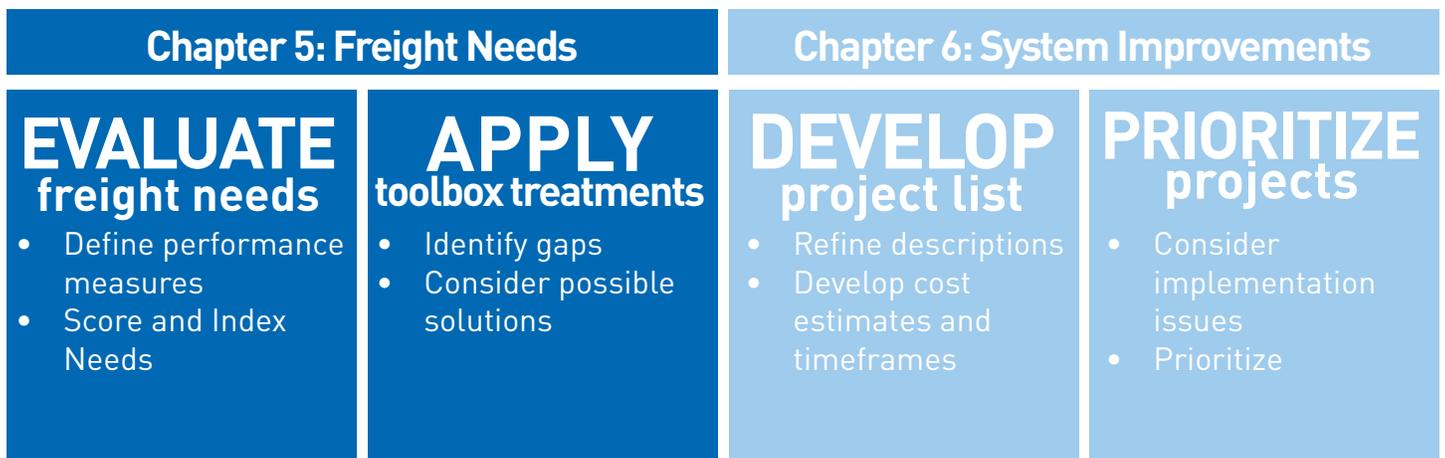




6 SYSTEM IMPROVEMENTS

The final product of the Freight Access Project (FAP) is a prioritized project list based on current data and understanding of the problems facing truck freight within, between, and on access routes to the two MICS. Within this chapter, projects are defined that benefit freight between now and the planning year of 2035. This chapter summarizes the development of that project list and presents the top tier projects. Building on Chapter 5, the following improvements support Seattle’s Freight Mobility Action Plan and keep freight moving¹.

This chapter is organized first by identifying a range of projects that address freight needs, including projects that have been previously identified through prior programming and planning efforts, and improvements identified through the evaluation process described in Chapter 5. Next, the list of projects was prioritized to also incorporate pavement conditions (to the extent available), roadway designations, reliability benefits, and environmental impacts. Finally, this chapter provides a list of tiered or prioritized projects. Together, Chapters 5 and 6 describe the development of the project list through the process illustrated below.



¹ www.seattle.gov/transportation/freight.htm#plan

6.1 Project Identification Methodology

In developing the project list, the project team focused on meeting the primary goal of the FAP: To improve freight and goods movement within and between the City's MICs and from the MICs to the regional highway system. This Freight Access Project report provides a tiered list of improvements to help meet freight mobility between now and 2035. (Programs and policies to support city-wide freight mobility between now and 2035 will be addressed in the Freight Master Plan. That plan takes the projects identified herein and prioritizes those projects with other freight needs in the City of Seattle.)

To develop project improvement concepts, the team identified high scoring roadway segments based on the composite freight scores shown in Section 5.4. After considering a range of previously identified projects from other planning efforts (described below), the team applied the freight toolbox treatments to address gaps in previous planning and programming efforts. Toolbox treatments were applied to both the previously identified projects and high scoring roadway segments that were not addressed in previous efforts.

6.1.1 Problem Roadway Segments

Project focus areas are located on roadway segments of major truck streets, arterial roadways, and first/last mile connectors. The roadway segments were filtered to show locations that scored highest in the performance measures evaluation. The roadway segments requiring attention are shown in Figure 6.1. As shown in the figure, there are several segments (identified in red) that are on roadways critical to freight.



The projects that were previously identified on locations/roadway segments within the project area are discussed in the next section.

6.1.2 Projects Previously Identified

Prior planning efforts in the City of Seattle have already identified a number of freight-related transportation infrastructure projects. Previously identified freight projects within and connecting the MICs are summarized in Table 6.1.



Figure 6.1 High Scoring Roadway Segments

Table 6.1 Previously identified freight projects in the MICs

Concept Source	Project Name
City of Seattle Department of Transportation	Multimodal Corridor Projects located on Major Truck Streets or freight corridors
	NW Market Street / Leary Way / N 36th Street Rebuild
	S Hanford Street Rebuild
	15th Avenue / Elliott Avenue Rebuild
	1st Avenue South Viaduct over UP Argo Yard
	West Emerson Street / 21st Avenue West / West Commodore Way Intersection Improvement
	Holman Road NW Rebuild
	N 105th Street / Northgate Way
	S Lucille Street Rebuild
	Massachusetts Street (access road) Rebuild
	Diagonal Avenue S / S Oregon Street / Denver Avenue S Rebuild
	Holman Road / 13th Avenue Intersection Improvement
	W Marginal Way / Chelan Street Intersection Improvement
	Heavy Haul Corridor (jointly with the Port of Seattle)
	Railroad Crossing Delay Warning System
	South Spokane Surface Street ITS
	Denny Way ITS
	S Michigan St ITS Improvements
City Center Dynamic Signal Timing	
SoDo Phase 1 ITS	
I-5 Connector ITS	
PSRC 2040	Hanford & Main SIG Railyard Access Improvements
	South Lander Street Grade Separation
	Study and Implementation of additional Mainline Grade Separation
WSDOT Rail Plan	4th Avenue South Viaduct Replacement over UP Argo Yard

The projects shown in the table provide benefits to trucks and other modes. In the development of the FAP project list, these projects were revisited from the perspective of the freight needs identified in Chapter 5 and their anticipated benefits. Several of the projects shown in the table overlap with the project focus areas shown in Figure 6.1. Where applicable, these projects were modified and refined to match freight needs.

In addition to the freight projects identified in Table 6.1, there are several ongoing projects within the central downtown area that benefit all modes. Some of these projects currently underway include the SR 99 Viaduct Replacement Program and Waterfront Seattle, and improvements to Mercer Street, which will be accomplished within the near-term planning horizon of the FAP.

6.1.3 Matching Tools to Problem

Roadway Segments

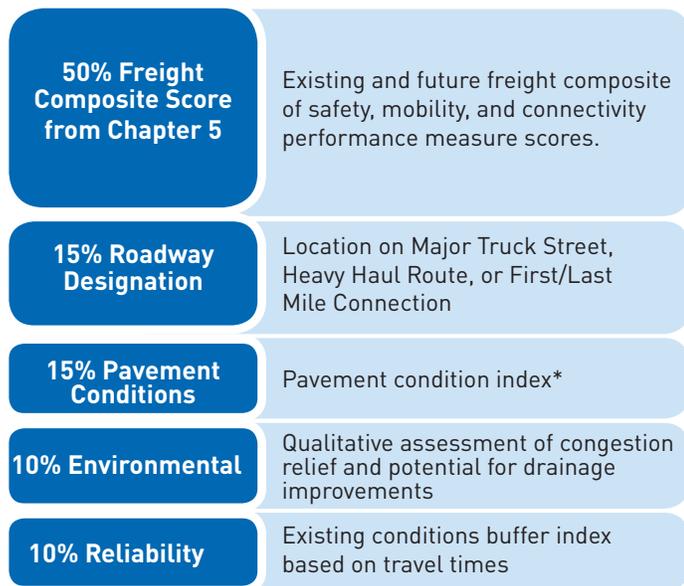
The freight toolbox consists of a “menu” of improvement options that represent the types of improvements that could improve freight safety, mobility and connectivity. The toolbox treatments were applied to the problem roadway segments developed from the performance measures evaluation. The toolbox treatments described in Chapter 5 were used to fill in gaps to add new projects to the pre-existing list. If necessary, toolbox treatments were also applied to previously identified projects to adjust elements of the description or scope of the project to better address freight needs. The treatments include the improvement strategies introduced in Chapter 5, ranging from technology solutions to geometric improvements that were grouped into the following categories:

- Maintenance and preservation
- Capital investments
- ITS applications
- Intersection operations
- Wayfinding for trucks
- Geometric improvements
- Freight management

The application of the freight toolbox treatments was completed with a series of gap analyses conducted by the project team. Brainstorming sessions within the project team with input from the Freight Advisory Board (FAB) and subject matter experts from the Seattle Department of Transportation and Port of Seattle generated a new number of projects to fill the gaps not covered by previously identified freight projects within the MICs.

6.2 Prioritizing Projects

Projects were prioritized based on a framework that included the results of the performance measures evaluation outlined in the previous chapters. The breakdown for prioritizing projects included five components approximately weighted to the breakdown shown in Figure 6.2. A detailed description of the scoring approach for each component is contained in Appendix E.



*Pavement conditions score could only be applied to those roadways for which data was available. Pavement condition information was available for arterial roadways, but not for local streets.

Figure 6.2 Project Prioritization Components

The freight composite score is weighted most heavily because it directly supports the safety, mobility, and connectivity goals of the project. This component score is based on the performance evaluation described in Chapter 5.

Roadway designation and existing pavement conditions (for those roadways classifications for which condition assessments were available) are weighted equally and next highest in the

prioritization process. Roadway designation increases the priority of projects on Major Truck Streets, Heavy Haul Routes, or First/Last Mile Connections. Roadway designations are changed through a legislative process and are used as an important criterion for street design, traffic management decisions, and pavement design and repair.

Roadways with a lower pavement conditions index show the need for street surface improvements. Segments with poor existing pavement conditions are given higher priority as projects on these roadways could immediately improve travel conditions for all modes. This scoring approach gives greater weight to projects on principal and major arterials with the highest overall truck traffic volumes.

The environmental and reliability assessments are weighted slightly lower in the prioritization process. The environmental component is a qualitative assessment of congestion relief and a project's ability to integrate drainage improvements that would have some environmental benefit to the storm water system and Duwamish River.

The reliability criterion evaluates congestion on a corridor using measured average and 95th-percentile travel times (i.e. the minimum time required to travel the corridor 95 percent of the time). The extra time travelers must add to arrive on time for 95 percent of their trips is known as "buffer" time. The buffer index is calculated by dividing the buffer time by average travel time. Similar to the roadway designation and pavement

condition components, the buffer index gives higher weight to projects on corridors with the highest overall truck traffic volumes.

In coordination with SDOT subject matter experts, the project team also developed planning-level cost estimates (where possible to determine), and/or more general cost ranges or funding opportunities, to help determine priority for projects. The determination of when a project will be needed is based on future travel demand and infrastructure investment plans. Implementation is described in section 6.4 including relationship to the citywide Freight Master Plan.

6.3 Freight Projects

The range, complexities, and funding needs of the freight projects in the FAP underscores the need to develop a strategy to fund freight projects now and in the future. This section of the report introduces the project list developed by the FAP team. The projects and programs described in this section are designed to serve freight safety, mobility, and connectivity needs over the 20-year planning horizon. The project listing is based on available data and analysis and should be seen as a snapshot in time. Future implementation will be determined by Seattle decision makers and parallel agency decision makers in consideration of need, funding, environmental review and coordination with other modes.

Periodic future data collection and analysis will be needed to further define both individual projects and the project list itself. It should be seen as a living document with priorities that will need to be revisited regularly to ensure that the City is a good

steward of public funds, making investment in freight infrastructure in the most timely and cost-effective fashion possible.

In the following section, freight projects are categorized into three tiers based on the scoring criteria and available information presented in prior chapters. Tier I projects scored highest based on current information and needs. The tiered system reflects current information, the relative importance of projects to enhance the freight transportation system and provides guidance in implementing the improvements. Projects from the lower tiers (Tier II and Tier III) should be monitored and may become higher priorities as funding becomes available or as conditions and needs change.

As more detailed information becomes available and other plans are completed, the list will need to be revisited to address future needs, funding availability and opportunities, and suggested project timelines. The Freight Master Plan (FMP) is anticipated to insert projects within the MICs into the citywide planning process currently underway. The relative priority of the projects contained in the FAP may change based on the outcomes of the FMP planning process.

Notably, the projects listed as Tier I are within the MICs and do not include projects for connections between the MICs. Projects currently underway to improve connections between the MICs include Alaskan Way, the SR 99 Viaduct Replacement Program, and Mercer Street.

6.3.1 Tier I Projects

The Tier I projects scored highest in the project prioritization process and are considered most important for near to mid-term implementation. These projects are, for the most part, focused on corridors that are critical to the movement of both freight and people and serve a large number of both trucks and other vehicles. They comprise a combination of new and refined system improvements for all modes traveling within, to, or from the MICs. Given the large-scale, complexity, and duration of anticipated projects programmed for downtown Seattle (deep-bore tunnel, streetcar, waterfront programs), the FAP did not identify additional capital improvements there. However, there may be opportunities through the Tier I Freight Spot Improvement Program and related ITS investments.

These projects improve safety and mobility and reduce the number of connectivity constraints for trucks. A complete list of Tier I projects is shown in Table 6.2. Projects in the Tier I category were also summarized in detailed project cut-sheets to assist with grant funding proposals and/or future Seattle Capital Improvement Program (CIP) planning.

Two projects are located in the BINMIC and shown in Figure 6.3. One of the projects would improve roadway geometry along 15th Avenue W at W Dravus Street and W Emerson Street (#22). That project would address existing geometric deficiencies that are located on these key truck routes. In order to provide a solution for freight at these locations, minor changes to curbs, roadway striping, and other lower cost improvements to reduce constraints for truck traffic are proposed.

A second project in the BINMIC (#52) is a two-phased project to improve geometry, wayfinding, and intersection operations throughout the area.

As the analysis presented in previous chapters has shown, the number and severity of freight mobility challenges is particularly evident in Greater Duwamish MIC. It includes a dozen projects that would address maintenance & preservation, utilize ITS applications, and require capital investments. E Marginal Way S (#5A and #5B) is anticipated to have significant investment over the planning horizon to bring the roadway up to Heavy Haul standards and improve the intersection at S Hanford Street. Capital investment projects that include the S Lander Street Grade Separation (#16) and the study and implementation of a second grade separation (#17) are important projects to maintain and improve east-west connectivity within SoDo. ITS applications on S Spokane Street (#24 and #25) are anticipated to reduce congestion for all vehicles and study freight-only lanes in a potential pilot project. These projects and the other Tier I FAP projects within the Greater Duwamish MIC are shown in Figure 6.4.

Table 6.2 Recommended Priority Project List

No.	Project Name	Project Need	Project Type							
		 SAFETY  MOBILITY  CONNECTIVITY	Maintenance & Preservation	Capital Investment	ITS Application	Intersection Operations	Wayfinding for trucks	Geometric	Ongoing Programs	
Ballard/Interbay Northend MIC										
22	15th Avenue West Spot Improvements at W Dravus Street and W Emerson Street	 							✓	
52	BINMIC Truck Route Improvements	 				✓	✓	✓		
Greater Duwamish MIC										
5A	East Marginal Way South Roadway Rehabilitation	 	✓	✓	✓					
5B	E Marginal Way S / S Hanford Street Intersection Improvements	 	✓	✓		✓				
15	Hanford & Main SIG Access Improvements	 		✓		✓				
16	South Lander Street Grade Separation	  		✓						
17	Study and Implementation of Mainline Grade Separations in Mid-SoDo area	 		✓	✓					
20	4th Avenue South Viaduct Replacement	 	✓	✓						
23	South Holgate Street Rail Crossing Improvements	 		✓						
24	Lower Spokane Street Freight-Only Lanes Pilot Project	 			✓	✓				
25	South Spokane Street ITS Upgrades				✓					
28	Railroad Crossing Delay Warning System				✓					
37A	1st Avenue S / Atlantic Street Intersection Improvements	 	✓			✓		✓		
37B	South Atlantic Street Corridor Improvements	 			✓	✓				
Citywide										
-	Citywide Freight Spot Improvement Program Expansion	 	✓			✓	✓	✓	✓	✓
-	Freight Data Collection/Analysis Program				✓	✓				✓

Tier I Project Cost Estimates

Planning level cost estimates are shown in Table 6.3 with a summary provided in Table 6.4. Cost estimates were prepared based on typical unit costs, the functional classification of the roadway, and type of improvement. These are preliminary cost estimates that will be refined as further project definition is developed. “Soft Cost” factors that incorporate a ratio of design, construction, and administration costs to construction costs were applied following guidelines from SDOT’s own cost estimate approach using its Top-Down Cost Estimating Tool ². Appendix F contains the cost-estimate worksheets.

Top-Down Cost Estimating Tool

The Top-Down Cost Estimating Tool provides administration soft cost estimates for the design and construction phases of a project based on historical information. The tool selects from a historical set of projects that have reached substantial completion within the last five years. A soft cost ratio is selected for projects in conceptual or preliminary stages to be applied to an engineer’s estimate of cost. Soft costs include contingencies for construction, design, and Rights-of-Way acquisition. These factors, along with an allowance for the engineer’s estimate, are combined into the soft cost ratio which is the total design and construction administration soft costs compared to the construction contractor costs.

The benefits of using this tool is it allows contingency factors to be applied as the engineer’s estimate of cost is refined. Given the early stages of planning for the priority freight projects included in the Tier I list, the contingencies are generally the highest (more conservative) available from this tool. This tool does not include survey, environmental, or other potential costs that could be incurred as part of the design process.

² Top-Down Cost Estimating Tool. Seattle Department of Transportation. August 2014.

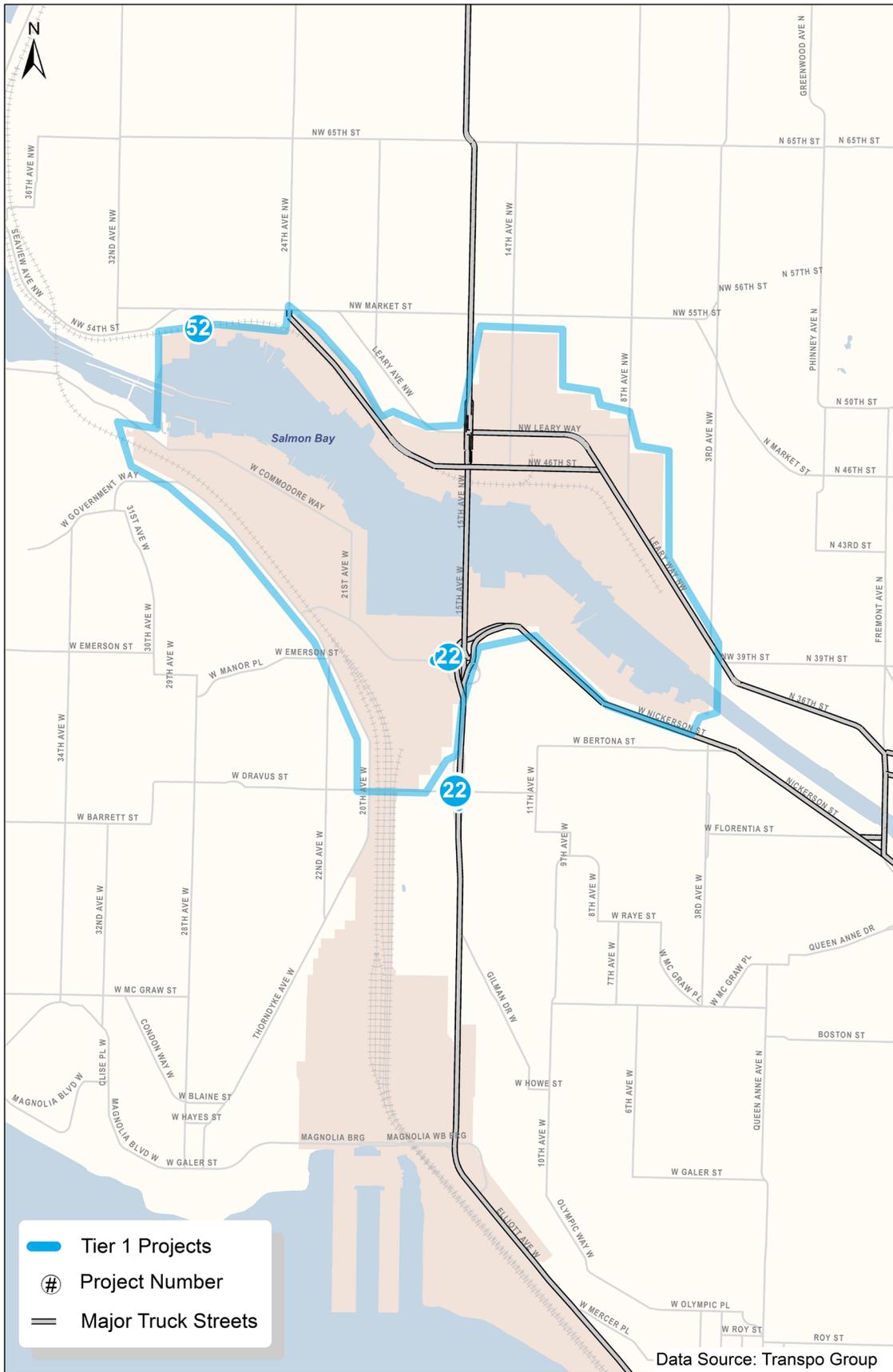


Figure 6.3 Tier I Projects (BINMIC)

Table 6.3 Tier I Cost Estimates

No	Project Name	Cost Estimates (2014 Dollars)	Timeframe
Ballard/Interbay Northend MIC			
22	15th Avenue West Spot Improvements at W Dravus Street and W Emerson Street	\$ 700,000	2016-2020
52	BINMIC Truck Route Improvements	\$ 500,000 (Phase 1) \$ 1,500,000 (Phase 2)	2016-2018 2019-2021
Greater Duwamish MIC			
5A	East Marginal Way South Roadway Rehabilitation	\$ 48,000,000	2016-2020
5B	E Marginal Way S / S Hanford Street Intersection Improvements	\$ 7,000,000	2016-2020
15	Hanford & Main SIG Access Improvements	\$ 5,600,000	2021-2026
16	South Lander Street Grade Separation	\$ 150,000,000 ¹	2016-2020
17	Study and Implementation of Mainline Grade Separations in mid-SoDo area.	\$ 500,000 (Study) TBD ² (Construction)	2016-2020 (construction TBD)
20	4th Avenue South Viaduct Replacement	\$ 94,500,000	2027-2035
23	South Holgate Street Rail Crossing Improvements	\$ 5,600,000	2016-2020
24	Lower Spokane Street Freight Only Lanes Pilot Project	\$ 200,000 (Study) TBD ² (Construction)	2016-2017 (construction TBD)
25	South Spokane Street ITS Upgrades	\$ 1,500,000	2016-2020
28	Railroad Crossing Delay Warning System	\$ 500,000	2016-2020
37A	1st Avenue S / Atlantic Street Intersection Improvements	\$ 600,000	2016-2017
37B	South Atlantic Street Corridor Improvements	TBD ³	2016-2020
Citywide			
-	Citywide Freight Spot Improvement Program Expansion	\$ 1,500,000/year	-
-	Freight Data Collection/Analysis Program	\$ 150,000/year	-

Notes: 1 Cost reduction opportunities to be explored as part of Project #17

2 Cost estimate dependent on outcomes of the study

3 Monitoring to identify specific project needs

Projects with cost estimates not yet determined are listed as ‘TBD’ and include Implementation of a second Mainline Grade Separation (#17), Lower Spokane Street Freight Only Lanes Pilot (#24), and South Atlantic Street Corridor Improvements (#37B). Cost estimates are summarized by timeframe for the Tier I projects and shown in Table 6.4.

Table 6.4 Summary of Tier I Project Costs (in millions of dollars)

Type	2016 -2021	2022 -2027	2028 -2035	Total
MIC freight projects	\$ 214.4	\$ 7.8	\$ 94.5	\$ 316.7
Citywide programs	\$ 9.0	\$ 9.0	\$13.5	\$ 31.5

Notes: All cost estimates are in 2014 dollars. Program costs are summed over the timeframe and do not account for inflation.

As shown in Table 6.4, an estimated \$316.7 million worth of freight system projects are included in the FAP. Cut sheets with project descriptions and details related to costs follow the end of this chapter.

6.3.2 Tier II and Tier III Projects

Tier II and III projects cover a similar range of geometric improvements, ITS applications, and capital investments, as the Tier I projects. Many of these projects build on and/or are complementary to, the Tier I projects. Similar to the Tier 1 projects, they comprise future investments to the freight system that include both previously identified and new projects. Tier II and Tier III projects are often smaller projects on minor or non-arterials for which the available data and analysis is not as robust as that for projects on principal or major arterials, affecting scoring. Due to these uncertainties, there are currently no cost estimates for Tier II and Tier III projects and they are unfunded.

Future analysis may show that some of these projects have a cost-benefit ratio that makes them competitive with the current list of Tier 1 projects. Future analysis may also show that (especially in the absence of funding for the large capital projects comprising Tier 1 projects) it may be beneficial for the City move some of these lower cost projects to Tier 1 status. For these reasons, it will be important to continue to consider the roadway segments on which these projects are located in future data analysis and evaluation efforts. Appendix G includes the complete list of Tier II and Tier III projects.

6.4 Implementation

Implementation of the FAP freight system improvements described in this document are recommended and should be completed over time to help meet existing and future travel demands within and between the MICs. While this FAP report provides an initial list of prioritized and tiered projects, as opportunities present themselves or priorities change, lower priority projects may become feasible and desirable. Throughout the development of a long-term strategy for meeting its transportation needs, the City of Seattle (with the support of the Port of Seattle) needs to balance multiple objectives alongside developing a range of sustainable revenue sources that are adequate to meet these needs.

This project also serves as a building block for the key policy, programmatic, and technical issues to be fully examined in the Seattle Freight Master Plan (FMP). The FMP will provide a City-wide comprehensive vision for freight transportation, as well as, a strategy for implementing policies, and a prioritized package of project and program improvements.

6.5 Project Cut Sheets

Project cut sheets describing the Tier I projects follow. Each sheet includes a map, description, related projects and timeframe.

PROJECT AREA

#22 – 15th Avenue West Spot Improvements W Dravus Street and W Emerson Street



Project Cost: \$700,000

Freight Need

- ✓ Geometric constraints
- ✓ Recurring peak period congestion

Description

This project addresses turn radii issues for trucks through small-scale geometric and intersection operational improvements along 15th Avenue W. Trucks of all sizes experience challenges traveling on the elevated structures at W Emerson Street and W Dravus Street. 15th Avenue W, W Emerson Street, and W Dravus Street are vital connections for freight traveling to and from the Ballard/Interbay Northend Manufacturing and Industrial Center (BINMIC). This project includes two components to implement changes at these locations.

- The W Emerson Street ramp over 15th Avenue W serves trucks going to and from W Nickerson Street. This component includes moving the centerline on the ramp to provide a greater turning radius for trucks and making adjustments to the stop bars at the intersection on the west side of the ramp.
- W Dravus Street is used by trucks of all sizes, including over-legal vehicles unable to pass underneath the bridge on 15th Avenue W. Northbound trucks have particular difficulty turning left onto W Dravus Street from the off-ramp. This component of the project includes upgrading signal timing and hardware at the ramp terminals to ensure vehicle queues on the bridge clear to allow trucks adequate space to turn at the intersection.

Toolbox Treatments

Geometric Improvement

Intersection Operations

Project Elements

- ✓ Moving roadway centerline to improve turning radius
- ✓ Upgraded signal timing and hardware

Project Benefits

- ✓ Improved freight mobility
- ✓ Maintained connectivity
- ✓ Geometric improvements

Current Status

- ✓ Timeframe: 2015-2020
- ✓ Unfunded

Related Projects

- ✓ BINMIC Truck Route Improvements (#52)
- ✓ South End Ballard Bridge Bicycle Improvements



mobility
reliability
throughput



connectivity

PROJECT AREA

#52 – BINMIC Truck Route Improvements

Area bounded by Dravus Street, Nickerson Street, Market Street, and Fremont Avenue



Freight Need

- ✓ Freight mobility and connectivity
- ✓ Safety concerns

Description

The Ballard/Interbay Northend MIC is an important industrial and maritime area to the City and region, with a growing need to accommodate a variety of users within the limited amount of public right-of-way. The first phase of the project will be to evaluate truck freight movements to identify specific projects to address geometric and operating challenges for trucks. The projects will be focused on readily feasible improvements with primary consideration given to safety and freight connectivity. They may include signal timing adjustments, additional signage or wayfinding, larger intersection turn radii, lane width adjustments, joint use of bus lanes, new traffic signals, or tree trimming.

- Phase I: Collect data on needs through a detailed assessment of truck volumes, truck sizes, and over-dimensional truck activity. Build from the forecasts developed in the FAP and work with stakeholders to identify and prioritize specific truck route projects.
- Phase II: Implement top priority projects given funding availability and opportunities. Develop long term budget and funding strategy to implement remaining projects.

Toolbox Treatments

Geometric Improvement

Intersection Operations

Project Elements

- ✓ Roadway delineation and restriping
- ✓ Signal and signage improvements
- ✓ Geometric improvements



connectivity



safety

Project Benefits

- ✓ Improved freight mobility
- ✓ Improved access

Current Status

- ✓ Timeframe: Phase I 2015-2018,
- ✓ Phase II 2019-2021
- ✓ Unfunded

Related Projects

- ✓ 15th Avenue West at W Dravus Street and W Emerson Street (#22)
- ✓ 15th Avenue NW / NW Market Street Intersection Improvements (#45)
- ✓ Citywide Freight Spot Improvement Program Expansion

Project Cost: \$500,000 (Phase I)
\$1,500,000 (Phase II)

PROJECT AREA

#5A – East Marginal Way South Freight Roadway Rehabilitation *S Massachusetts Street to S Dakota Street (SR 99 ramps)*



Freight Need

- ✓ Heavy truck volumes
- ✓ Recurring peak period congestion
- ✓ History of truck-bike collisions

Description

This roadway provides access to Port of Seattle terminals, rail yards, and other industrial land uses in the Greater Duwamish MIC. It is a critical last mile connector and a vital route for trucks carrying over-sized or flammable cargo. It serves as an important connection between the Greater Duwamish MIC and BINMIC areas. The roadway experiences recurring congestion during peak travel times. This project rebuilds the roadway to Heavy Haul route standards, upgrades signal hardware, and adds CCTV cameras and dynamic message signs to improve truck travel conditions.

Toolbox Treatments

Maintenance & Repair

Capital Investment

ITS Application



safety



mobility
reliability
throughput

Project Elements

- ✓ Heavy Haul route rebuild
- ✓ Roadway upgrades
- ✓ Upgrade signal timing and hardware (ITS)

Project Benefits

- ✓ Reduced travel time and increased roadway resiliency
- ✓ Last mile connector and Heavy Haul route
- ✓ Improved freight mobility
- ✓ Improved safety

Current Status

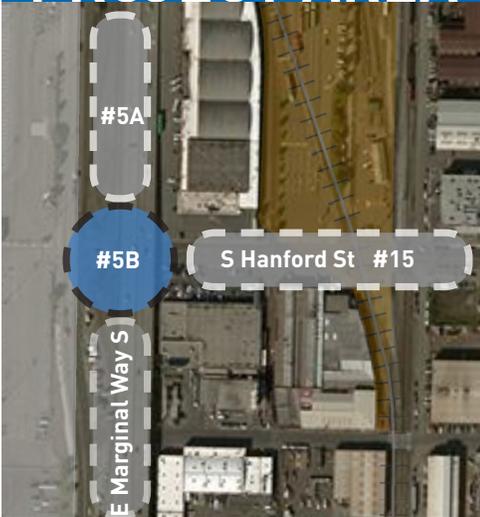
- ✓ Timeframe: 2015-2020
- ✓ Partially funded: ~\$250,000 (concept design)

Related Projects

- ✓ SDOT Multimodal Corridor Project
- ✓ E Marginal Way / S Hanford Street Intersection Improvements (#5B)
- ✓ Hanford & Main SIG Access Improvements (#15)

PROJECT AREA

#5B – E Marginal Way / S Hanford Street *Intersection Improvements*



Cost Estimate: \$7,000,000

Freight Need

- ✓ Recurring peak period congestion
- ✓ Heavy daily truck volumes
- ✓ History of truck-bike collisions

Description

The E Marginal Way / S Hanford Street intersection is an important component of the proposed Heavy Haul network, the first and last mile connector system, and the City's hazmat and over-legal vehicle routes. It serves heavy truck traffic throughout the day, including those heading to and from the Main SIG intermodal rail yard. This project would upgrade the signal, lengthen the northbound right-turn lane, improve the railroad crossing pavement, and evaluate the need for railroad crossing gates at the Whatcom track crossings. The project also includes rebuilding the intersection and its approaches to Heavy Haul route requirements. This project will also more clearly delineate parking on the southeast corner of the intersection.

Toolbox Treatments

Intersection Operations

Maintenance & Repair

Capital Investment



safety



mobility
reliability
throughput

Project Elements

- ✓ Heavy Haul route upgrades
- ✓ Upgraded signal timing and hardware
- ✓ Roadway preservation and rebuild
- ✓ Rail crossing improvements

Project Benefits

- ✓ Improved freight mobility
- ✓ Improved freight connectivity
- ✓ Improved safety

Current Status

- ✓ Timeframe: 2015-2020
- ✓ Partially funded: ~\$250,000 (of \$48,000,000)

Related Projects

- ✓ SDOT Multimodal Corridor Project
- ✓ East Marginal Way South Rebuild (#5A)
- ✓ Hanford & Main SIG Access Improvements (#15)
- ✓ Hanford Street Greenway (Bicycle Master Plan)

PROJECT AREA

#15 – Hanford & Main SIG Access Improvements *East Marginal Way South to 1st Avenue South*



Project Cost: \$5,600,000

Freight Need

- ✓ Recurring peak period congestion
- ✓ Constrained truck mobility and access
- ✓ Delays due to train crossings

Description

Eastbound access to the Main SIG Yard can be challenging for trucks due to a lack of breaks in the westbound traffic stream. As a result, trucks queue in both directions along E Marginal Way S and in the northbound truck-only lanes under SR 99.

This project improves access to the Main SIG Yard. Initially, it examines the feasibility of installing a traffic signal and other potential changes to facilitate traffic flow in the area. If or when warranted, a traffic signal at the Main SIG entrance could alleviate congestion and allow for improved truck access to the yard. This project also rebuilds the segment of Hanford Street between the E Marginal Way S and 1st Avenue S to Heavy Haul route standards, including new pavement at railroad crossings. It may include rail crossing gates or other devices, if needed.

Toolbox Treatments

Intersection Operations

Capital Investment



safety



mobility
reliability
throughput

Project Elements

- ✓ Heavy Haul route upgrades
- ✓ Roadway rebuild and preservation
- ✓ New traffic signal and rail crossing improvement

Project Benefits

- ✓ Improved safety
- ✓ Improved freight access and mobility

Current Status

- ✓ Timeframe: 2021-2026
- ✓ Unfunded

Related Projects

- ✓ E Marginal Way S Rebuild (#5A)
- ✓ E Marginal Way / S Hanford Street Intersection Improvements (#5B)
- ✓ Hanford Street Greenway (Bicycle MasterPlan)

#16 – South Lander Street Grade Separation

1st Avenue South to 4th Avenue South

Freight Need

- ✓ Safety concerns due to track crossings
- ✓ Delays due to extended rail blockages
- ✓ Recurring peak period congestion

Description

South Lander Street is a route vital to east-west travel and connectivity for freight and general purpose traffic in mid-SoDo. To reduce at-grade railroad crossing delays and improve safety for all modes using the corridor, this project constructs a grade separated bridge over the mainline BNSF railroad tracks between approximately 1st Avenue S and 4th Avenue S.

Toolbox Treatments

Capital Investment

Project Elements

- ✓ Roadway grade-separation

Project Benefits

- ✓ Improved safety
- ✓ Improved freight mobility
- ✓ Improved connectivity and access

Current Status

- ✓ Timeframe: 2015-2020
- ✓ Unfunded
- ✓ In SDOT CIP and WSDOT Freight Plan

Related Projects

- ✓ Study and Implementation of Mainline Grade Separation (#17), which includes value engineering the most recent design of this project to explore cost-reduction opportunities.



mobility
reliability
throughput

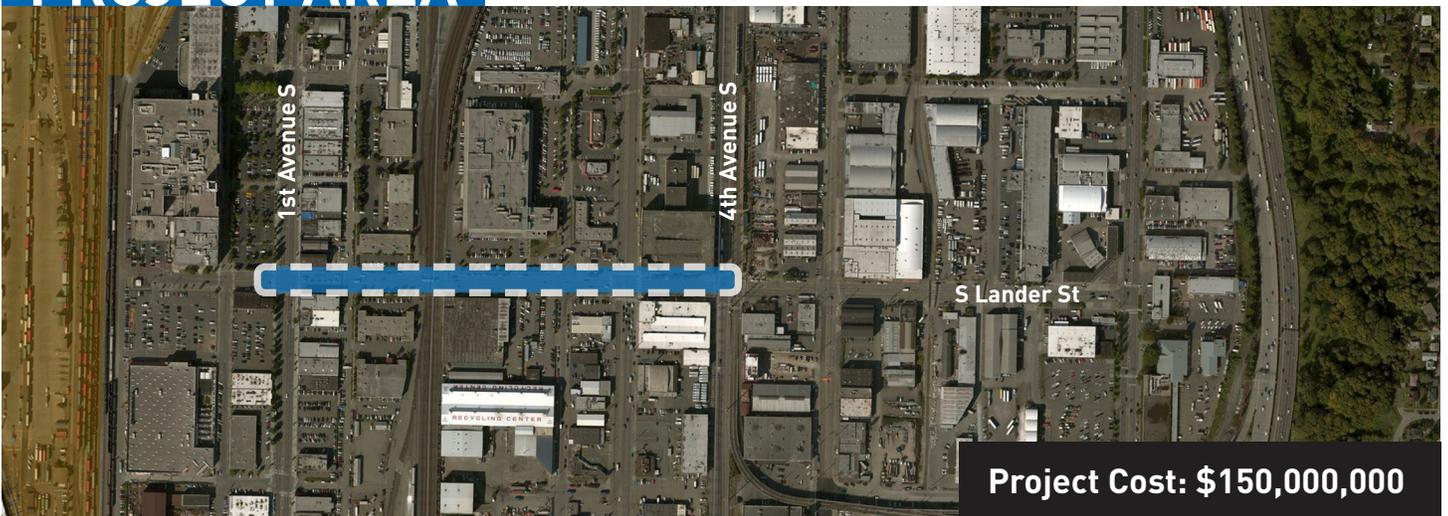


safety



connectivity

PROJECT AREA

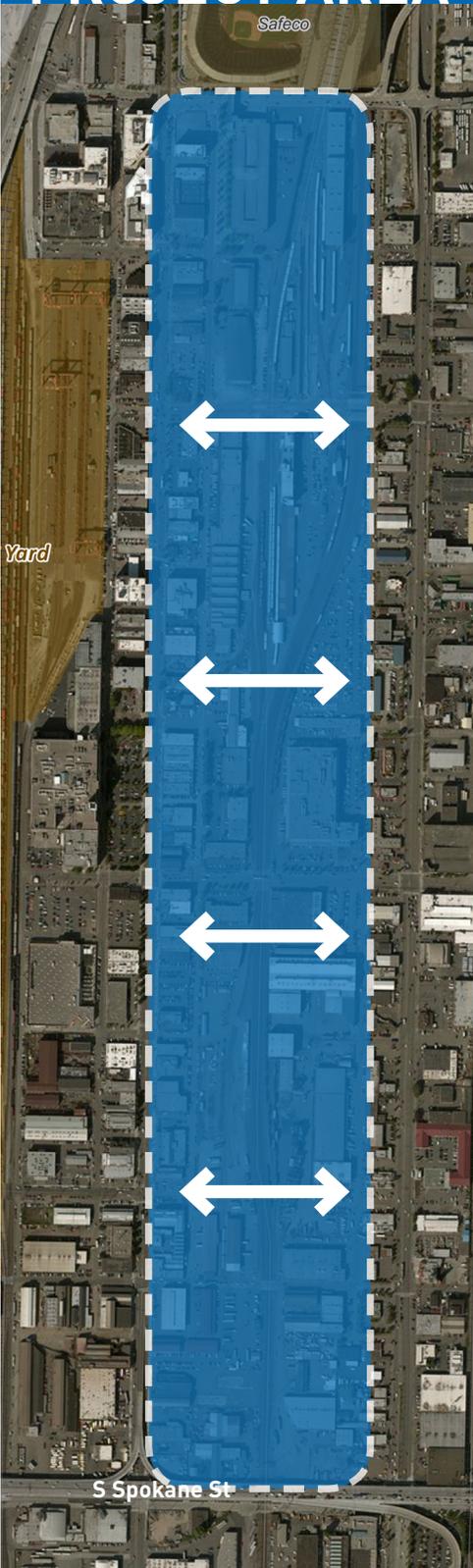


*Cost reduction opportunities to be explored as part of Project #17.

#17 – Study and Implementation of Mainline Grade Separations in mid-SoDo

Mainline between S Atlantic Street to S Spokane Street

PROJECT AREA



Freight Need

- ✓ Lack of east-west roadway connectivity
- ✓ Delays due to extended rail blockages
- ✓ Recurring peak period congestion



mobility
reliability
throughput



connectivity

Description

East-west connectivity is constrained by the multiple at-grade rail crossings in the SoDo area. This project will identify alternatives for an additional (to S Lander Street) grade separated crossing of the BNSF mainline railroad tracks between S Atlantic Street and S Spokane Street, and will include a value engineering evaluation of the South Lander Street Grade Separation (#16) to identify potential cost savings. This project could also identify other technology investments, including adaptive signal timing, to maintain reliable east/west street movement for motor vehicles, including trucks, and non-motorized traffic.

Toolbox Treatments

ITS Application

Capital Investment

Project Elements

- ✓ Value engineering of S Lander St grade-separated railroad crossing project
- ✓ Evaluation of an additional (to S Lander Street) grade-separated roadway crossing of the railroad tracks
- ✓ South Lander Street value engineering study

Project Benefits

- ✓ Improved safety
- ✓ Improved freight mobility
- ✓ Improved connectivity and access

Current Status

- ✓ Timeframe: Study 2015-2020, Implementation TBD
- ✓ Unfunded
- ✓ In PSRC Transportation 2040

Related Projects

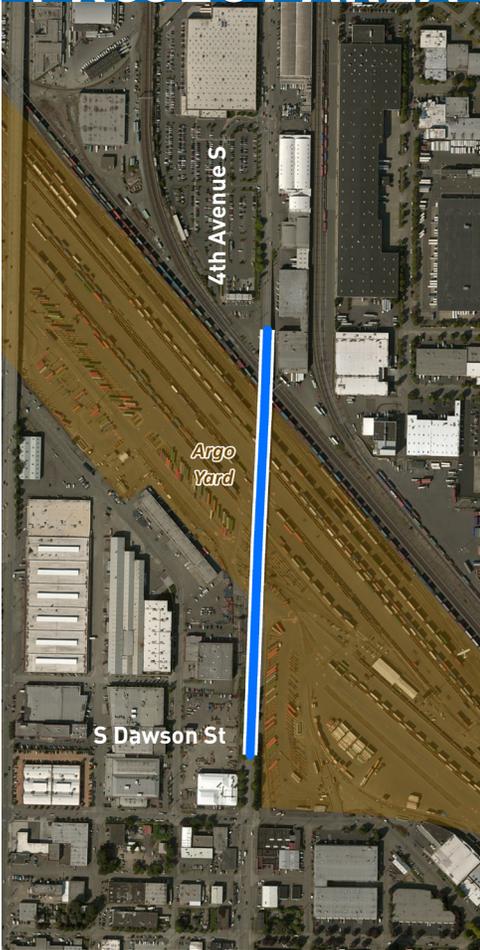
- ✓ South Lander Street Grade Separation (#16)

Project Cost: \$500,000 (study)
TBD (construction)

PROJECT AREA

#20 – 4th Avenue South Viaduct Replacement

1st Avenue South to Grade crossing over Union Pacific Railroad
Argo Yard



Project Cost: \$94,500,000

Freight Need

- ✓ Maintenance and service life span
- ✓ History of collisions at bridge approaches

Description

The project will replace the viaduct structure spanning the Union Pacific Railroad (UP) yard at the conclusion of its service life, which is expected to occur within the 20-year planning timeframe (by 2035). While built around the same time and of a similar type as the bridge structure on 1st Avenue South, “detailing differences” (in design and construction) with the 4th Avenue South bridge structure give it less of a “remaining useful life” and a higher priority for replacement.

The new structure will increase vertical clearance above the railroad tracks to improve safety and rail operations. Columns and pier walls will be removed to increase and optimize rail yard functionality and operations.

Toolbox Treatments

Capital Investment

Maintenance & Repair

Project Elements

- ✓ New bridge built to current standards at time of construction

Project Benefits

- ✓ Maintain connectivity
- ✓ Infrastructure renewal
- ✓ Improved safety
- ✓ Rail freight operational improvement

Current Status

- ✓ Timeframe: 2027-2035
- ✓ Unfunded

Related Projects

- ✓ 1st Avenue South Viaduct Replacement (#19)



safety



connectivity

#23 – South Holgate Street Rail Crossing Improvements

1st Avenue Occidental Avenue to 4th Avenue South

Freight Need

- ✓ Road closures and delays due to mainline train crossings and maintenance yard track operations
- ✓ Recurring peak period congestion
- ✓ Poor pavement, channelization markings, and pedestrian facilities
- ✓ Safety concerns

Description

S Holgate Street is one of the few east-west arterials in the Greater Duwamish MIC between 1st Avenue S and Airport Way, and providing viaduct access to Beacon Hill. Amtrak is anticipated to install new quad gates and improve pavement at the railroad crossings, while SDOT will be installing ITS equipment to inform the public about train crossing delays and provide dynamic signage to identify alternative routes. This project would rebuild the pavement to Heavy Haul route requirements, improve channelization and signage, add new curb/gutter, and provide sidewalks along the south side outside the immediate crossing areas.

Toolbox Treatments

Capital Investment

Project Elements

- ✓ Heavy Haul route upgrades
- ✓ New pavement, curb/gutter, signage, and striping
- ✓ New sidewalks

Project Benefits

- ✓ Improved safety
- ✓ Improved freight mobility

Current Status

- ✓ Timeframe: 2015-2020
- ✓ Unfunded



safety

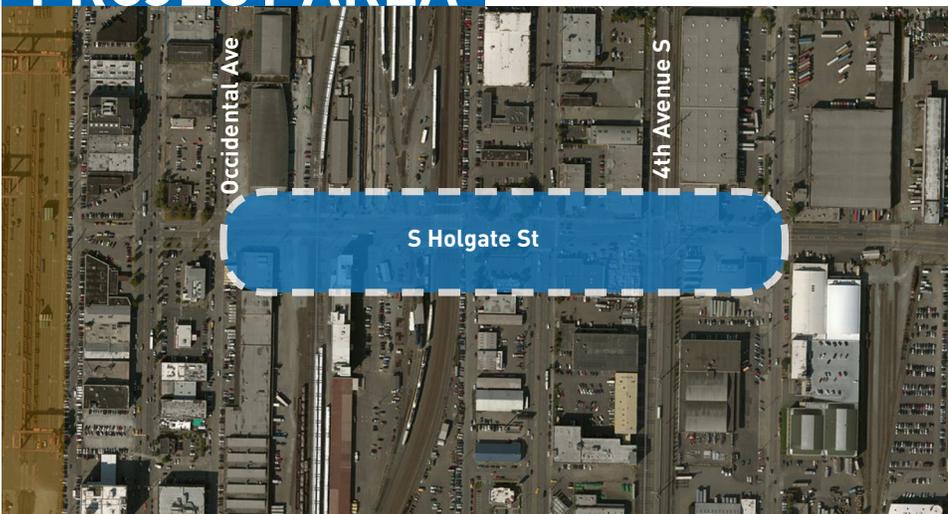


connectivity

Related Projects

- ✓ Railroad Crossing Delay Warning System (#28)
- ✓ Amtrak Maintenance Yard Improvements (new gates, wayside horns, upgrades to pavement at crossings)

PROJECT AREA



Project Cost: \$5,600,000

#24 – Lower Spokane Street Freight Only Lanes Pilot Project

Harbor Island to Airport Way South

Freight Need

- ✓ Recurring peak period congestion
- ✓ Heavy daily truck volumes

Description

Lower Spokane Street is a primary freight route serving nearly 5,000 trucks daily and connecting the Port terminals and other land uses to the regional highway system. It currently experiences delays throughout the day caused by train crossings and intersection operations. This pilot project would design, implement, and evaluate freight-only lanes on the corridor. The first phase of the project would determine project limits; identify design options and new infrastructure needed to implement the pilot. The second phase would implement the modifications to roadway channelization for truck-only lanes, install signal and signage upgrades, and provide ITS equipment such as variable message signs and detection equipment. The project would evaluate time-of-day operations, while providing a contingency for allowing all traffic to use the lanes in the event of an incident on the upper bridge.

Toolbox Treatments

Intersection Operations

ITS Applications

Project Elements

- ✓ Signal and signage improvements
- ✓ Roadway delineation and restriping
- ✓ Variable message signs and detection equipment

Project Benefits

- ✓ Improved freight mobility
- ✓ Improved freight connectivity

Current Status

- ✓ Timeframe: 2015-2017 (Study)
- ✓ Unfunded

Related Projects

- ✓ S Spokane Surface Street ITS (#25)



mobility
reliability
throughput



connectivity

PROJECT AREA



#25 – South Spokane Street ITS Upgrades Chelan Avenue to Airport Way South

Freight Need

- ✓ Recurring peak period congestion
- ✓ Heavy daily truck volumes

Description

Lower S Spokane Street is a primary freight route serving nearly 5,000 trucks daily that provides access to the regional highway system. It currently experiences recurring delays throughout the day caused by train crossings, bridge openings, and intersection operations. This project would install ITS equipment along the corridor to collect and provide real-time travel time information for trucks and the general public. The specific equipment would include Bluetooth readers and dynamic message signs installed along the corridor to collect and disseminate travel time information between Airport Way and Chelan Avenue, including access to Port Terminal 5. An additional project component, which has not yet been evaluated for cost, may be to improve the signal system at the intersection of Chelan Avenue at the western terminus of the corridor.

Toolbox Treatments

ITS Applications

Project Elements

- ✓ Bluetooth readers
- ✓ Dynamic message signs



mobility
reliability
throughput

Project Benefits

- ✓ Real-time travel information
- ✓ Improved freight mobility

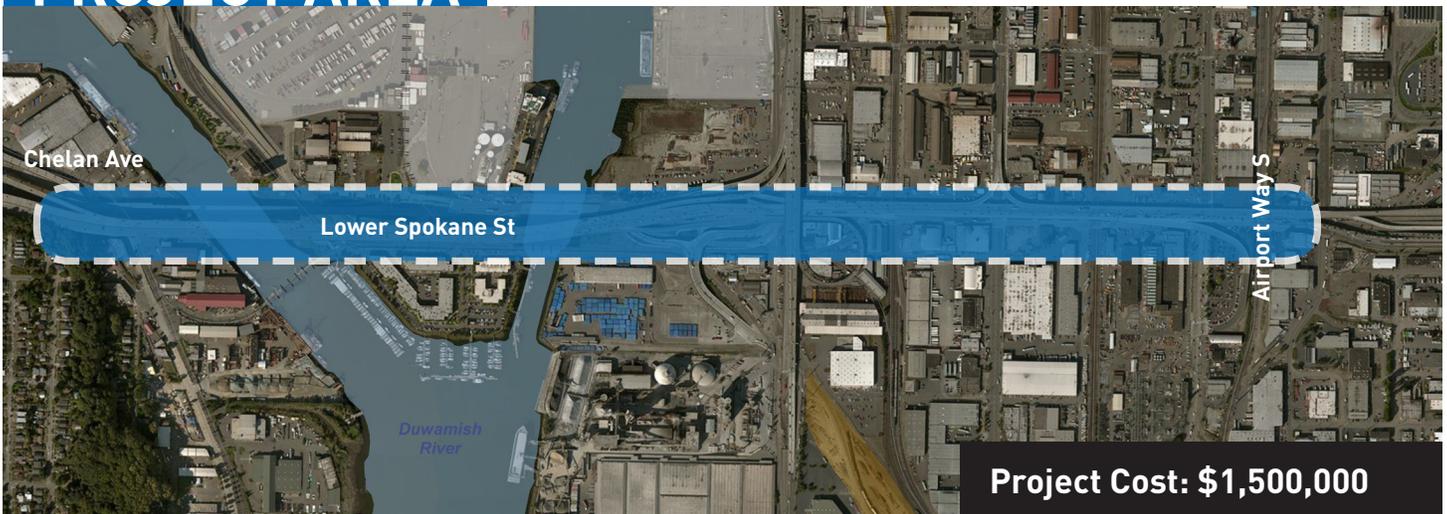
Related Projects

- ✓ SDOT Next Generation ITS Plan
- ✓ Lower Spokane Street Freight Only Lanes Pilot Project (#24)

Current Status

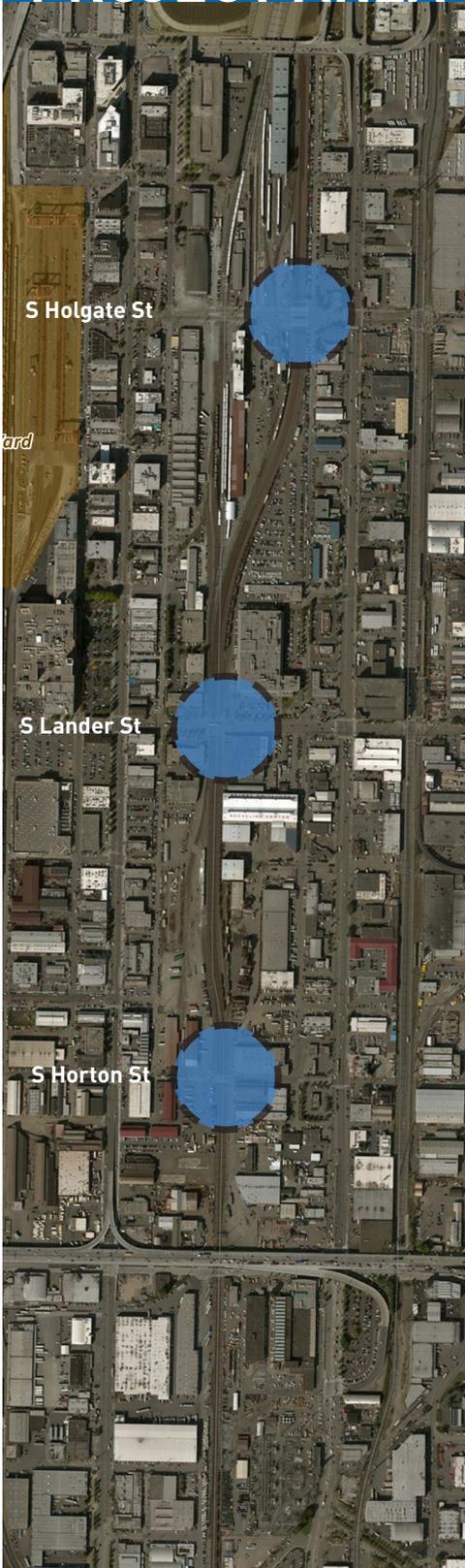
- ✓ Timeframe: 2015-2020
- ✓ Unfunded

PROJECT AREA



PROJECT AREA

#28 – Railroad Crossing Delay Warning System *Crossings at Holgate, Lander, and Horton Streets*



Project Cost: \$500,000

Freight Need

- ✓ East-west roadway connectivity
- ✓ Delays due to extended train crossing blockages
- ✓ Recurring peak period congestion

Description

The at-grade railroad crossings in the Greater Duwamish MIC block east-west roadways for significant portions of the day, causing unpredictable delays for both truck and passenger vehicles. This project installs ITS equipment to monitor and inform the public of road closures due to train activity, and provides alternative routing options via dynamic message signs that display real-time information to drivers at key locations.

Toolbox Treatments

ITS Application



connectivity

Project Elements

- ✓ Dynamic message signs and train detection equipment

Project Benefits

- ✓ Improved safety
- ✓ Improved connectivity
- ✓ Improved reliability

Current Status

- ✓ Timeframe: 2015-2020
- ✓ Partially funded: ~\$110,000 (of \$500,000)

Related Projects

- ✓ S Holgate Street Improvements (#23)
- ✓ Amtrak Maintenance Yard Improvements (new gates, wayside horns, upgrades to pavement at crossings)
- ✓ South Lander Street Grade Separation (#16) and Study and Implementation of Mainline Grade Separation (#17)

#37A – 1st Avenue S/Atlantic Street Intersection Improvements

Freight Need

- ✓ Geometric constraints
- ✓ Intersection operational delays
- ✓ Heavy daily truck volumes
- ✓ Event related impacts

Description

The 1st Avenue S / S Atlantic Street (SR519) intersection is a major chokepoint for both trucks and passenger vehicles traveling to and from I-5 and I-90. It currently experiences regular operational delays throughout the day, and especially during the peak periods and around large stadium events. This project would enhance signal operations and lighting at the intersection by installing new LED street lighting and right-turn overlap signal phases on the east and west approaches. The project would also improve the turn radius for trucks at the southeast corner of the intersection by widening the northbound right-turn lane. Pavement marking improvements are included to enhance the visibility and durability of the lane lines and crosswalks.

Toolbox Treatments

Geometric Improvement

Intersection Operations

Project Elements

- ✓ Geometric improvements
- ✓ Signal and lighting upgrades
- ✓ Pavement markings

Project Benefits

- ✓ Improved freight mobility
- ✓ Improved freight connectivity
- ✓ Improved safety



connectivity



mobility
reliability
throughput

Current Status

- ✓ Timeframe: 2015-2017
- ✓ Unfunded

Related Projects

- ✓ WSDOT SR 99 Bored Tunnel
- ✓ S Atlantic Street Corridor Improvements (#37B)
- ✓ 1st Avenue South ITS

PROJECT AREA



#37B – South Atlantic Street Corridor Improvements

Alaskan Way to 4th Avenue South

Freight Need

- ✓ Recurring peak period congestion
- ✓ Heavy daily truck volumes
- ✓ Event related impacts

Description

S Atlantic Street (SR 519) is a primary east-west freight route that provides direct access to I-5 and I-90. It currently experiences recurring congestion throughout the day primarily caused from operational delays at the 1st Avenue S intersection. Travel time reliability along the corridor is also impacted by stadium events. As the SR 99 bored tunnel is completed, SDOT will regularly monitor travel conditions to evaluate potential changes in corridor operations. This project would implement signal, channelization, and ITS improvements based on the results of the monitoring program.

Toolbox Treatments

ITS Application

Intersection Operations

Project Elements

- ✓ Signal and signage improvements
- ✓ Roadway restriping
- ✓ Variable message signs and detection equipment

Project Benefits

- ✓ Improved freight mobility
- ✓ Improved access to the regional highway system

Current Status

- ✓ Monitoring of conditions
- ✓ Timeframe: 2015-2020
- ✓ Unfunded

Related Projects

- ✓ WSDOT SR 99 Bored Tunnel
- ✓ 1st Avenue S / Atlantic Street Intersection Improvements (#37A)
- ✓ 1st Avenue South ITS

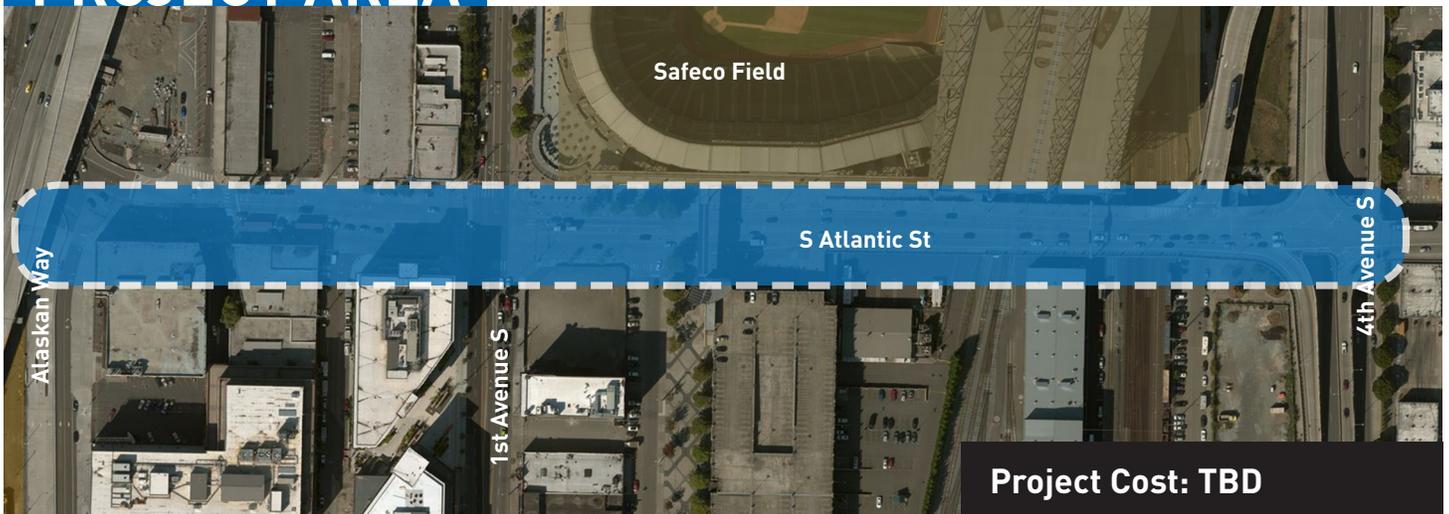


mobility
reliability
throughput



connectivity

PROJECT AREA



Project Cost: TBD

*monitoring to identify specific project needs

Citywide Freight Spot Improvement Program Expansion

Freight Need

- ✓ Mobility constraints
- ✓ Barriers to freight connectivity
- ✓ Wayfinding
- ✓ Safety concerns



safety



connectivity

Description

There are a range of physical constraints on roadways heavily traveled by trucks that impact the reliability and speed of goods deliveries. This program, originated in response to input from the freight community, provides SDOT with the ability to make inexpensive improvements at locations where mobility barriers present barriers to truck mobility. The existing program has implemented valuable small-scale geometric, channelization, signal, wayfinding, and other operational improvement projects.

The recommendation is for this program to be enhanced to enable SDOT to increase the number of low-cost improvements implemented annually, and to better respond to emerging issues and challenges. To achieve the latter goal, a second, new key component of the Freight Spot Improvement Program would be a project development function for projects with estimated capital costs in excess of \$50,000, but below a threshold of \$500,000. This function would involve taking planning-level truck freight improvement concepts to between 5% and 10% design, including a cost estimate. Achieving this level of design would support grant applications and funding partnerships, allow for smaller-scale projects to be constructed by SDOT crews and migrate larger-scale projects to SDOT's Capital Program for final design and construction.

Toolbox Treatments

Geometric Improvement

Maintenance & Repair

Intersection Operations

Project Elements

- ✓ Intersection and other geometric design improvements
- ✓ Traffic signal improvements
- ✓ Wayfinding signs and markings
- ✓ Trimming of trees and bushes in the rights-of-way

Project Benefits

- ✓ Improved freight mobility
- ✓ Improved connectivity
- ✓ Improved safety

Current Status

- ✓ Timeframe: Ongoing
- ✓ Partially funded (\$450,000/year)

Example Projects

- ✓ NW Leary Way at 46th Street or 45th Street (#36)
- ✓ Airport Way S / Edmunds Street (#38)
- ✓ S Bailey Street Channelization and Operational Improvements (#42)
- ✓ E Marginal Way S / Corson Street Improvements (#47)
- ✓ E Marginal Way S railroad track removal (#48)

Program Cost: \$1,500,000/year

Citywide Freight Data Collection/Analysis Program



Freight Need

- ✓ Truck freight data to support decision making
- ✓ Improved real-time information for the trucking community
- ✓ Inter-departmental and jurisdictional coordination on freight issues

Description

SDOT is currently in the process of updating its Traffic Management Center. It is also deploying new technology to pro-actively manage critical corridors, collect data, and provide real-time information. This program builds on these existing efforts to improve the monitoring, collection, and analysis of truck volume, truck classification, and travel-time data within the City, with a focus on MICs and connecting corridors. The freight-focused ITS program would facilitate data sharing, assist in data transmission, and coordinate data collection efforts specific to freight in order to improve SDOT's—and WSDOT's—capacity to recognize, and respond to, immediate and longer-range freight challenges.

Reliable data analytics are important to determine the volumes of freight moving on Seattle's portion of our state's Freight and Goods Transportation System (FGTS). Data submitted every two years ensures that Seattle's major freight routes are eligible for state and federal funding. A third element of the Freight ITS Program builds on the above elements and SDOT's existing efforts to communicate construction impacts, congestion, and incidents to the traveling public. The ability of truck drivers to avoid congested corridors, or restricted right-of-way, is even more limited than that of other drivers. The program would explore cost-effective options for improving conditions and disseminating information to truck drivers.

Toolbox Treatments

ITS Application

Intersection Operations



Project Elements

- ✓ Data collection / sharing
- ✓ Communication protocols
- ✓ Signal timing adjustments

Project Benefits

- ✓ Improved information and data regarding changes to truck mobility and reliability

Current Status

- ✓ Timeframe: Ongoing
- ✓ Unfunded

Related Projects

N/A

Program Cost: \$150,000/year



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