Alley, making the Portland/Vancouver area even more competitive. As an example, in 2014, nearly 50,000 Ford vehicles were exported through the port, which is a 400% increase from 2013.

Since the transportation equipment and fabricated metals sectors are prevalent in the region, they may be good candidates to capitalize on the re-shoring trend. With the abundance of relatively low-cost energy sources like hydropower, sectors with high-energy demands like steel mills might pick up the pace of production.

Distribution Strategies

Many BCOs, particularly big box retailers, have shifted from "push" supply chains where they push product to stores in the hopes consumers will purchase them to "pull" supply chains in which demand forecasts and actual sales data are used to determine how much and what product to pull into stores at a given time. "Pull" supply chains tend to decrease the volume of inventory and reduce obsolescence and discounting of merchandise because supply is matched more closely to demand. In order for "pull" supply chains to function well, the point of distribution needs to be as close to the ultimate consumer as possible to enable fast store inventory replenishment.

BCOs are increasingly establishing regional distribution centers as opposed to having one or two national distribution centers, thus enabling them to delay the final delivery decision to direct cargo to the right stores to meet customer demand, since the regional facility is closer to the customer. Often BCOs use a four-corner distribution center strategy, positioning a facility in the Pacific Northwest, Southern California, the Northeast, and Southeast.

As delivery time requirements become shorter, it is likely that more companies will embrace a decentralized distribution center strategy in the coming years. This means that some might find the Portland/Vancouver region an attractive place to locate their Pacific Northwest facilities. The issue for the region will be the amount of land that will be available for this purpose.

These outcomes will affect companies in the region that import or manufacture fast moving consumer products more than industrial products.

Mega Vessels

Containerized ocean carriers are continuing to push the envelope when it comes to deploying larger vessels being designed and constructed in shipyards. A limited number of ports and marine terminals around the world have the operating capacity and naturally deep channels to service mega vessels. The 43-foot draft of the Columbia River Channel limits the size of container vessels able to call at the Port of Portland, which basically precludes the Port from taking advantage of the mega vessel trend. Deep water ports such as Tacoma, Seattle, Oakland, Long Beach and Los Angeles that can handle mega vessels for a greater portion of their shipments. This trend could negatively impact the Port of Portland's future container

volumes. Exporters of heavy products will have a harder time shifting their shipments to alternate ports and may lose sales as a result of limited ocean service at Port of Portland.

Bulk and break-bulk vessels also are increasing in size and becoming more technologically advanced to achieve lower operating costs for the carriers. This could present a challenge for the ports of Portland and Vancouver USA in the future similar to the situation with container vessels. These vessels are very important to exporters of agricultural goods, raw materials, and heavy industrial products.

Note: In early 2015 the main ocean carrier container service (Hanjin) stopped making calls at the Port of Portland's Terminal 6.

Asian Demand for Raw Materials

In the past five years, Asian manufacturers, particularly in China, have become hungrier for raw materials mined or processed in the U.S. such as coal and oil to power factories. Inputs to craft metal products are in demand. The construction industry desires wood products and building materials. Fertilizers enrich the soil to increase crop yields in the agriculture sector. Livestock producers must have more grain to feed the animals being raised to satisfy the growing appetite for meat among the Asian middle class.

Much of these raw materials are exported on bulk rather than container vessels. The Columbia River is a natural conduit for bulk barges moving from interior points in the U.S. to the ports of Portland and Vancouver USA for transfer to ocean going bulk vessels, poising the region to capture some of this business.

Demand for Recycled Products

Instead of using 100 percent virgin raw materials, Asian factories increasingly use recycled paper, metals, glass, and plastics as inputs in the manufacturing process for goods and packaging materials. This demand can create opportunities for producers and collectors of such recycled products in the region.

Such products are exported in containers and on bulk vessels. Having the ports of Portland and Vancouver USA in close proximity is an advantage for companies in this trade, as the products are typically low in value, with transportation comprising a sizable percentage of the cost of goods. Domestic manufacturers also use recycled products, and these typically move via motor carrier and less, frequently, by truck or barge.

Other Key Analysis, Freight Plans, and Strategies

Clark County Freight Mobility Study Summary Report (December 2010)

Introduction

At the December RTC Board meeting, RTC will look to conclude the Clark County Freight Mobility Study with action from the Board to endorse the Study as a first step in addressing freight transportation in this region. As the Board may recall from prior presentations and discussions in late 2009 and earlier in 2010, the Clark County Freight Mobility Study was initiated to provide an understanding of the key elements of freight movement and to explain why freight and goods movement is important to Clark County's economy and employment. The Study was viewed as a first effort to describe and define the regional freight transportation system with significance for supporting industrial lands and jobs in the County. During the course of the Study, much has been learned about freight movement within and through Clark County. Information and data was collected, inventoried and analyzed and a good foundation laid for continuing our consideration of freight transportation as part of the metropolitan transportation planning process required of RTC as part of the local comprehensive planning process and as part of planning efforts of local Port districts.

Background

The Clark County Freight Mobility Study was initiated in May 2009. RTC was assisted throughout the study by a consultant team led by David Evans and Associates in partnership with BST Associates, Heffron Transportation, and Starboard Alliance. A team of agency stakeholders, comprised of staff from WSDOT, Clark County, the City of Vancouver, the Port of Vancouver, the Port of Camas-Washougal and the Port of Ridgefield, helped develop the Study. Input was also sought from the Regional Transportation Advisory Committee and from a Business Stakeholders Group. Regular updates were provided to the RTC Board during the Study's development.

Future Action Items Identified

As the Clark County Freight Mobility Study was developed, through discussions with the RTC Board and with the community at large, several concerns regarding freight transportation were raised. These issues included land use/transportation coordination and livability. In a nutshell, while recognizing the importance of freight transportation to the region, and particularly to regional employment, issues regarding the co-existence of industrial, commercial and residential lands reach beyond the scope of this Freight Mobility Study. These issues, along with the Freight Corridors of Regional Significance, will continue to be addressed as RTC embarks on the 2011 update to the Metropolitan Transportation Plan and as local jurisdictions update their local comprehensive plans. In addition, freight data will continue to be addressed as part of RTC's Transportation System Management and Operations and Congestion Management Processes as well as through local traffic management efforts.

Action Requested

The Clark County Freight Mobility Study provides useful information and analysis designed to inform future metropolitan transportation planning, local comprehensive planning and project design. The RTC Board is asked to endorse the Study to mark the conclusion of this Study phase. Freight transportation planning will continue as part of the Metropolitan Transportation Plan update in 2011.

Executive Summary

The Regional Transportation Council (RTC) initiated the Clark County Freight Mobility Study (Study) to provide an understanding of the key elements of freight movement and to explain why freight and goods movement is important to Clark County's economy and employment.

The Study inventories existing freight and goods movement, identifies current deficiencies and future action items to be addressed as part of ongoing regional and local planning processes. The study begins to identify corridor investment needs in order to sustain jobs and economic development for existing and future industrial and employment centers consistent with the adopted Metropolitan Transportation Plan.

Elements of the Clark County Freight Mobility Study report will be incorporated into the next major update to the Metropolitan Transportation Plan (MTP) in 2011 and can be used by local jurisdictions in updates to local comprehensive plans.

The study was conducted through a collaborative partnership of stakeholders that included local governments, ports, state transportation departments, economic development agencies, RTC, and system users.

For the project, the RTC and the consultant team prepared the technical memoranda with the following findings:

Freight issues and trends:

- Global Trade and Transportation Trends – Four basic principles underlie all supply chains: the desire of shippers to reduce costs, improve supply chain efficiency, improve time-to-market, and deliver better service to customers. The key issues for truckers are congestion, travel-time reliability, and a need for additional capacity. Key issues for rail are congestion, port access, and mainline capacity limitations. All three ports in Clark County are expanding their portfolios of commercial/industrial lands.

- Current and expected economic conditions and economic impact of freight delay – Most of the freight-related jobs in Clark County are located within five miles of the Columbia River, nearly 30 percent in the urbanized area of Clark County in the vicinity of I-5, I-205, and the Columbia River. The five most freight-intensive industry sectors, which account for half of the freight moving in the Portland-Vancouver area and more than half of the freight moved by truck are petroleum products, minerals, food and beverages, wood products, and grain. The freight generating sectors located in Clark County have a direct impact of 66,057 employees with an income of $3.2 billion.

- Outreach to shippers and documentation of representative supply chains – Surveys of 25 importers and exporters (shippers), motor carriers, ports, barge operators and railroads revealed that interstate bridges are critical; they are used by 90 percent of shippers and 100 percent of motor carriers, the strengths of the regional freight system are good rail, marine and road access, congestion on interstate bridges and at the Vancouver Wye and Vancouver Yard needs to be alleviated, and decision makers should take a regional, system-wide view of the County's multimodal transportation system.

Existing freight system:

- Existing and future truck movements – The Study collected existing truck volumes and employment data for Clark County and then developed growth rates for medium and heavy trucks that can be applied to industrial development projects in Clark County to provide us with a tool for analyzing potential growth in truck volumes.

- Vehicle classification counts - best practices – Recommends developing a statistically reliable method of estimating vehicle classification percentages on roadways to obtain accurate volumes, preferably using 48-hours vehicle counts, and control locations where counts are taken at different times of the year to determine a seasonal adjustment factor.

- Characteristics of truck movements – The major findings from existing truck data are that an estimated 55 percent of Clark County's freight is moved by truck – this exceeds the tonnage of freight moved by all other modes combined. Truck volumes throughout Clark County have declined in recent years, peak hour truck volumes typically occur midday (2 to 12 percent trucks), and 67 percent of the 7,000 medium and heavy daily truck trips that use I-5's on- and off- ramps between SR 14 and SR 500 are to and from the south (2,400 more trips than to and from the north).

Future freight system:

- Existing design guidelines relating to truck mobility – The design guidelines of jurisdictions in Clark County are flexible and provide for the basic needs of truck mobility; however, the design guidelines do not necessarily address the design of facilities for multiple modes of transportation.

- Basic principles of truck mobility – Improving truck mobility through design considerations such as acceleration and stopping distances, gaps in traffic, and turning radii can enhance site design for industrial land and other truck-trip generating facilities, ensure that nearby uses are compatible, and ensure access to the Clark County transportation system.

Based on the findings and recommendations from the analysis of existing and future freight movement, current economic conditions, freight and transportation policies, and discussions with agency and business-freight stakeholder groups and the stakeholder input, the Study team developed strategies to improve freight mobility. These strategies and issues are noted as future action items and will continue to be addressed as RTC embarks on the 2011 update to the Metropolitan Transportation Plan, and as local jurisdictions update their local comprehensive plans. In addition, the freight data needs will continue to be addressed as

part of RTC's Transportation System Management and Operations and Congestion Management Processes as well as through local traffic management efforts.

Summary of Clark County Freight Mobility Study Strategies and Future Action Items

Process	Strategies to Support Freight Transportation
Regional Freight System and Economic Development	Invest in freight mobility to support industrial development goals and job creation
Identify Needs and Projects	Support road improvements that benefit freight mobility
	Support rail improvements
Design	Develop model design guidelines for complete streets and freight
	Plan and design for local truck access to Clark County business sectors
Land Use and Transportation Integration	Land use and transportation coordination: protect viability of industrial lands and livability of residents
	Manage access to industrial areas
Funding	Position projects for funding

The Cost of Congestion to the Economy of the Portland Region (November 2015)

Introduction

As the Portland region moves further into the 21st century, it becomes important to understand the need for transportation facilities to keep up with changes occurring in the region's population and business base. The stakes can be high. Failure to provide sufficient transportation capacity and functionality could potentially increase traffic congestion delays enough to reduce the quality of life for area residents and reduce the competitiveness of the region for business. Since most residents in the region depend on household income generated by good local jobs, the financial well being of area residents is directly tied to the ability of the region to maintain its position as a competitive location for business investment, expansion and attraction.

To examine these issues, the Portland Business Alliance (PBA) sponsored this study working in close cooperation with Metro and the Port of Portland. This report examines the costs of traffic congestion to businesses currently located in the Portland metro area, forecasts for future changes in traffic congestion, and the impact that transportation infrastructure improvements can have on business productivity, competitiveness and growth. The report seeks to address two questions:

- How do transportation infrastructure improvements, or lack of improvements, affect the costs and ability of businesses now located in the region to compete locally and globally?
- How do transportation infrastructure improvements, or lack of improvements, affect the competitiveness of the Portland metropolitan region for recruiting and retaining industries targeted by regional economic development efforts?

By addressing these questions, this report seeks to provide a context for better understanding the business case for the next generation of public investments in transportation system upgrades, and the economic risks associated with failure to address congestion growth.

As a first step to addressing the Portland region's rising congestion problem, public and private sector partners commissioned a study to provide base line information about the information between investments in transportation and the economy.

This report does not recommend a level of funding for transportation improvements, nor does it endorse a specific package of improvements. Instead, it is intended as a springboard for discussions about planning for and investing in the Portland metropolitan region's transportation system.

Executive Summary

Congestion and the Economy

1. ***The region's economy is transportation-dependent, especially on its roads and highways, for the movement of freight.***

In comparison with other U.S. metropolitan areas of similar size, Portland's competitiveness is largely dependent on the region's goal as a gateway and distribution center for domestic inland and international markets. Some other metropolitan markets have larger bases of research, venture capital and higher education, or are surrounded by greater population centers that enable their economies to be competitive even with more congested highway conditions.

- **"Traded" industries which bring new money into the region and enable the rest of the economy to prosper, require an efficient transportation system.**

  Portland's economy depends on industries that could locate elsewhere, but have been attracted to the area because of its advantageous trading position. Those industries include computer equipment, wood products, metal products, tourism, publishing, wholesale distribution activities and gateway activities.

  Because traded industries depend on the movement of freight, reasonably good transportation access must be maintained if those industries are to remain and grow and in the Portland area in the years to come.

- **All modes – roads, transit, air, marine and freight rail – are important to an efficient transportation system, but few alternatives exist to a smoothly functioning road and highway system for on-the-clock business travel.**

  Portland is located at the confluence of two navigable rivers and is served by two intercontinental rail lines and an international airport. However, these modes commonly require a road system get to and from a terminal or a parking lot. While alternatives such as rail and bus transit help alleviate congestion for many commuters, these transit services do not meet the specialized needs of business travel for delivery of freight and other services. As many business-related trips are subject to schedule requirements, businesses become "prisoners of congestion," significantly increasing their cost of doing business.

2. ***Congestion is already impacting large and small businesses and hurting their competitiveness.***

   Interviews with local business leaders reveal how traffic is affecting their operations. Many businesses have already made schedule changes to avoid peak afternoon traffic conditions. However, businesses have expressed a growing concern that the relatively few windows of time when congestion is not a problem are shrinking.

   Businesses reported the following the impacts of congestion:
   - Costs for additional drivers and trucks due to longer travel times;
   - Costly "rescue drivers" to avoid missed deliveries due to unexpected delays;
   - Loss of productivity due to missed deliveries;

- Shift changes to allow earlier production cut-off;
- Reduced market areas;
- Increased inventories;
- Costs for additional crews and decentralized operations to serve the same market area.

Specific examples of how businesses are being harmed by congestion:

- Intel has moved their last shipment departure time up two hours for outbound shipments through PDX because of increased pm peak congestion. A missed flight affects production across the globe and can result in costly operational changes.

- Sysco Foods opened a new regional distribution center in Spokane to better serve their market area, because it was taking too long to serve its market from their market area, and other companies are following suit;

- Providence Health Systems reported medical deliveries, which have to be rapid and frequent, are getting very difficult on the west side with routine runs requiring more than four hours. As a result, Providence is planning a relocation of warehousing and support operations at a cost (independent of construction) from $1 – 1.5 million in 2006/7.

- OrePac has increased inventories from 7 to 8 percent to mitigate for congestion delays, which represents a lost opportunity for other investment.

- Other businesses have managed to restructure their operations to deal with congestion, but many have reached the point at which operational changes are resulting in real costs. As an example, PGE estimates that it spends approximately $500,000 a year for additional travel time for maintenance crews.

Overall Impacts of Congestion on the Economy

Transportation forecasting models show that currently planned transportation investments will not keep up with traffic growth, resulting in severe congestion delays.

This will affect how well the region can compete for new jobs and cost each household an additional 50 hours of lost time annually by 2025. Simply put, congestion reduces the advantage of location, which is particularly troubling for the Portland metropolitan region because its traded industries are dependent on transportation.

The study compares Planned Investments Scenario, anticipated to be funded over the next 20 years, to an Improved System Scenario, which would double transportation investment over the next 20 years. The Improved System Scenario would result in significantly less congestion growth during morning and afternoon peaks which are key times for businesses. It would also save 28 hours of travel time per household annually by 2025.

- **Economic benefit: The total value of benefit from such an investment is $844 million annually by 2025. It also supports 6,500 additional permanent jobs as of 2025, as well as 2,000 – 3,000 jobs annually.**

This total combines the value-added income generated in the region and the value of time savings to individuals. Under a higher investment scenario, businesses are able to convert time travel savings into additional sales, resulting in $426 million a year of value-added benefit and 6,500 jobs. The benefit to business would also be complemented by significant time savings and higher quality of life for residents, valued at $418 million a year. This scenario, while not eliminating congestion, will improve reliability, which is also critical to business travel.

- **Return on investment: Under an Improved System Scenario, each dollar invested returns at least $2 in value.**

Some significant costs are incurred in the early years of the study period, and benefits continue to phase in over a longer time period. Looking at both the cost stream and the benefit stream in terms of their net present value, the analysis shows a potential benefit/cost ratio of about $2 to every dollar invested.

Conclusion

The region's economy is transportation-dependent. Despite Portland's excellent rail, marine, highway and air connections to national and international destinations, projected growth in freight and general traffic cannot be accommodated on the current system. Increasing congestion – even with currently planned improvements – will significantly impact the region's ability to maintain and grow business, as well as our quality of life.

Action is needed to remain competitive with other regions that are planning large investments in their transportation infrastructure. This report finds that:

- Being a trade hub, Portland's competitiveness is largely dependent on efficient transportation, and congestion threatens the region's economic vitality.
- Businesses are reporting that traffic congestion is already costing them money.
- Failure to invest adequately in transportation improvements will result in a potential loss valued at $844 million annually by 2025 – $782 per household – and 6,500 jobs. It equates to 118,000 hours of vehicle travel per day, or 28 hours of travel time annually.
- Additional regional investment in transportation would generate a benefit of at least $2 for each dollar spent.

City of Portland – Freight Master Plan (May 2006)

Portland's Freight Master Plan – Plan Objectives

The Freight Master Plan provides a road map for managing freight movement and commercial delivery of goods and services in Portland, today and into the future. The goal is to foster a freight system that works for the community.

The Freight Master Plan objectives center around three main themes: Mobility, livability and a healthy economy.

Mobility:

- Ensure Portland's transportation system can meet increased freight and goods movement demand.
- Understand where we need to invest in system improvements for all modes of freight.

Livability:

- Develop strategies for reducing community impacts from freight movement.
- Look for ways to balance truck movement needs with those of other transportation modes.

Healthy Economy:

- Recognize the role of goods delivery in supporting healthy, vibrant industrial districts, mixed-use centers and main streets.
- Use strategic investments in freight transportation to benefit existing businesses and attract new ones.

A Course of Action

The freight Master Plan provides an overall strategy of investment and management of the City's transportation system, including connections to other public and private facilities as a catalyst for improved mobility, livability and economic health. The Plan strives to achieve its goals in a way that is supportive of and consistent with the community's transportation values in the Transportation System plan, including:

- Maintain a healthy economy and a thriving community.
- Manage transportation assets in a fiscally-responsible way to ensure the region's limited dollars are available for a wide range of solutions.
- Provide transportation choices.
- Look for ways to reduce environmental impacts of transportation.
- Emphasize coordination and partnership in planning the transportation system.

Comprehensive Plan Policies for Freight

Goals, policies and objectives are the common link between the Freight Master Plan and the Comprehensive Plan. Development of the Freight Master Plan identified revisions to policies to better address freight movement needs and impacts. The following is a summary of the goals and policies that guide freight activity in Portland:

Goal 5 – Economic Development Policies

Goal 5.4, Transportation System Objectives A, B and H, address the connection between the City's transportation system and economic development by enhancing the multimodal freight transportation system for competitive access to global markets, supportive development of industrial and employment zoned properties, and reinforcing the link between transportation investment and thriving industrial districts.

Goal 6 – Transportation Policies

Many Goal 6 policies pertain directly to freight mobility including:

Policy 6.3 Transportation Education, Objective B, supports a public-private partnership for implementing educational programs about freight movement in the City.

Policy 6.9 Freight Classification Descriptions, Objectives A-I, describe the various elements of the City's Freight System including roadways, railways, freight districts, and freight facilities.

Policy 6.13 Traffic Calming, Objective C, encourages vehicular traffic, including trucks, to use streets with higher classifications consistent with their function to avoid non-local traffic from infiltrating residential neighborhoods.

Policy 6.15 Transportation System Management, Objective B, directs the City to give preference to projects that add system capacity through operational improvements such as signal upgrades, ITS, and intersection design that benefits all modes of travel.

Policy 6.29 Multimodal Freight System, Objectives A-E, supports the development of a safe, reliable and efficient freight system that includes truck, rail, air marine, and pipeline transport modes. The objective emphasizes public-private coordination and partnership in planning, prioritizing and funding freight projects. They also stress the need to work cooperatively to minimize adverse impacts caused by freight movement.

Policy 6.30 Truck Mobility, Objectives A-G, provides guidance for developing, maintaining and managing the street network that supports truck movement. The objectives guide investment priorities, design for legal and over-dimensional loads, and appropriate use of streets by trucks, and operational improvements to reduce delay.

Policy 6.XX Truck Accessibility, Objective A-F, addresses truck access and circulation needs through objectives that focus on such actions as eliminating bridge weight and height restrictions, improving at-grade rail crossings to limit delay and increase safety, managing on-

street loading zones for efficient loading and unloading, and considering truck needs in street design.

Goal 11B – Public Rights-of-Way

Policy 11.10 Street Design and Right-of Way Improvements, Objective E, directs the City to use a collection of right-of-way design resources including Design Guide for Trucks when developing and designing street improvements.

The Freight System

Portland relies on a multimodal classification system to describe the design and function of a street or other transportation facility. There are seven classification categories: Traffic Transit, Pedestrian, Bicycle, Freight, Emergency Response, and Street Design. When funding, designing, or operating a facility all mode classifications are considered.

Portland's Freight System is comprised of streets, rail lines, and freight facilities, including marine terminals, intermodal rail yards, airports and pipeline terminals.

Industrial-serving freight moves by a combination of modes – truck, rail, air, pipeline, and marine vessel. Origins and destinations for this type of movement are primarily in Portland's industrial sanctuaries. Efficient and reliable access to terminal facilities and the regional/interstate freight network is paramount for this category of freight. High truck volumes and tractor-trailer activity characterize industrial serving freight movement.

Commercial goods and services delivery relies largely on trucks. This category of truck movement has varied origins and destinations, which can be industrial, commercial or residential. Truck size varies depending on the type of delivery or service. Efficient circulation and access between distribution centers and customer locations is important.

Table 3 describes the type of freight movement and land uses that correspond to the freight classifications.

Table 3
Freight Classification by Activity Type
Placeholder

Mapping the Freight System

Figure 8, the Recommended Freight Network Map, displays Portland's freight system including the highways and street network, rail network and major freight facilities. The mapped network, in combination with the classification descriptions, is part of Goal 6 of the Comprehensive Plan.

Figure 8
Freight Network Map
Placeholder

ST. JOHNS TRUCK STRATEGY – REPORT AND RECOMMENDATIONS (May 2001)

Placeholder – Summary to be provided later.

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and sustainable transportation and living choices for people and businesses in the region. Voters have asked Metro to help with the challenges and opportunities that affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to providing services, operating venues and making decisions about how the region grows. Metro works with communities to support a resilient economy, keep nature close by and respond to a changing climate. Together we're making a great place, now and for generations to come.

Metro | *Making a great place*

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2018 Regional Transportation Plan

www.oregonmetro.gov/rtp

May 2016 - Draft

Commodities Movement and Key Freight Trends

International Trade

With access to one of the best multimodal transportation hubs on the West Coast, Portland-Metro and Oregon businesses reap huge benefits from efficient connections to domestic and international trade markets.

According to a recent study in 2013 of international trade trends:

- The Portland-Metro region exported one-fourth of its economic output in 2012.
- On the state level, goods exported accounted for over 8% of Oregon's Gross Domestic Product (GDP) in 2012.
- Oregon manufactures and their workers depend on foreign customers for one in every four sales dollars.

In 2012, all exported goods from Oregon reached $16.5 billion. Compared to 2008, this total was down about 6 percent (from $17.2 billion), but represented a third successive year of post recession growth.

In 2012, nearly 40 percent of Oregon's exported goods revenue could be attributed to the computer and electronics sector. Machinery, chemicals and transportation equipment combined, represented about 27 percent of total merchandise export revenue.

The following are some key Oregon international trade facts:

- Oregon's exports ranked 14th among U.S. states based on 2014 state Gross Domestic Product.
- The value of exported goods exported from Oregon in 2015 was $20.1 billion.
- The estimated value of Oregon's imports in 2015 was $14.8 billion.

Current Commodities Movement

In terms of the dollar value of commodities coming in and out of the region, 74 percent traveled by truck (in 2007). Respectively in terms of value, 14 percent traveled by rail, 8 percent by Ocean liners and river barges, 2 percent by pipeline, and only 2 percent by airplane.

In terms of the tonnage of commodities coming in and out of the region, 66 percent traveled by truck (in 2007). Respectively in terms of tonnage, 14 percent traveled by rail, 16 percent by Ocean liner and river barge, about 4 percent by pipeline, and far less than 1 percent by airplane.

Potentially insert pie charts of flows by mode from Commodity Flow Forecast slideshow.

In terms of the dollar value of the region's domestic commodities (both inbound and outbound), the top three commodities in 2007 were Computers/electronics (about 11%), Mixed freight (about 9%), and Machinery (about 9%). Mixed freight is generally restaurant supplies, food and grocery supplies, and office supplies.

In terms of the tonnage of domestic commodities (both inbound and outbound), the top three commodities in 2007 were Nonmetal mineral products (about 16%) Gravel (about 15%), and Gasoline and other fuels (about 15%). Nonmetal mineral products include salt, clay, various stone products and other minerals.

Changes to the Portland Region's Key Industries

Forest Products Industries - Traditionally, forest products have been most important in the region. Currently they are experiencing a decline domestically, but and increases in overseas shipments. Timber production and jobs in the forest products industries has declined, due to a reduction of logging on Federal lands. The movement of forest products is dependent on US housing and construction markets, and increasingly on exports of these products to China.

Manufacturing - High-tech electronics has become a highly significant sector in manufacturing. High-tech manufacturing drives growth in manufacturing activities in Portland, especially from Intel's semi-conductor production. The percentage of Oregon's gross domestic product (GDP) that is in Computers and Electronics grew from about 5% in 2003 to about 20% in 2012. The recent large capital investments in the local industry will mean even more high-tech manufacturing activity in the future.

Agriculture - Traditionally, agricultural products have been very important part of freight movement in the Portland region. Significant shares of agricultural products are exported to Asia.

Energy – Energy dependence in the Portland region is shifting from hydroelectric power to other renewable energy sources and natural gas. This creates changes in future demand both in terms of commodities and mode of transport. The sources used for energy consumption in Oregon have shifted over the last twenty to twenty to twenty-five years. From 1990 to 2010 the use consumption of hydroelectric energy is down by nearly one third, and the consumption of natural gas has about doubled. Renewable energy sources for Oregon were almost non-existent in 2000, but are now a small but rapidly growing part of energy consumption.

Impact of Loosing Container Service at Terminal 6

With the departure of Hanjin and Hapag-Lloyd container service at the Port of Portland's Terminal 6 in early 2015, thousands of Oregon businesses directly and indirectly experienced increasing challenges moving goods to and from global markets. While those using Terminal 6 have been impacted the most by service loss, shippers throughout the state that have benefited from lower costs resulting from the presence of this service will likely be impacted by that loss as well.

As part of the research from the Oregon Governor's International Trade and Logistics Initiative, the following are some of the findings identified that relate to freight mode and commodity movement:

- Portland's Terminal 6 serves broad geographic and commodity markets in Oregon, Idaho, and Washington. The Columbia/Snake River System expands the Portland cargo market to include southern Washington and Idaho. Cargo from this larger catchment area is critical to recruiting and sustaining cargo service at Terminal 6.
- Oregon's 2014 containerized exports through Terminal 6 were dominated by agricultural and forest products. Containerized imports were dominated by consumer and industrial goods, tires and other products feeding regional and national distribution centers.
- The loss of Hanjin and Hapag-Lloyd service means that roughly 97 percent of the 2014 Terminal 6 volume must now be moved to and from the Puget Sound ports of Tacoma and Seattle. About 3 percent of this containerized trade still moves on Westwood Shipping Lines through Terminal 6.
- Most Oregon exporters and importers are using rail and truck to reach Seattle and Tacoma rather than changing their shipping patterns. A few have reduced shipments or diverted export products into domestic markets.
- Most shippers have reported increased transportation costs in the short term, typically from $400 to $450 per container.

Bottleneck Studies and Congestion Impacts

Corridor Bottleneck Operations Study (CBOS) Project Atlas Summary (April 2013)

Introduction

The project atlas provides a collection of maps, tables and project sheets that can be used in a variety of different ways, depending on the user's needs. The Project Atlas identifies bottleneck locations along the five metro area corridors (I-5, I-205, I-84, I-405 and US 26) and correlate locations of congestion with recommended projects. This study is in response to Federal Highway Administration (FHWA) Localized Bottleneck Reduction (LBR) program. The LBR program focused on relieving recurring bottlenecks (as opposed to non-recurring bottleneck causes) and the operational influences that cause them. The primary purpose is to improve safety and operations at these bottlenecks. This new approach is to seek cost-effective and small-scale improvements to the existing system. The projects recommended are not capacity improvements.

The development of this Project Atlas consists of three steps:

- Corridor-level reconnaissance:

  This step consisted of corridor-level reconnaissance to provide the foundation for specific investigation to identify and validate bottleneck activity and causes.

- Bottleneck analysis, evaluation, screening, and selection of solutions:

  This step focused primarily on design and operations. Bottlenecks were analyzed and potential solutions were developed, evaluated, and screened by an expert multidisciplinary design panel.

- Refinement of solutions:

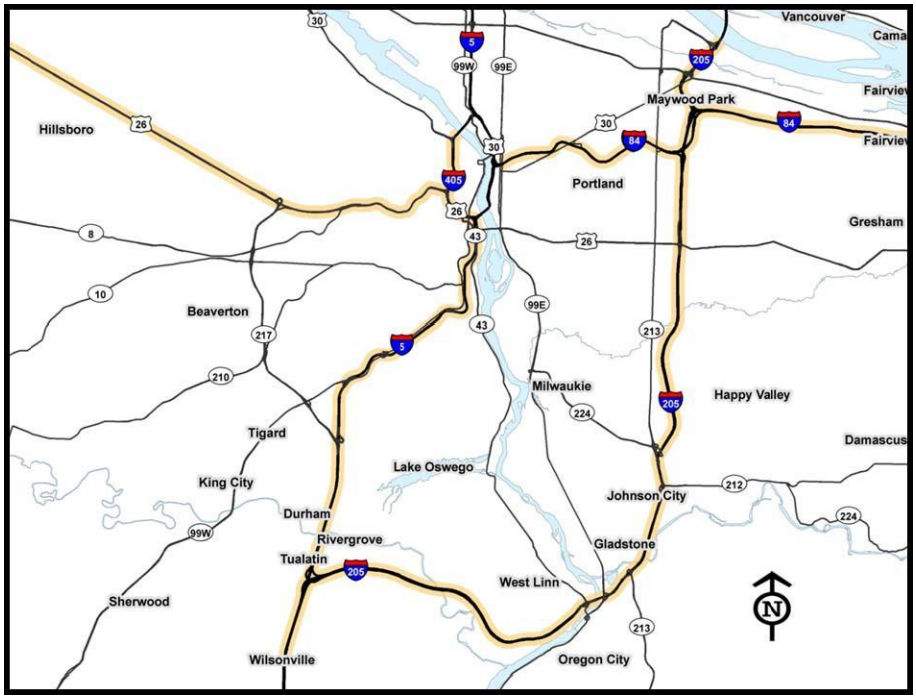
  The final step involved a more thorough operations and design evaluation of potential solutions deemed feasible by the screening panel. The detailed evaluation and refinement included traffic modeling to assess various performance measures, then assessment of project feasibility.

Projects were selected as providing the best value of benefits and cost (primarily $1 million to $20 million range). It should be noted, however, that traffic volumes on these highways are very high, particularly during the peak commute hours, and because these operational improvements do *not* add capacity, the benefits achieved will likely be moderate and incremental. Insofar as bottlenecks along these corridors often meter traffic flow, reducing the queuing and delay at a specific bottleneck may allow more traffic to pass through and move the bottleneck further downstream. Notwithstanding these occurrences, the proposed projects will alleviate congestion at identified bottlenecks, particularly on the peak commute shoulders, and enhance safety by improving the weaves and merges that occur at interchanges.

Study Area

The study area consists of five corridors in the Portland metropolitan area (see **Figure 1**): I-5, I-205, I-84, I-405, and US 26. The I-5 corridor is bounded on the north by the Marquam Bridge (approximately milepost 300) and on the south by the Boones Bridge (approximately milepost 283) in Wilsonville. The I-205 corridor is bounded on the north by Airport Way (approximately milepost 25) and on the south by the I-5 interchange in Tualatin (approximately milepost 0). The I-84 corridor is bounded on the west by I-5 and on the east by 257th Avenue. The I-405 corridor is bounded on the north and south by I-5. The US 26 corridor is bounded on the west by OR 47 and on the east by I-405. The study areas for each corridor includes the roadway mainline as well as the ramp merge/diverge locations. This project does not include evaluation of ramp terminals or other parallel roadway facilities.

Figure 1 Study Area Corridors Map



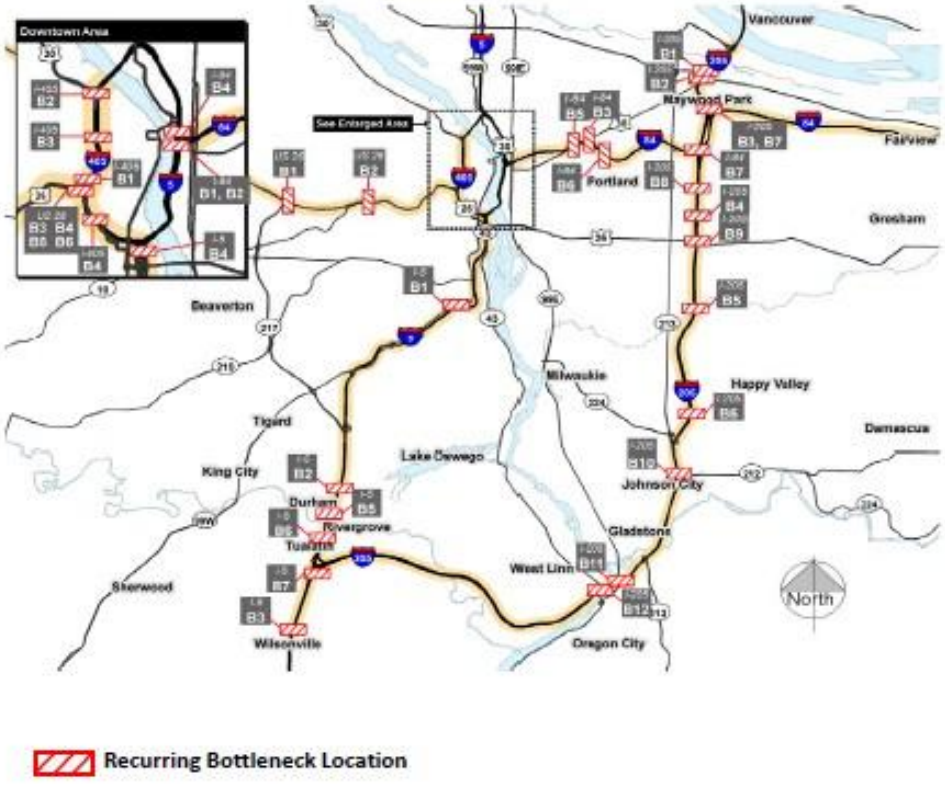
Bottleneck Identification Methodology

The bottleneck identification analysis in this study is intended to provide spatial and temporal evaluation of freeway operations along each of the freeway corridors and to help correlate locations of congestion with potential mitigation measures. For this study, the term bottleneck was used to identify corridor operations that result in a speed of 35 miles per hour or less across all lanes. There were two tiers of analysis used to identify bottlenecks.

The first tier of analysis included a corridor-level reconnaissance utilizing loop detector data from the Portland Oregon Regional Transportation Archive Listing (PORTAL), historical crash data (5 years) from ODOT's Online Crash Database, and a review of Oregon Highway Plan (OHP) mobility standards as they relate to the current operations of each

facility. The PORTAL data is used to identify bottleneck locations for a typical weekday commute during the AM and PM peak periods.

Figure 3-12: Regional Recurring Bottleneck Locations



Recurring Bottleneck ID	Recurring Bottleneck Locations	Cause		Congestion Speed (MPH)	Congestion Duration (Hours)
		Decision Point	Physical Constraint		
I-5 Bottlenecks					
B1	I-5 NB: Terwilliger Boulevard Entrance Ramp (AM & PM)	X	X	20	4
B2	I-5 NB: Lower Boones Ferry Road Exit Ramp (AM)	X		30	1.25
B3 *	I-5 NB: Westbound Elligsen Road Entrance Ramp (PM)	X		*	*
B4	I-5 SB: Hood Avenue Exit Ramp (PM)	X		10	2.75
B5	I-5 SB: Carman Drive Lane Drop (PM)	X		10	2.25
B6	I-5 SB: Nyberg Street Exit Ramp (PM)	X		25	2.5
B7 **	I-5 SB: I-205 Entrance Ramp (PM)	X		**	**
I-205 Bottlenecks					
B1	I-205 NB: Sandy Boulevard/Columbia Boulevard Entrance Ramp (PM)	X		20	3
B2	I-205 NB: Columbia Boulevard/Hwy 30 Exit Ramp (PM)	X		35	Inconclusive
B3	I-205 NB: Westbound I-84 Entrance Ramp (PM)	X		5	5.25
B4	I-205 NB: Division Street Entrance Ramp and Hwy 26/Powell Blvd. Entrance Ramp (AM & PM)	X		10	2.75
B5	I-205 NB: Foster Road Exit Ramp (AM & PM)	X		20	4
B6	I-205 NB: Sunnybrook Road Entrance Ramp (PM)	X		30	2.25
B7	I-205 SB: Westbound I-84 Exit Ramp (AM & PM)	X		5	4.25
B8	I-205 SB: Stark/Washington Street Entrance Ramp (PM)	X		10	3.25
B9	I-205 SB: Hwy 26/Division Street/Powell Boulevard Exit Ramp (PM)	X		25	3.25
B10	I-205 SB: 212/224 Entrance Ramp (PM)	X		35	1
B11	I-205 SB: 99E/McLoughlin Boulevard Exit Ramp (AM)	X		20	1.25
B12	I-205 SB: Hwy 43 Entrance Ramp (AM)	X		30	2
I-84 Bottlenecks					
B1	I-84 EB: I-5 SB Entrance Ramp (AM & PM)	X		10	12
B2	I-84 EB: I-5 SB/NB Merge (PM)		X	5	4
B3	I-84 EB: 39th Avenue Entrance Ramp (PM)	X		Inconclusive	Inconclusive
B4	I-84 WB: I-5 Diverge (AM & PM)	X		20	8+
B5	I-84 WB: 33rd Avenue Entrance Ramp (AM)	X		15	4
B6	I-84 WB: Glisan Entrance Ramp (AM)	X		Inconclusive	Inconclusive
B7	I-84 WB: I-205 SB to I-84 WB Ramp	X		Inconclusive	Inconclusive
I-405 Bottlenecks					
B1	I-405 NB: US 26/12th Ave (PM)	X		5	3
B2	I-405 SB: US 30 Entrance Ramp (PM)	X		5	3
B3	I-405 SB: Everett Street Entrance Ramp to US 26 Exit Ramp Weave (PM)	X		5	3
B4	I-405 SB: US 26 Entrance Ramp to Broadway Exit Ramp Weave (PM)	X		5	3
US 26 Bottlenecks					
B1	US 26 EB: Oregon 217 Entrance Ramp (AM)	X		10	3
B2	US 26 EB: Skyline/Scholls Ferry Entrance Ramp (AM & PM)	X		Inconclusive	Inconclusive
B3	US 26 EB: I-405 Positioning/Curves/Tunnel (AM & PM)	X	X	15	8
B4	US 26 EB: Ramp to I-405 SB (AM & PM)	X	X	5	8
B5	US 26 EB: Ramp to I-405 NB (AM & PM)	X	X	5	7
B6	US 26 WB: I-405 Ramps/US 26 merge (PM)	X	X	10	3

* Construction of NB Auxiliary Lane in 2011

** Construction of SB Auxiliary Lane in 2010

The second tier of bottleneck analysis included validation of the PORTAL observations by means of existing documentation, or further investigation in the form of ODOT video camera footage, field travel time data, and traffic volume collection (to determine saturation flow rates). After validation, the bottleneck locations, activation and deactivation times, duration, and average queue lengths were verified and translated to graphics to combine and visually assess correlations between crash frequency and lane geometry on the facilities.

Common Causes and General Locations of Bottlenecks

Previous traditional transportation solutions for freeway congestion bottlenecks were large-scale extensive, corridor-wide mega-projects. The recent economic downturn has resulted in a re-evaluation of developing congestion relief. Transportation agencies are now looking to understand and identify specific causes of freeway bottlenecks and develop the "best fit" solution to address congestion and safety concerns.

Recurring, localized bottlenecks occur any time the rate of approaching traffic is greater than the rate of departing traffic. The causal effect can usually be attributed to the existence of at least one of two factors:

- **Decision Points,** such as entrance and exit-ramps, merge areas, weave areas, and lane drops; or
- **Physical Constraints,** such as curves, underpasses, narrow structures, or absence of shoulders.

Over 30 recurring bottleneck locations were identified by a design panel of experts. The locations of these bottle necks are shown on the map and table in Figure 3-12.

The table above also shows the cause, average speed during congested periods and the duration (in hours) of the congestion for each of the recurring bottleneck locations.

What and Where are the Bottlenecks

Based on the review of Bottleneck Operations Detail Figures including PORTAL data, ODOT cameras, and field travel time data, thirty-six (36) bottlenecks are identified along the I-5, I-205, I-84, I-405, and US 26 corridors. The study corridor bottlenecks are classified by direction, time of day, (AM Peak or PM Peak) and location.

I-5 Corridor Bottleneck Operational Detail Findings

A total of seven (7) bottlenecks locations are identified within the I-5 study corridor; three bottlenecks are in the northbound direction and four in the southbound direction. Bottleneck numbers B-3 and B-7 have been removed. B-3, a southbound auxiliary lane was built in 2011 and for B-7 a northbound auxiliary lane was built in 2010.

I-205 Corridor Bottleneck Operational Detail Findings

A total of twelve (12) bottleneck locations are identified within the I-205 study corridor; six bottlenecks are in the northbound direction and six in the southbound direction.

I-84 Corridor Bottleneck Operational Detail Findings

A total of seven (7) bottleneck locations are identified within the I-84 study corridor; three bottlenecks are in the eastbound direction and four in the westbound direction.

I-405 Corridor Bottleneck Operational Detail Findings

A total of four (4) bottleneck locations are identified within the I-405 study corridor; one bottleneck is in the northbound direction and three in the southbound direction.

US 26 Corridor Bottleneck Operational Detail Findings

A total of six (6) bottleneck locations are identified within the US 26 study corridor; five in the eastbound direction and one in the westbound direction.

Recently Completed Improvements

I-5 Southbound auxiliary lane built in 2010. This auxiliary lane is 1.5 miles long from I-205 to Elligsen Road. This section of I-5 was ranked 125th on the national freight congestion list. The construction coast was approximately $5.0 million.

I-5 Southbound exit ramp to Nyberg Road built in 2010. The improvement widened the southbound Nyberg Road exit ramp from one lane to two lanes. The ramp widening resulted in significant crash reduction and operational improvement. The construction cost was approximately $500,000.

I-5 Southbound Phase 1: Carman Drive entrance ramp to Lower Boones Ferry exit ramp – auxiliary lane completed in 2012. This project extended the current lane drop just south of the Carman Drive exit ramp to Lower Boones Ferry Road exit ramp, where it would become a drop lane. The construction cost was approximately $1.25 million.

Potential Solutions and Potential Regional Projects

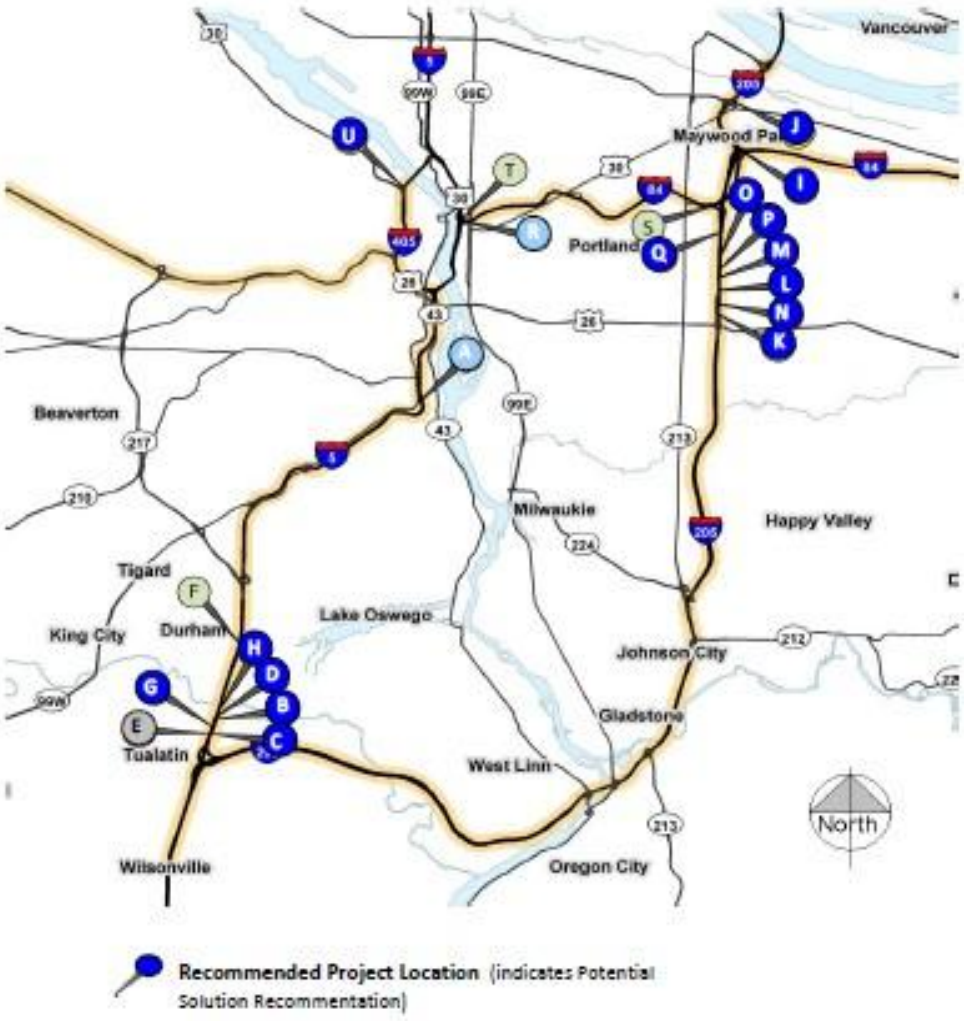
The majority of the projects were identified for the I-5 and I-205 corridors. No projects were selected for advancement along the US 26 corridor. Overall, there are four recommended actions:

- Bottleneck solution is recommended to move forward to develop a project. The project solution is recommended to move forward if analysis indicates that solution provided an operational or safety benefit and the estimated cost fit the $1.0 million to $20.0 million range.
- Recommendation for the solution is for additional analysis to determine the project. The additional analysis is required to develop a potential solution that will provide operational or safety benefit and an estimated cost that fits in the $1.0 million to $20.0 million range.
- Recommendation is that the bottleneck solution should be dropped.

- The final recommendation is that the solution has been constructed or is planned/programmed for construction.

Figure 3-13 (below) provides a list of potential projects by corridor.

Figure 3-13: Potential Regional Projects



CBOS Projects with Current Project Status (in 2016)			
Potential Regional Project Summary			
Map ID #	**Potential Solution and Current Status**	**Description of Potential Regional Projects**	**Est. Cost**
I-5 Potential Bottleneck Projects			
A	Further Analysis	I-5 NB: Terwilliger Blvd. Entrance Ramp Extension	$30-$40 M
B	Yes, Project Funded for Construction	I-5 NB: Phase 1 - Lower Boones Ferry Road Exit Ramp Reconfiguration	$1-$2 M
C	Yes, but Not Funded	I-5 NB: Phase 2 - Nyberg Rd. Interchange to Lower Boones Ferry Rd. Interchange - Auxiliary Lane Extension	$11.5-$13.5 M
D	Yes, but Not Funded	I-5 NB: Phase 3 - Lower Boones Ferry Rd. Interchange to Carman Dr. Interchange - Auxiliary Lane Extension	$17-$21 M
F	Project Constructed in August 2012	I-5 SB: Phase 1 - Carman Dr Entrance Ramp to Lower Boones Ferry Exit Ramp - Auxiliary Lane	$1.25 M
G	Yes, Project Funded for Construction	I-5 SB: Phase 2 - Lower Boones Ferry Rd. Exit to Lower Boones Ferry Rd. Entrance Auxiliary Lane	$7.5-$8.5 M
H	Yes, Project Funded for Construction	I-5 SB: Phase 3 - Lower Boones Ferry Rd. to I-205 Auxiliary Lane Extension	$10-$18 M
I-205 Potential Bottleneck Projects			
I	Yes, Projects combined into one project. Project under development	I-205 NB: Phase 1 - I-84 WB Entrance Ramp to Sandy Blvd. Exit Ramp - Auxiliary Lane	$10-$15 M
J		I-205 NB: Phase 2 - Sandy Blvd. Exit Ramp to Columbia Blvd. Exit Ramp - Auxiliary Lane Extension	
K	Yes, but Not Funded	I-205 NB: Powell Blvd. Entrance Ramp to Division St. Entrance Ramp - Auxiliary Lane Extension and 2-Lane Exit at Washington St.	$6.5-$7.5 M
L	Yes, but Not Funded	I-205 NB: Phase 1 - Powell Blvd Entrance Lane to Washington St. Exit Ramp - Auxiliary Lane Extension	$6.0-$6.9 M
M	Yes, but Not Funded	I-205 NB: Phase 2 - Washington St. Exit Ramp to Glisan St. Exit Ramp - Auxiliary Lane Extension	$2.4- $2.8 M

Map ID #	Potential Solution and Current Status	Description of Potential Regional Projects	Est. Cost
N	Yes, but Not Funded	I-205 NB: Phase 3 - Glisan St. Exit to I-84 WB Exit Ramp - Auxiliary Lane Extension	$2.2-$2.5M
O	Yes, but Not Funded	I-205 NB: Phase 4 - Division Street Entrance Ramp to Stark St./Washington St. Exit Ramp - Auxiliary Lane Extension w/ 2-lane Exit at Washington Street	$1.7-$2 M
P	Yes, but Not Funded	I-205 NB: Division St. entrance ramp to I-84 WB Exit Ramp - Auxiliary Lane Extension w/2-lane Exit at Washington St.	$7.6-$8 M
Q	Yes, Project under development	I-205 SB: I-84 EB Entrance ramp to Stark St./Washington St. exit Ramp - Auxiliary Lane	$7-$8.5M
I-84 Potential Bottleneck Projects			
R	Further Analysis	I-84 EB: Grand Ave. Entrance Ramp Extension	$4.4-$5 M
S	Project Constructed in 2013	I-84 EB: Halsey St. Exit Ramp to I-205 NB Entrance Ramp - Auxiliary Lane	$5.9 M
T	Project Constructed in 2013	I-84 WB: I-5 NB and I-5 SB Diverge Re-striping	$0.5 M
	TIGER Grant funding for construction	I-84 EB/WB Active Traffic Management (I-5 to I-205)	
I-405 Potential Bottleneck Projects			
U	Yes, New signage on Bridge, most of project not funded	I-405 SB/US30 EB: Entrance Ramp Lane Re-arrangement	$0.5-$1.0 M
US 26 Potential Projects			
	TIGER Grant funding for construction	US26 Active Traffic Management OR217 to I-405 EB)	

REGIONAL FREIGHT POLICY FRAMEWORK
(Chapter 2 of Regional Freight Plan – June 2010)

Freight goals within a regional policy framework

Informing the regional framework for freight policy is the understanding that the Portland-Vancouver region is a globally competitive international gateway and domestic hub for commerce. The multimodal freight transportation system is a foundation for economic activities and we must strategically maintain, operate and expand it in a timely manner to ensure a vital and healthy economy. After much deliberation, the Regional Freight and Goods Movement (RFGM) Task Force developed the following goal statement to elaborate a policy framework that would protect and improve the cost-effective functioning of the critical regional freight network:

- We must use a systems approach to plan and manage our multimodal freight transportation infrastructure, recognizing and coordinating both regional and local decisions to maintain seamless flow and access for freight movement that benefits all of us.
- We must adequately fund and sustain investment in our multimodal freight transportation system to ensure that the region and its businesses stay economically competitive.
- We must create first-rate multimodal freight networks that reduce delay, increase reliability, improve safety and provide choices.
- We must integrate freight mobility and access needs in land use decisions to ensure the efficient use of prime industrial lands, protection of critical freight corridors and access for commercial delivery activities.
- We must ensure that our multimodal freight transportation system supports the health of the economy and the environment.
- We must enlighten our region's citizens and decision makers about the importance of freight movement on our daily lives and economic well-being.

2.5.4 Regional Freight Network Vision

The Portland –Vancouver region is a globally competitive international gateway and domestic hub for commerce. The multimodal freight transportation network is a foundation for the region's economic activities and we must strategically maintain, operate and expand it in a timely manner to ensure a vital and healthy economy.

Trade-dependent state economies

Exports: In 2012 Oregon state exports totaled $18 billion. Portland ranked 4th among the largest 100 U.S. metro areas in terms of export value as a share of metro output (24 percent).

Businesses: Oregon companies depend on Portland's marine, rail, air and road facilities for access to resources and markets: onions, apples, hazelnuts, grass seed, seafood, wood products, Les Schwab, Fred Meyer, Intel, Nike, Columbia Sportswear, etc.

Jobs: 490,000 Oregon jobs tie directly or indirectly to, or supported by, international trade

Sources: Portland Business Alliance, Today More than Ever: Oregon and Portland/Vancouver Depend on International Trade and Investment, 2013exports as a percentage of gross state product.

Regional Freight Network Concept

The Regional Freight Plan relies on a coordinated, integrated, multimodal and collaborative approach to integrating freight considerations into the multi-purpose transportation system and the larger land use issues in the region. It addresses the needs for freight through-traffic as well as regional movements, and access to employment and industrial areas, and commercial districts.

The Regional Freight Network Concept contains policy and strategy provisions to develop and implement a coordinated and integrated freight network that helps the region's businesses attract new jobs and remain competitive in the global economy.

Five policies to serve as the foundation of this vision:

1. **Use a systems approach to plan for and manage the freight network**
2. **Reduce delay and increase reliability**
3. **Protect industrial lands and freight transportation investments**
4. **Look beyond the roadway network to address critical marine and rail needs**
5. **Pursue clean, green and smart technologies and practices**

Freight Policy 1. Use systems approach to plan for and manage the freight network

A comprehensive, multi-modal systems approach is central to planning and managing the region's multimodal freight transportation infrastructure. This approach provides a strong foundation for addressing core throughway network bottlenecks, recognizing and coordinating both regional and local decisions to maintain seamless flow and access for freight movement that benefits all.

The transport and distribution of freight occurs via a combination of interconnected publicly- and privately-owned networks and terminal facilities. Rivers, mainline rail, pipeline, air routes, and arterial streets and throughways connect our region to international and domestic markets and suppliers beyond our boundaries.

Inside our region, throughways and arterial streets distribute freight moved by truck to air, marine, and pipeline terminal facilities, rail yards, industrial areas, and commercial centers. Rail branch lines connect industrial areas, marine terminals, and pipeline terminals to rail yards. Pipelines transport petroleum products to and from terminal facilities.

Better integrate freight issues in regional and local planning and communication
Potential freight impacts should be considered in all modal planning and funding, policy and project development and implementation and monitoring. This also means better informing the region's residents and decision makers about the importance of freight movement on our daily lives and economic well-being. Metro will work with its transportation partners to improve the level of freight information available to decision-makers, the business community and the public.

Figure 2.14 shows the components of the regional freight network and their relationships.

Figure 2.14
Regional Freight Network Concept

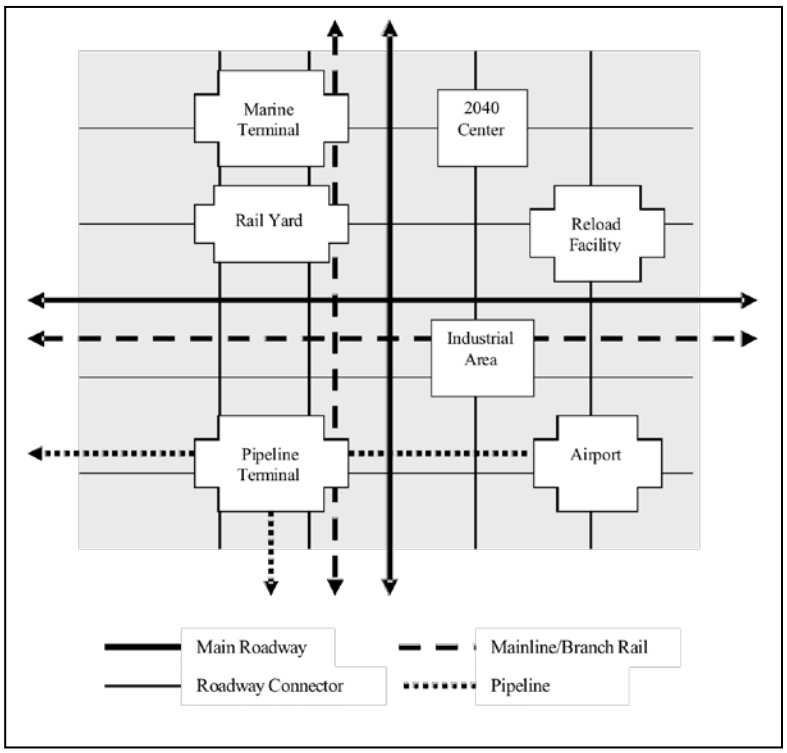
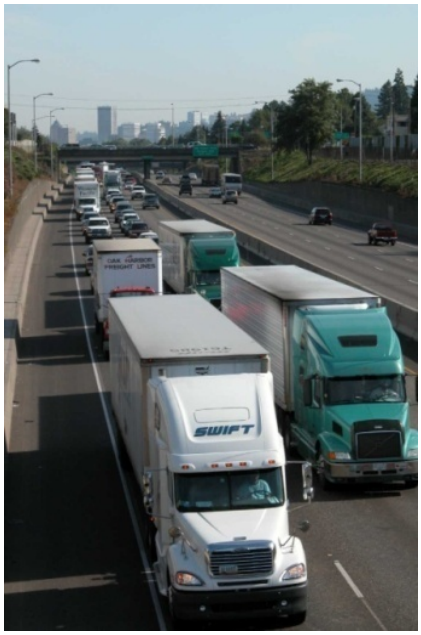


Figure 2.15 applies the regional freight network concept on the ground to identify the transportation networks and facilities that serve our region and the state's freight mobility needs. (See http://gis.oregonmetro.gov/RTP/ for zoomable version.

Freight Policy 2. Reduce delay and increase reliability

The 2005 Cost of Congestion to the Economy of the Portland Region Study reported that our region has a higher than average dependency on traded sector industries, particularly computer/electronic products, wholesale distribution services, metals, forestry/wood/paper products, and publishing; business sectors that serve broader regional, national, and international markets and bring outside dollars into the region's economy.

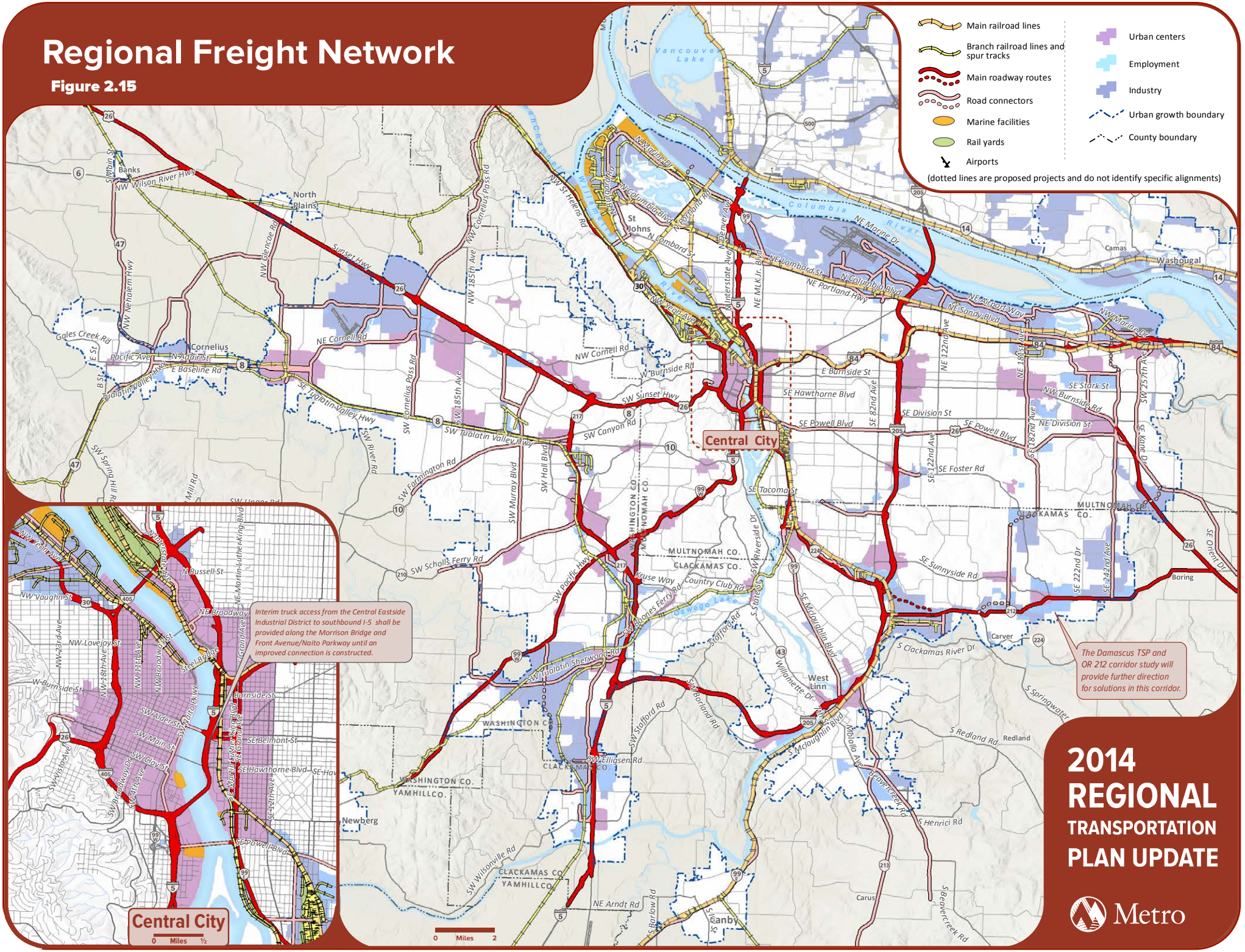
These industries depend on a well-integrated and well-functioning international and domestic transportation system to stay competitive in a global economy.



Reducing delay and increasingly reliability of the freight network is critical for the health our regional economy.

Regional Freight Network

Figure 2.15



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

As an international gateway and domestic freight hub, the region is particularly influenced by the dynamic trends affecting distribution and logistics. As a result of these global trends, U.S. international and domestic trade volumes are expected to grow at an accelerated rate. The value of trade in Oregon is expected to double by 2040, to $730 billion.[9] The region's forecasted population and job growth – an additional 917,000 residents and 597,000 jobs to be added between 2010 and 2040[10] – along with the associated boost in the consumption of goods and services are significant drivers of projected increases in local freight volume.

It is critical to maximize system operations and create first-rate multimodal freight networks that reduce delay, increase reliability, maintain and improve safety and provide cost-effective choices to shippers. In industrial and employment areas, the policy emphasizes providing critical freight access to the interstate highway system to help the region's businesses and industry in these areas remain competitive. Providing access and new street connections to support industrial area access and commercial delivery activities and upgrading main line and rail yard infrastructure in these areas are also emphasized.

Ensure adequate investment in freight capacity

In order to carry out an overall policy of reducing delay and increasing reliability, it will be necessary to expand the types of programs and amounts of funding for freight transportation infrastructure to adequately fund and sustain investment in our multimodal freight transportation network in order to ensure that the region and its businesses stay economically competitive. This includes a more rigorous analysis of the return-on-investment of all transportation projects (a practice which may result in prioritizing freight projects in some cases) and exploration of possible expansion of public-private partnerships to fund transportation system expansion. It also requires more analysis to understand appropriate public investment in private (freight) facilities when improvements in those facilities result in public benefits.

Freight Policy 3. Protect industrial lands and freight transportation investments

It is important to integrate freight mobility and access needs in land use decisions to ensure the efficient use of prime industrial lands, protection of critical freight corridors and access for commercial delivery activities. This includes improving and protecting the throughway interchanges that provide access to major industrial areas, as well as the last-mile arterial connections to both current and emerging industrial areas and terminals.

[9] Federal Highway Administration, Freight Analysis Framework version 3.4, 2013

[10] Metro 2040 growth forecast. Represents forecasted population and jobs within 4-county area (Multnomah, Clackamas, WAshignton, Clark).

Freight Policy 4. Look beyond the roadway network to address critical marine and rail needs

It is important to look beyond the roadway network to address needs of the multi-modal and intermodal system that supports our regional economy. As described in Chapter 1, freight rail capacity is adequate to meet today's needs but as rail traffic increases additional investment will be needed in rail mainline, yard and siding capacity.[11] Whenever right-of-way is considered for multiple uses such as freight rail, passenger rail and trails, analysis must include long-term needs for existing freight and freight rail expansion to ensure that necessary future capacity is not compromised.

In addition, navigation channel depth on the Columbia River continues to be the limiting factor on the size, and therefore the number, of ships that call on the Portland-Vancouver Harbor. Channel deepening has been pursued for several decades, balanced by the need to protect various fish stocks migrating on the river.

Freight Policy 5. Pursue clean, green and smart technologies and practices

It is important to ensure that the multimodal freight transportation network supports the health of the economy and the environment by pursuing clean, green and smart technologies and practices. Details of the most promising technologies and practices will be developed as part of the Regional Freight Plan's elaboration of a freight action plan, as identified in Chapter 10 of that plan; however examples could include support for Cascade Sierra Solutions to provide diesel emission reduction technologies in the region.

The Columbia River serves as a critical international marine gateway to the region's system of multi-modal freight networks.

[11] Port of Portland, Port of Portland Rail Plan, 2013

Fostering Advancements in Shipping and Transportation for Long-term Achievement of National Efficiencies (FASTLANE) Grants Overview

Submission dates and Timelines:

- Grants.gov "Apply" function opens on March 15, 2016.
- Applicants interested in applying should email FASTLANEgrants@dot.gov no later than March 25, 2016 with applicant name, State project is located in, approximate total project cost, amount of grant request, and brief project description.
- Application must be submitted by 8:00 p.m. EDT April 14, 2016.
- Applications must be submitted through Grants.gov (late applications will not be considered).
- Registration process usually takes 2-4 weeks to complete

Project Match

Grants may be used for up to 60 percent of future eligible project costs. Other Federal assistance may satisfy the non-federal share requirement for the grant, but total Federal assistance for the project receiving a grant may not exceed 80 percent of the future eligible project costs.

Applicant and Project Eligibility

Eligible applicants are 1) a State or group of States; 2) an MPO with a population of more than 200,000 individuals; 3) a unit of local government; 4) a political subdivision of a State or local government; 5) a public authority with a transportation function, including a port authority; 6) other government agencies as described in the Notice of Funding Opportunity.

Eligible projects are:

- Highway freight projects on the National Highway Freight Network
- Highway or bridge projects on the National Highway System
- Railway-highway grade crossing or grade separation projects
- Freight projects that is and intermodal or rail project, or within the boundary of a public or private freight rail, water or intermodal facility.

Project readiness:

For a large project, DOT cannot award a project that is not reasonably expected to begin construction within 18 months of obligation of funds for the project (see page 21 – 28 of the Notice of Funding Opportunity) and must start construction no later than September 19, 2019.

- The minimum project size for a large project is the lesser of $100 million; or 30 percent of the State's FY 2015 Federal aid apportionment if the project is located in one State.
- The minimum total grant award for a small project is $5 million.