



U.S. Department of Transportation

Federal Motor Carrier Safety Administration

Washington State U.S. Department of Transportation Large Vehicle, Non-Motorized Traffic Safety Assessment

May 7, 2015



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Executive Summary



Figure 1 Video Executive Summary, Jeff James, FMCSA Washington State Division Administrator¹

In 2014, Secretary Anthony Foxx launched the U.S Department of Transportation's (USDOT) Safer People, Safer Streets Initiative. As part of this initiative, the Department's field offices conducted safety assessments in every state during 2014 - 2015². The Federal Motor Carrier Safety Administration (FMCSA) coordinated with the Federal Highway Administration (FHWA), National Highway Traffic Safety Administration (NHTSA), and the Federal Railroad Administration (FRA) to lead a walking and bicycling road safety assessment in Seattle, Washington, on May 7, 2015. This assessment was the only one that included large trucks and buses as part of the safety equation.

Nearly 100 participants from a variety of organizations joined in the assessment. The assessment included two safety demonstrations. The "No-Zone" display showed the locations of blind spots on large trucks, and a metro transit bus demonstration showcased innovative safety technologies currently being used on some of King County, Washington's, buses.

Speakers provided participants with information about the transportation engineering aspects of the South of Downtown (SoDo) area of Seattle, as well as information about the safety and efficiency issues related to bicycle and pedestrian transportation and freight mobility issues. Participants had the opportunity to experience the SoDo neighborhood via ride-alongs in large trucks, ride-alongs in a metro transit bus, or via a video shot from the perspective of a bicyclist or large truck driver. Afterwards, participants completed an assessment form.

The assessment tool ranked respondent perceptions in various categories, including: surface conditions; intersections; pavement markings; signage; and behavior of other road users. Participants also provided their opinions on their most pressing concerns, perceptions of overall safety by travel mode, infrastructure design, and public policy issues.

¹ <https://youtu.be/2J1clm3zN9I>

² <http://www.transportation.gov/policy-initiatives/ped-bike-safety/road-safety-assessments>

The capstone event of the assessment allowed participants to take a bicycle tour of the SoDo neighborhood.

Assessment Planning

The planning for this safety assessment was conducted by an internal USDOT team. Core assessment team planning members included:

Name	Title	USDOT Mode
Jeff James	Division Administrator	FMCSA
Max Sevareid	Regional Program Manager	NHTSA
Jennifer Tarbox	Office Automation Clerk	NHTSA
Jeremy Borrego	Transportation Program Specialist	FTA
Bruce (Spielberg) Moody	Program Management Analyst	FHWA
Nichole Causey	Marketing Specialist	FMCSA
Megan Hall	Local Programs/Research & T2 Engineer	FHWA
Brian Wood	UW Student & NHTSA Analyst	NHTSA

The USDOT assessment team engaged with state, trucking industry, and nonprofit stakeholders in the planning process. Early in planning, focus shifted toward investigating truck related conflicts with bicyclists and pedestrians. Initial conversations with the Washington Department of Transportation (WSDOT) and the Seattle Department of Transportation (SDOT) directed the team to focus on an area of south Seattle. This neighborhood, “SoDo”, contained most of the criteria identified in the Office of the Secretary of Transportation (OST) safety assessment guide. After this location was selected, representatives from each of the regional/state USDOT modes met at NHTSA’s Seattle office in the fall of 2014 to determine specific strategies on conducting an assessment in SoDo. This planning included a bicycle ride/tour of the SoDo neighborhood³.

Planning for this assessment continued through the winter of 2015 and included many small meetings with the industry, bicycle advocacy organizations, the relevant transportation departments, and more. The team identified and evaluated possible assessment day venues that could handle a large number of people and large vehicles. At no cost, the team was able to secure space in the Federal Center South Building, a GSA-owned and managed building with conference room facilities, a cafeteria, and a large parking lot sufficient to hold large vehicles.

Planning continued in the winter and spring, and the team created a custom assessment tool. This tool was available in print and online. The team also created a video⁴ that showcased the neighborhood design and infrastructure from the perspective of a bicyclist as well as a large vehicle operator. This video was leveraged on the assessment day when participants had three options to “experience the neighborhood” of SoDo:

1. Truck ride-along
2. Transit bus ride-along
3. Viewing the prepared video of a ride through SoDo

³ Video of rainy bicycle ride/tour of SoDo: <https://youtu.be/wiTfhqBeqbw>

⁴ <https://youtu.be/eMxVcQeCzFI>

Assessment Area and Route Background

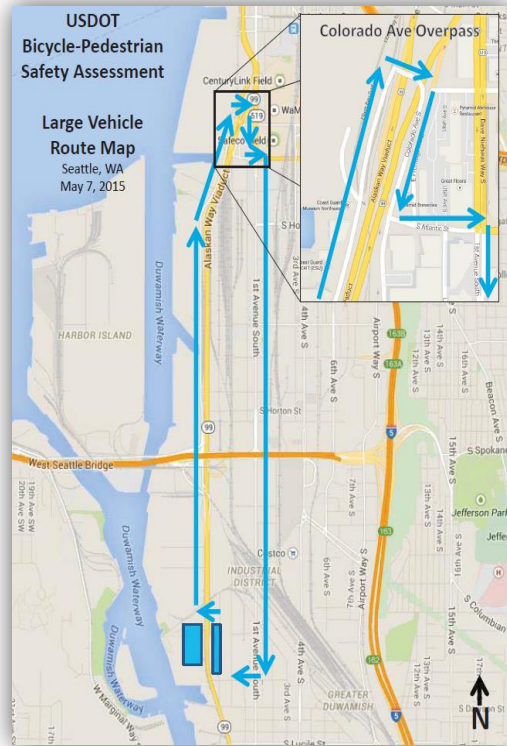


Figure 2 USDOT Bike-Pedestrian Large Vehicle Route Map. A larger map can be found in [Appendix 1.4](#).

The assessment route was a 6-mile loop in SoDo. This neighborhood is a highly industrial region dominated by an active seaport and rail yard, both bringing in heavy amounts of commercial vehicle traffic. This Seattle neighborhood houses a number of large office complexes, such as the Starbucks world headquarters, and serves as a primary corridor for travel from South and West Seattle urban communities into downtown Seattle.

Two major sports stadiums are located in SoDo (CenturyLink – MLS/NFL and Safeco – MLB). These attractions bring significant traffic and a various modes of transportation to and through the neighborhood.

Approximately 7,000 people ride bicycles into Seattle’s central business district each day, and 33 percent⁵ of downtown residents walk to work. Cyclists living in West Seattle reach downtown by traveling along East Marginal Way, which parallels the Port of Seattle. East Marginal Way is listed by SDOT⁶ as Seattle’s third busiest street with a 2012 Annual Average Weekday Traffic (AAWDT) of 64,816 vehicles per day. The road is a major drayage trucking route, transporting containers between the port and nearby rail facilities. Here, people on

bicycles travel in close proximity to large commercial motor vehicles. In 2013, a bicycle commuter was killed in a high-profile crash⁷ with a semi-truck on East Marginal Way at Hanford Street. The fatality generated significant attention for modal conflicts in the SoDo region from many stakeholders such as bicycle advocacy groups and port operators.

Seattle recently adopted a Bicycle Master Plan⁸ with the primary goal to “increase the amount and mode share of bicycling in Seattle for all trip purposes.” The main objectives of the plan are to “complete and maintain a safe, high-quality bicycle network of on-street and trail facilities throughout the city” and to “integrate planning for bicycle facilities with all travel

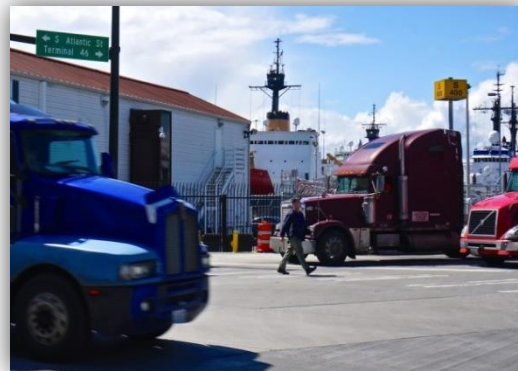


Figure 3 Trucks on the bike route.

⁵ <http://blogs.seattletimes.com/today/2013/09/downtown-seattle-employs-as-many-people-as-bellevue-and-redmond-combined/>

⁶ <http://www.seattle.gov/transportation/tfdmaps.htm>

⁷ <http://blogs.seattletimes.com/today/2013/05/cyclist-killed-in-collision-with-truck-along-east-marginal-way-south/>

⁸ <http://www.seattle.gov/transportation/bikemaster.htm>

modes and complete streets principles.”

A Seattle Freight Master Plan⁹ is currently in the works, and it may contain a commitment to support freight activities and strengthen key commercial traffic corridors.

Bicycle ridership is increasing rapidly in the SoDo area. According to SDOT 2012 data, an estimated 1,312 bicycle riders rode along East Marginal Way and Hanford Street. This data equates to a 35 percent increase in that location from 2011 (SDOT 2012 Traffic Report¹⁰).

The assessment route started at the Seattle Federal Center South Complex. The building is located on a section of East Marginal Way South that is included in the assessment route, but is not identified as a bicycle corridor on the Seattle Bicycle Master Plan. The route took participants north along this heavily trafficked road that has no bicycle infrastructure. When East Marginal Way South intersects with Spokane Street, the route transitions into a road with a painted bike lane. The route then continues north, and bicycles travel along the Elliot Bay Trail, a completely separated bike/multi-use path. At Jackson Street (just north of the sport stadiums), participants change directions to head south on 1st Avenue back to the venue location. 1st Avenue allows participants to evaluate a designated bike route that contains “sharrows”¹¹, the only bicycle infrastructure on this heavily trafficked road. In summary, while long (6 miles) this route allowed participants to observe a variety of bicycle infrastructure – ranging from nothing to a dedicated trail – in an area with significant commercial vehicle traffic.

⁹ <http://www.seattle.gov/transportation/freight.htm>

¹⁰ <http://www.seattle.gov/transportation/docs/2012TrafficReportfinalv3.pdf>

¹¹ <http://www.seattle.gov/transportation/sharrows.htm>

Assessment Participants



Figure 4 Participants from left to right: Jennifer Tarbox, NHTSA; Kirk Gillett, NHTSA; Max Severeid, NHTSA; Jeremy Borrego, FTA; Jeff James, FMCSA; Brian Wood, University of Washington; Nichole Causey, FMCSA

The team sent nearly 150 invitations to stakeholders. The planning process involved many meetings and presentations about the USDOT’s Safer Streets – Safer Communities – Safer Policies¹² initiative to generate interest and involvement. Ultimately, the Large Vehicle, Non-Motorized Traffic Safety Assessment was widely attended with approximately 100 individuals participating. Attendees had an opportunity to experience the neighborhood in one of the many commercial vehicles onsite.

Notable Participating Agencies		
Washington Trucking Association (WTA)	University of Washington	Cascade Bicycle Club
Seattle Department of Transportation (SDOT)	King County Metro Transit	Port of Seattle
Washington Department of Transportation (WSDOT)	Seattle Freight Advisory Board	Seattle Neighborhood Greenways
United States Department of Transportation (USDOT)	Washington Bikes	West Seattle Bicycle Connections
Washington Traffic Safety Commission (WTSC)	Feet First	Puget Sound Regional Council

¹² <http://www.transportation.gov/policy-initiatives/ped-bike-safety/safer-people-safer-streets-pedestrian-and-bicycle-safety>

Assessment Overview

The assessment's three key objectives:

1. Provide participants with information from three distinct areas:
 - The engineering aspect of transportation in SoDo with regard to large vehicles and bicycles/pedestrians;
 - The safety and efficiency issues related to bicycle transportation in SoDo; and
 - The safety and efficiency issues related to freight mobility in SoDo.
2. Provide participants with an opportunity to experience the neighborhood of SoDo via one of three options:
 - Truck ride-along;
 - Transit bus ride; or
 - Viewing a video¹³ of a ride through the SoDo neighborhood shot from the perspective of a bicyclist and a commercial motor vehicle operator.
3. Collect participants' thoughts, opinions, and perspectives of the SoDo neighborhood.
 - Participants completed assessment questionnaires.

For a detailed description of the assessment day program, see Appendix 1.5.



Figure 5 Assessment participants on transit bus ride-along.

¹³ <https://www.youtube.com/watch?v=eMxVcQeCzFI>

Assessment Tool and Observations/Results



Figure 6 Max Severeid of NHTSA speaks in front of stakeholders.

The actual assessment tool is included at the end of this report¹⁴. The assessment tool sought to group respondent perceptions into the following categories:

- Surface Conditions
- Intersections
- Pavement Markings
- Signage
- Behavior of Other Road Users

Additional assessment data collected included participant opinions on their most pressing concerns, perceptions of overall safety by travel mode, infrastructure design, and public policy issues.

Participants were asked to rate conditions they observed on the 6-mile assessment route in SoDo on a 5-point scale:

- Excellent (4)
- Good (3)
- Acceptable (2)
- Minimal (1)
- Unsafe (0)

Of all respondents, the mean scores are as follows:

Assessment Category	Average Score
Surface Conditions	1.3
Intersections	1.7
Pavement Markings	1.3
Signage	1.7
Behavior of Other Road Users	1.5

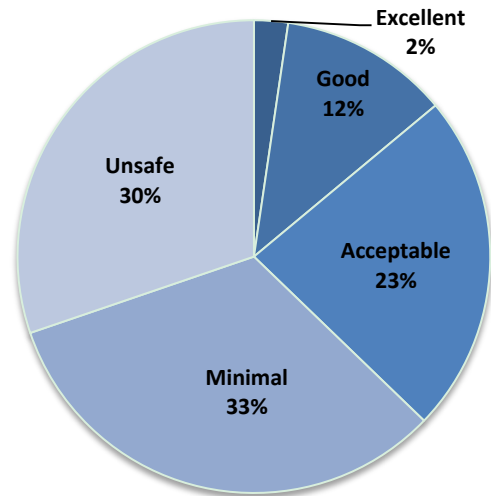
¹⁴ [Appendix 1.2](#)

Issues and Problems Observed

Surface Conditions

Most of the participants found conditions along the route to be hazardous and poorly kept. Potholes were the most commonly cited problem, followed by debris, general pavement damage, and hazardous rail crossings. Other comments included lack of walking space, conflicts due to construction, and narrow lanes.

How was the surface?

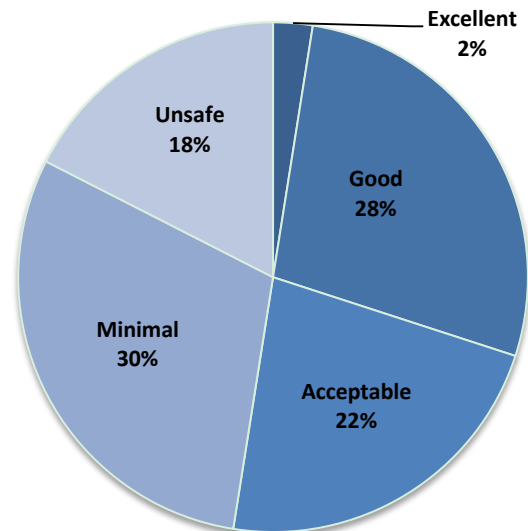


Intersections

About half of the participants had concerns about intersections in SoDo with several comments focusing on long signal wait times and difficult crossings for pedestrians and bicyclists. There were concerns that turning traffic would not see vulnerable users entering the intersection or waiting on a signal. Additional issues included:

- Excessive traffic
- Fast turns by vehicles
- Poor bicycle recognition by signal detectors
- Long crossing distances for pedestrians
- Insufficient sidewalks
- Too many intersections
- Trucks blocking crosswalks during walk signals

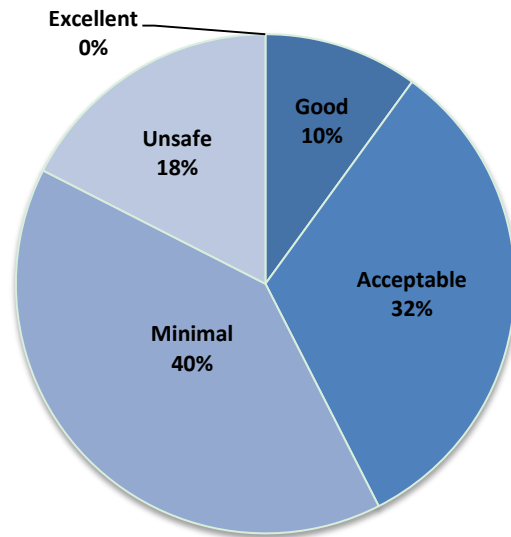
How were the intersections?



Pavement Markings

Well over half of the participants had concerns about pavement markings. Most commenters noted missing or faded pavement markings for bicycles. Problems with sharrows¹⁵ that were faded, absent, or blocked by parked vehicles were a common concern. Other comments indicated that markings for bicyclists were confusing in some cases or were part of an incomplete network that left the bicycle rider wondering where to go next.

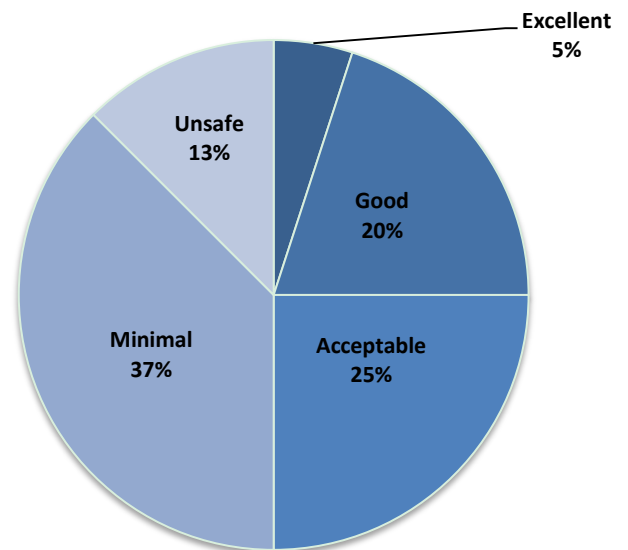
How were the markings?



Signage

Over half of the participants thought that signage was a problem in SoDo. The most common issue cited was inadequate or missing signage in association with complex intersections and grade changing ramps. SoDo has a variety of unique grade change configurations that address the many rail crossings that are present. Both drivers and cyclists found the transitions to be confusing and lacking adequate instructional or wayfinding signage. Some abandoned rail lines lacked signage to warn bicyclists of hazardous conditions.

How were the signs?

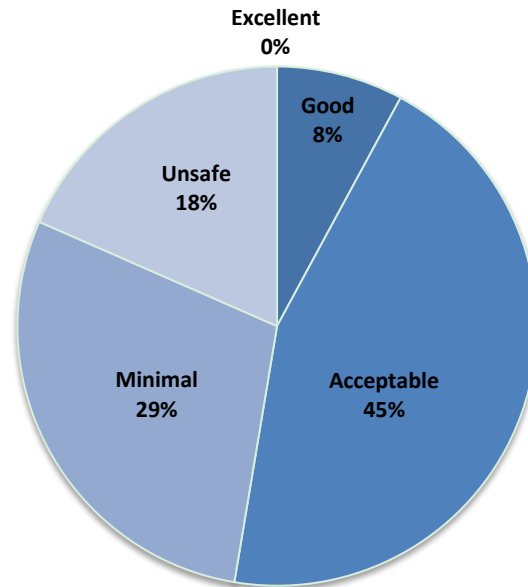


¹⁵ <http://www.seattle.gov/transportation/sharrows.htm>

Behavior

Just under half of the participants were concerned about the behavior of other road users. Some participants made positive comments about the behavior of other road users, and good behavior on the part of truck drivers was specifically noted. However, many participants were largely negative about the behaviors they saw. There were reports of excessive speed by automobile drivers and unpredictable behaviors by bicycle riders. Cars were observed crossing over lane lines. Some participants observed that bicycle riders seemed pressured by truck drivers, and that there was a sense of general chaos in the SoDo area.

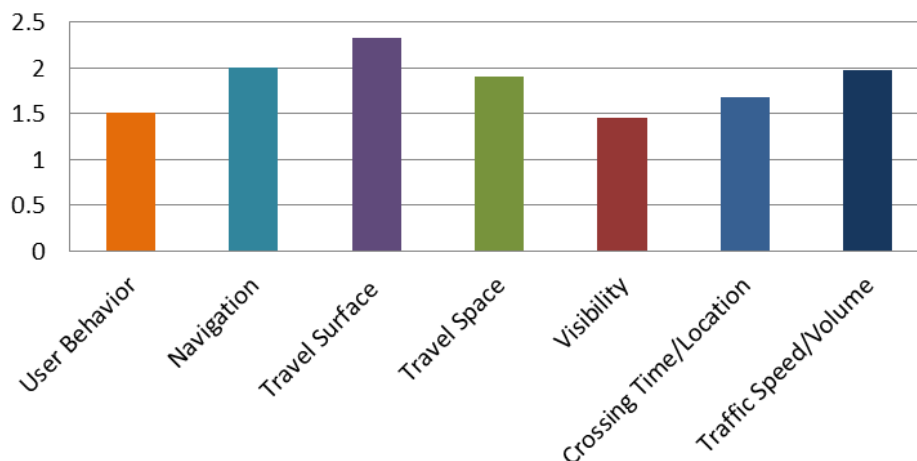
How were the other road users?



Standout Problems

When participants were asked to rank a list of problems with the route, the highest ranking problem was a poor road surface. Other major concerns included disappearing lanes/shoulders, heavy traffic, fast moving traffic, worn lane markings, poor signage, inadequate road width, and difficulty predicting the behavior of others. Most of the comments referred to missing bike lanes or a lack of separated bike lanes. Other comments included inadequate space for bicycle to share the road with motor vehicles, the risk of dooring, excessive traffic, the lack of an integrated non-motorized system, and motor vehicle drivers not yielding to bicycle riders. Overall, participants reported feeling unsafe and uncomfortable operating a bicycle in the area.

Problems that stand out



Safety by Mode

Large vehicles and automobiles were considered the safest forms of transportation in SoDo. Pedestrians were ranked as the next safest, and bicycle riders the least. Comments noted a lack of priority and safety for pedestrians and bicycle riders. Truck drivers were noted to be less of a hazard to bicyclist and pedestrians than automobiles. Poor behavior by bicyclists was also mentioned.

Participants were asked to rate the level of safety for each of these transportation modes in SoDo on a 5-point scale:

- Excellent (4)
- Good (3)
- Acceptable (2)
- Minimal (1)
- Unsafe (0)

Transportation Mode	Average Score
Large Vehicle	2.2
Automobile	2.2
Bicycle	0.9
Pedestrian	1.2

Efficiency of Infrastructure

Rankings by the respondents placed freight mobility as the top priority, followed by use as a traffic corridor and then access to local businesses. A much lower ranking was given for walkers and bicycle riders. Similar to remarks made by commenters on previous questions, a call for better pedestrian/bicycle user infrastructure, such as separated bike lanes and changes to rail crossings, was made.

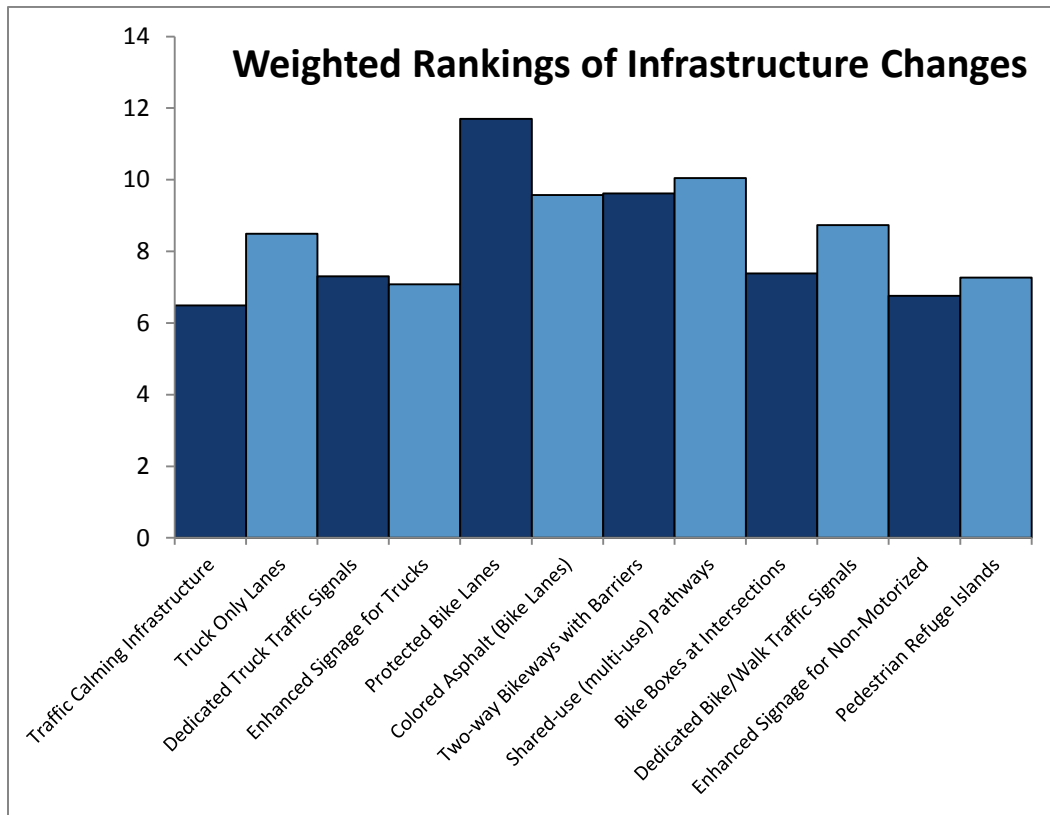
Participants were asked to rate the efficiency of the current infrastructure/design in SoDo on a 5-point scale:

- Excellent (4)
- Good (3)
- Acceptable (2)
- Minimal (1)
- Inefficient (0)

Assessment Category	Average Score
Commerce/Freight Mobility	1.8
Access to Local Businesses	1.7
Transportation Corridor	1.7
People who Bike	0.9
People who Walk	1.1

Greatest Needs

From highest need to lowest, the six highest ranking needs for SoDo were protected bike lanes, multi-use pathways, two-way protected bike lanes, colored asphalt for bike lanes, and truck-only lanes.



Truck Perspective on Bicycle/Truck Interaction

For commercial motor vehicle (CMV) drivers the biggest concern was the unpredictability of cyclists and the fear of hitting one. Most of the participants recommended separated bike lane infrastructure. Increased law enforcement was also mentioned.



Figure 7 Bicyclist perspective on Bicycle/Truck Interaction.

Bicycle Perspective on Bicycle/Truck Interaction

For cyclists, the most common concern was being hit by a motor vehicle, while protected bike lanes were the most common recommendation. Improved pavement, better rail crossings, changes to signal timing, removal of signals, bike specific signals, and better road markings were also noted.

Policies, Measures, Rules for Improvement

Most of the respondents listed infrastructure changes in this section, and those were added to the previous prompt. Policy changes that were noted included speed limit reductions, a clean bike lane policy, enforcement for violations by all users, education, mandatory bicycle training, and limiting access to certain modes on some corridors.

Demographic and SoDo Travel Query

In general, respondents were more likely to be middle-aged males that either drive or use a bicycle. Some truck drivers and walkers were represented as well. Bicycle riders reported using the route a bit more than drivers.

- Three respondents had residences in West Seattle, which is a primary origin for bicycle riders who frequently travel through the assessment area.
- Only one respondent indicated employment in the assessment area, though several indicated employment downtown, which may have generated trips through SoDo.

Barriers to Improvements

As always, funding is a primary issue with regard to improvements that would facilitate bicycle and pedestrian transportation within the SoDo area. Another significant issue is competing stakeholder visions for SoDo. Strong advocacy in the Seattle Metropolitan Area exists for bicyclists and pedestrians, but concerns are also being raised regarding disruption of the industrial base that the region supports. The Duwamish Manufacturing Industrial Council¹⁶ (MIC) wants to ensure that industrial interests remain the primary focus for SoDo and that transportation infrastructure changes do not have a negative impact on commercial activity in the region. Brian Wood of the University of Washington and an intern with NHTSA conducted two post-assessment interviews of invitees that represented commercial/industrial interests in SoDo. The interview findings indicated that commercial/industrial interests did not receive the focus that they were due, and the involvement of the “powerful” bicycle advocacy group Cascade Bicycle Club may have polarized what might have been a more fruitful discussion regarding possible changes to SoDo. The trucking industry was represented during the assessment keynote presentations, and truck drivers were more than willing to help with ride-alongs or discuss the challenges they face as freight carriers in Seattle. However, there appeared to be less input than expected from freight carriers on the assessment tool itself, thus underrepresenting their voice.

Given the competing advocacy efforts for SoDo, the assessment brought diverse stakeholders together and made an effort to educate all participants on competing concerns. This model would be helpful for creating a collaborative path forward. The post-assessment interviews suggested that the assessment forum was only partially successful in helping stakeholders to consider alternative viewpoints. It should be noted that the different perspectives frequently agreed on the same proposed solutions even though the reasons for them may differ (i.e., separated bike lanes).

¹⁶ <http://seattleindustry.org/about/>

Recommendations

The recommended actions for the assessment route outlined in this report consider assessment results, best practices presented, and plans already in place for the corridor. The recommendations from participating stakeholders are divided into basic strategies and longer-term strategies.

Basic Recommendations

Pavement Repair

Pavement conditions were considered very poor by many assessment participants, particularly south of Spokane Street on East Marginal Way. Pavement damage can result in the loss of vehicle control, initiate sudden/unsafe avoidance maneuvers, and cause bicycle crashes. When bicycles are operated within a travel lane, it is especially critical that rider actions be highly predictable to motorists. If a large crack, pothole, or piece of debris is in the path of the bicyclist, they will be forced to swerve to avoid the hazard, which puts them at high risk of being struck. Adequate pavement conditions are of primary importance when mixing vehicular traffic with bicyclists and pedestrians.

Painting

At a minimum, a busy arterial such as East Marginal Way should include painted bike lanes with buffers to designate adequate space for bicycle use. Given the vehicle speeds, however, this should be considered an interim solution. Travel lanes could also be narrowed with paint, which combined with lower posted speeds, would help to reduce the speed differential between vehicular traffic, bicyclists, and pedestrians. Repainting of sharrows on First Avenue and the addition of intersection paint, such as bike boxes, would be an improvement. Installing a protected bicycle lane on First Avenue would be a safer alternative.

Speed

Bicycle speeds can vary considerably, but speeds in SoDo are more predictable due to the flat terrain. Ten to 15 mph is a reasonable expectation. Assessment day presenters indicated collision speeds greater than 20 mph had a significantly higher probability of causing a fatality. Using a maximum speed differential of 20 to 25 mph would suggest a maximum posted speed of 35 mph. Narrower lanes help to encourage the necessary speed reductions.

Railroad Tracks

Assessment participants reported some train track segments crossing travel lanes that had no visible connections or were otherwise obviously redundant. Identifying and removing track segments that have no current or future freight value should be prioritized. When track crossings cannot be avoided, the crossings should be improved (smoother and flatter) according to best practices for mitigating hazards for people on bicycles.

Pedestrian Crossings

Intersections or midblock locations with significant pedestrian volumes, such as the crossing from the parking lot to Seattle Federal Center South, should be made safer and more efficient. Wait times for pedestrians to cross should be reduced, especially during peak crossing times, and adequate shelter should be provided where wait times are long.

Wayfinding

All users should be able to readily navigate complex intersections and grade changes. Many participants indicated that the grade changes resulted in confusion for automobile drivers, freight carriers, and

bicyclists and pedestrians. Adequate wayfinding signage should mitigate these issues. When safer alternative routes are available, signage should apprise bicycle and pedestrian users of their options.

Maintenance

Regular maintenance would decrease the possibility of roadway debris causing hazardous conditions for bicycle riders. Maintenance should also address potholes and broken pavement. SDOT does operate a “Pothole and Street Repair Hotline:” 206-684-ROAD (7623). The hotline contact information could be posted along heavy use corridors such as East Marginal Way.

Enforcement

Periodic enforcement of vehicle speeds and legal maneuvers by bicycle and pedestrian users would help to create a safer and more predictable corridor. Educational enforcement, including the display of a vehicle’s actual speed, could help to improve behavioral issues.

Long-term Solutions

Modal Separation

The assessment results revealed modal separation is the correct solution in the SoDo neighborhood. Separation could take the form of barrier protected (or parking protected bike lanes¹⁷) or multi-use trails. In order to address intersections, the team recommends bike boxes¹⁸. Bike boxes and mode specific signals should improve intersection conflicts.

Electronic Enforcement

Because the assessment route is outside of the central business district of Seattle and spread over a large area, a significant increase in physical police presence would be difficult to fund. Speed activated warning signs and photo enforcement would help to ensure that users are safe and predictable. Research from Spokane, WA, has shown that photo enforcement is well received when revenues from violations are spent on local safety improvements¹⁹.

Transit

SDOT has not prioritized transit along the East Marginal Way corridor. Because transit use in Seattle is popular, traffic volumes might be reduced if workers in the area had the option of using transit to get to the employment centers along East Marginal Way.

Secure Bicycle Storage

People on bikes need to have secure storage options at their destination if the full potential of bicycles as a mode of transportation is to be realized. An increase of bicycle racks in highly visible locations at appropriate destinations would be beneficial.

¹⁷ <http://www.seattle.gov/transportation/PBL.htm>

¹⁸ <http://www.seattle.gov/transportation/bikeboxes.htm>

¹⁹ <https://static.spokanecity.org/documents/police/prevention/intersection-safety-program-presentation.pdf>

Conclusion

The Washington State USDOT Large Vehicle, Non-Motorized Traffic Safety Assessment provided participants with an opportunity to see the SoDo neighborhood from the perspective of a bicyclist, pedestrian, and truck driver to allow them to assess the safety of the corridor. The participating stakeholders provided information on the transportation engineering aspects of the SoDo area as well as information about the safety and efficiency issues related to bicycle and pedestrian transportation and freight mobility issues. Each of the presentations, the ride-alongs, and the safety demonstrations provided participants with a better understanding of the safety issues faced by all road users on this route. The assessment enabled participants to provide a number of recommendations for improving the safety of the corridor for all users.



Figure 8 Bicyclist in the SoDo neighborhood.

Appendix 1.1 Agenda

Agenda
Large Vehicle / Non-motorized Traffic Safety Assessment
 Seattle Washington – SoDo Neighborhood
May 7th, 2015 **10:00am – 2:00pm**
 Federal Center South Building - 4735 Marginal Way S, Seattle, WA 98134

<p>10:00am – 11:15am Galaxy Room</p>	<p>Welcome</p> <p>Jeff James – WA Division Administrator, Federal Motor Carrier Safety Administration Daphne Jefferson – Deputy Administrator, Federal Motor Carrier Safety Administration</p> <p>Introductory Speakers</p> <p>Scott Kubly – Director, Seattle Department of Transportation Darrin Grondel – Director, Washington Traffic Safety Commission</p> <p>Keynote Presentations</p> <p>Dongho Chang – Chief City Traffic Engineer, Seattle Department of Transportation Engineering Perspective</p> <p>Brock Howell – Policy & Government Affairs Manager, Cascade Bicycle Club Bicycle Advocacy Perspective</p> <p>Marc Rogers – President / CEO, Interstate Distributor Co. Freight Mobility Perspective</p> <p>Assessment Tool Introduction</p> <p>Max Seveid - National Highway Traffic Safety Administration Brian Wood - UW Master Student, Sustainable Transportation Program</p>
<p>11:15am – 12:30pm East Parking Lot</p>	<p>Assessment – Experience the Neighborhood</p> <p>Truck Ride-Alongs – signup required Bus Ride-Alongs – signup required View Truck/Bike Video – remain in Galaxy Room</p> <p>Lunch (on your own) – Federal Center South Cafeteria</p>
<p>12:30pm – 1:30pm Galaxy Room</p>	<p>Best Practice Presentations</p> <p>Darryl Russell – Transit Safety Superintendent, King County Metro Transit Best Practices in Vehicle Safety Technology</p> <p>George Donegan – Fleet Services Manager, University of Washington Best Practices in Truck Side Guard Utilization</p> <p>Paula Reeves – Community Design Manager, Washington Department of Transportation Best Practices in Highway/Road Design</p> <p>FHWA & Toole Design Group Forum & Feedback</p>
<p>1:30pm – 2:00 pm</p>	<p>Wrap-up & Optional Bike Ride</p>

Appendix 1.2 Safety Assessment Tool

Safety Assessment Tool

Can you get to your destination safely by truck, bike, or on foot in the south of downtown (SoDo) neighborhood of Seattle?

How does SoDo compare in transportation safety to other areas of Seattle? Please review the questions in this assessment tool and then experience the SoDo neighborhood. Let us know how safe and efficient you felt you could travel to your destination. Additionally, identify areas of potential large vehicle conflicts with non-motorized travelers.

At the end of your trip, complete the assessment tool based on your opinion. Questions start on the next page; before your trip, here are a few questions to ask yourself and consider as you travel in SoDo:

- Is there sufficient space for trucks, buses, or people who bicycle or walk to safely travel?
 - Consider the sizes, shapes, and designs of the roadway, lanes, or crossings
- How well do the route lanes, paths, or sidewalks allow you to travel safely?
 - Consider the ways you navigated through your route
- How efficiently did you travel through intersections along the route?
 - Consider the manner by which trucks or people who bike or walk might wait or cross intersections
- What was the quality of the surface materials along the roadways?
 - Consider the materials, markings, and roadway conditions on which you traveled
- Do travelers on your route interact well?
 - Consider the movements and interactions of other travelers you meet or pass through your route
- Is it easy to follow safety rules?
 - Consider the signals, signage, or lane markings directing your travel
- What can you do to make your travel safer the next time you travel the same route?
 - Consider the actions taken by you and fellow travelers, turns you made, and times you paused, stopped, slowed down, or sped up

Appendix 1.3 Questionnaire

1	How was the surface you traveled on?	Assessment Score
Things to consider (<i>not limited to</i>): <ul style="list-style-type: none"> • Potholes • Cracked or broken pavement • Debris (e.g. broken glass, sand, gravel, etc.) • Uneven surfaces or gaps • Bumpy or angled railroad tracks Comments:		CIRCLE ONE Excellent (4) Good (3) Acceptable (2) Minimal (1) Unsafe (0)
2	How were the intersections you traveled through?	Assessment Score
Things to consider (<i>not limited to</i>): <ul style="list-style-type: none"> • Had to wait too long to cross intersection • Couldn't see crossing traffic • Signal didn't give me enough time to cross the road • Signal didn't change for me • Unsure where or how to travel safely through intersection • Excessive pedestrian crossing distances Comments:		CIRCLE ONE Excellent (4) Good (3) Acceptable (2) Minimal (1) Unsafe (0)
3	How were the markings?	Assessment Score
Things to consider (<i>not limited to</i>): <ul style="list-style-type: none"> • Center markings / Shoulder markings • Crosswalks • Bike Lanes • Sharrows (shared-lane marking) • Turn lanes • Highway railroad grade crossing signs/markings • What was the condition of markings? • Were the markings comprehensible? Comments:		CIRCLE ONE Excellent (4) Good (3) Acceptable (2) Minimal (1) Unsafe (0)
4	How were the signs?	Assessment Score
Things to consider (<i>not limited to</i>): <ul style="list-style-type: none"> • Stop signs • Speed limit signs • Crosswalks • Railroad crossing • Sign visibility • Confusing signs/locations or areas where more signs were needed? Comments:		CIRCLE ONE Excellent (4) Good (3) Acceptable (2) Minimal (1) Unsafe (0)

5	How were other road users?	Assessment Score
Things to consider (<i>not limited to</i>): <ul style="list-style-type: none"> • Speed of traffic • Following distance • Right of way • Compliance with stop signs/lights • Sharing the road Comments:		CIRCLE ONE Excellent (4) Good (3) Acceptable (2) Minimal (1) Unsafe (0)

6	While traveling through SoDo, what particular problems impacted you?	
Things to consider: Circle one for each	<u>AMOUNT OF IMPACT –</u>	
<ul style="list-style-type: none"> • Other travelers parked in your lane -----> noticeable ---- significant • Other travelers not sharing the roadway -----> noticeable ---- significant • Other travelers not following rules of the road -----> noticeable ---- significant • Poor road surface conditions -----> noticeable ---- significant • Worn out lane markings -----> noticeable ---- significant • A door opening into a bike lane -----> noticeable ---- significant • Difficulty in crossing intersections -----> noticeable ---- significant • Difficulty in seeing other travelers -----> noticeable ---- significant • Difficulty in predicting other travelers' movements -----> noticeable ---- significant • Road or path width not sufficient -----> noticeable ---- significant • Impractical pedestrian crossing point -----> noticeable ---- significant • Insufficient space to travel -----> noticeable ---- significant • Lane, shoulder, or sidewalk disappeared -----> noticeable ---- significant • Heavy and/or fast-moving traffic -----> noticeable ---- significant • Poorly signed roadways, lanes, paths OR Poorly marked intersections/crossings -----> noticeable ---- significant • (Additional) _____ -----> noticeable ---- significant • (Additional) _____ -----> noticeable ---- significant 	none ---- little ----	
Comments:		

7	What is the level of safety for each of these transportation modes in SoDo?	Large Vehicle	Automobile	Bicycle	Pedestrian
	Comments:	CIRCLE ONE	CIRCLE ONE	CIRCLE ONE	CIRCLE ONE
		Excellent (4)	Excellent (4)	Excellent (4)	Excellent (4)
		Good (3)	Good (3)	Good (3)	Good (3)
		Acceptable (2)	Acceptable (2)	Acceptable (2)	Acceptable (2)
		Minimal (1)	Minimal (1)	Minimal (1)	Minimal (1)
		Unsafe (0)	Unsafe (0)	Unsafe (0)	Unsafe (0)

8	What is the efficiency of the current infrastructure/design in SoDo?	Commerce / Freight Mobility	Access to local Businesses	Transportation Corridor	People who Bike	People who Walk
	Comments:	CIRCLE ONE	CIRCLE ONE	CIRCLE ONE	CIRCLE ONE	CIRCLE ONE
		Excellent (4)	Excellent (4)	Excellent (4)	Excellent (4)	Excellent (4)
		Good (3)	Good (3)	Good (3)	Good (3)	Good (3)
		Acceptable (2)	Acceptable (2)	Acceptable (2)	Acceptable (2)	Acceptable (2)
		Minimal (1)	Minimal (1)	Minimal (1)	Minimal (1)	Minimal (1)
		Inefficient (0)	Inefficient (0)	Inefficient (0)	Inefficient (0)	Inefficient (0)

9	RANK (in order of priority) what is most needed in SoDo (of 12 listed + 2 additional)	
	Things to RANK (not limited to)	1 = Highest priority 10+ = lowest priority
	<input type="checkbox"/> Truck Only Lanes <input type="checkbox"/> Protected bike lanes <input type="checkbox"/> Colored asphalt for designated bike lanes <input type="checkbox"/> Two-way bikeways with barriers <input type="checkbox"/> Shared Use (multi-use) Pathways <input type="checkbox"/> Traffic signals dedicated to trucks <input type="checkbox"/> Traffic signals or crosswalks dedicated for people who bike or walk	<input type="checkbox"/> Bike boxes at intersections <input type="checkbox"/> Enhanced signage for large vehicle operators <input type="checkbox"/> Enhanced signage for non-motorized traffic <input type="checkbox"/> Pedestrian Refuge Islands. <input type="checkbox"/> Traffic Calming Infrastructure, <input type="checkbox"/> (Additional) <input type="checkbox"/> (Additional)
	Comments:	

10	Demographic questions
	<ul style="list-style-type: none"> • What is your home zip code or city? _____ • In what zip code or city do you store your vehicle or bicycle when not in use? _____ • In what zip code or city do you work most? _____ • What is your age? _____ • What is your gender? _____ • In a normal month, about how many days a month do you travel through SoDo? _____ • Which of these phrases best describes how you most travel through SoDo? As a... <ul style="list-style-type: none"> ____ commercial motor vehicle driver: bus, van, truck ____ person who drives a passenger motor vehicle ____ person who bikes ____ person who walks • How long have you been routinely traveling through SoDo? Years () + Months ()

11 Imagine driving a truck through this route in SoDo and you drive up behind a bicycle in your lane. What concerns would you have? What would you do to roadway facilities to reduce your concerns if you had the power to change it?

12 Imagine you are a person who bikes through this route in SoDo and you bike up behind a truck in your lane. What concerns would you have? What would you do to roadway facilities to reduce your concerns if you had the power to change it?

13 Can you describe reasonable measures, new policies, or new rules that could be taken to improve safety for trucks or people who bike or walk in SoDo?

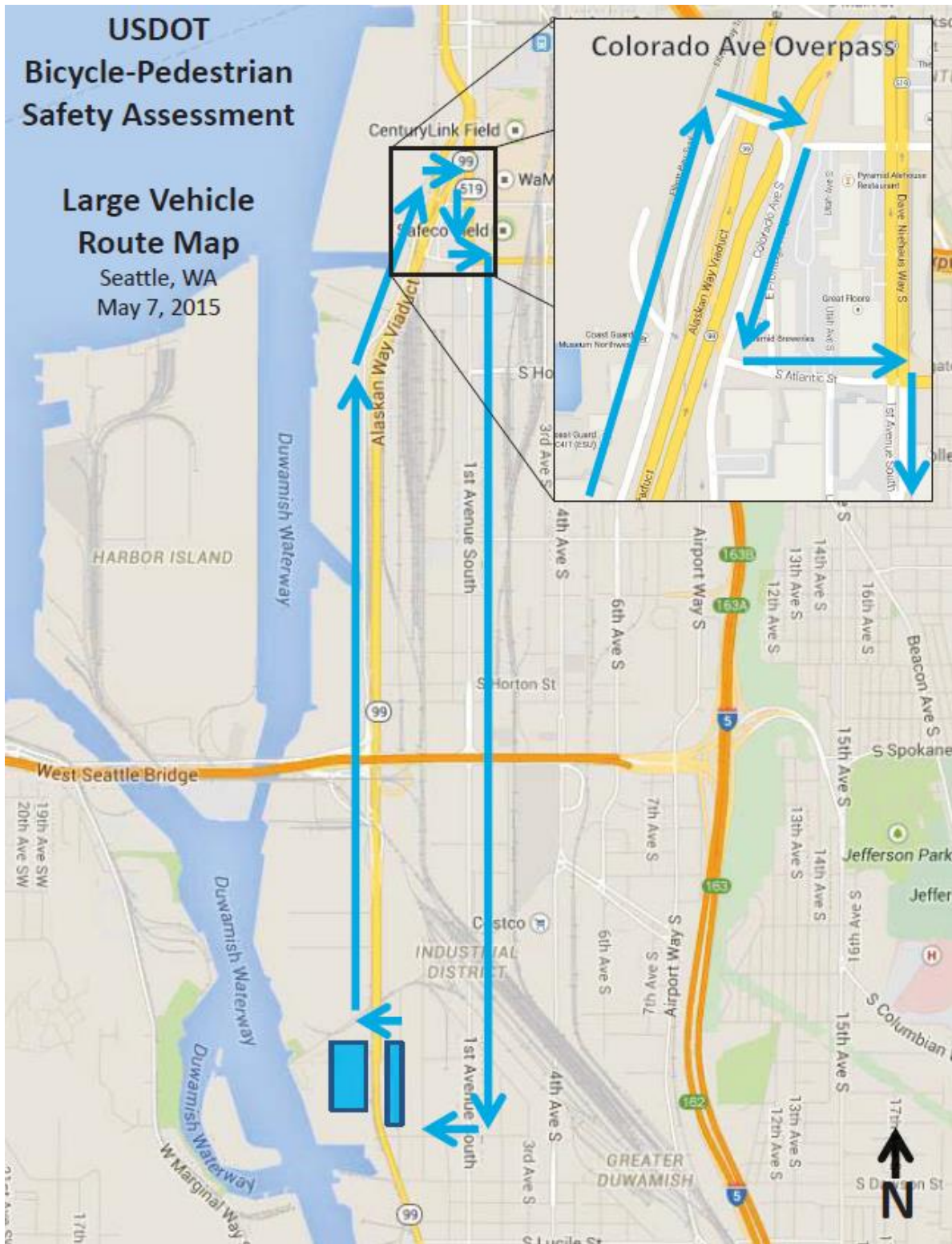
14 Can you describe impediments which have not already been addressed by this assessment tool?

Thank you for your participation. We need you to help all travelers be safe in SoDo.



U.S. DOT

Appendix 1.4 Bike Route Map



Appendix 1.5 Event/Assessment Day Overview, Details, and Description



Figure 9 Jeff James speaks at the event.

The Assessment event began at 10 a.m. on May 7, 2015 at the Seattle Federal Center South Complex. Assessment team members arrived several hours early to help commercial motor vehicles to be used for ride-alongs as well as to set up the large conference room. Additionally, two safety demonstrations were set up in the near parking lot. One of the safety demonstrations was a semi-truck with an orange cone “No-Zone²⁰” display, and the other was a bus installed with cutting-edge safety technology. Both were available for participants to walk around, sit in, and ask questions.

The assessment day had three key objectives:

1. Provide participants with information from three distinct areas.
 - The engineering aspect of transportation in SoDo with regard to large vehicles and bicycles/pedestrians;
 - The safety and efficiency issues related to bicycle transportation in SoDo; and
 - The safety and efficiency issues related to freight mobility in SoDo.
2. Provide participants with an opportunity to experience the neighborhood of SoDo via one of three options:
 - Truck ride-along;
 - Transit bus ride; or
 - View a video²¹ of a ride through the SoDo neighborhood shot from the perspective of a bicyclist as well as a commercial motor vehicle operator.
3. Collect participants’ thoughts, opinions, and perspectives of the SoDo neighborhood.
 - We asked that the stakeholders combine what they already knew with the information that they learned from the speakers and complete an assessment form (either with a pen and paper or online survey (See Appendix 1.3).

Jeff James of FMCSA opened the event by providing context to the assessment day and an overview of the activities. James then introduced three opening speakers to help set the tone for the event. First was FMCSA’s Deputy Administrator, Daphne Jefferson, who provided background information for the USDOT safety assessments and stressed the importance of collaboration within the States. The Director of the Washington Traffic Safety Commission, Darrin Grondel, spoke next. He highlighted the valuable partnership that government, advocacy groups, business, and industry were bringing to the assessment effort. Finally, Director of Seattle DOT, Scott Kubley, gave a short talk that illustrated the impact of

²⁰ <http://www.fmcsa.dot.gov/newsroom/no-zone-help>

²¹ <https://www.youtube.com/watch?v=eMxVcQeCzFI>

collisions from multiple perspectives, including personal and societal. Kubley emphasized communication among stakeholders as a key element in addressing transportation needs.



Figure 10 Keynote speakers speak at the event.

Three keynote speakers followed with the purpose of providing participants with the information necessary to complete their assessment forms. First to present was Chief City Traffic Engineer for SDOT, Dongho Chang. He opened with a discussion of the crash statistics in and around SoDo. He then went on to discuss specific challenges to traffic safety in the SoDo area. He characterized the major truck routes and showed the difficulties trucks face with respect to navigation through some parts of SoDo such as tight turning radii, low underpasses, and train delays. East Marginal Way, in particular, was shown to have high truck traffic and an increasing demand by bicycles riders. Chang noted that a lack of predictability from people on bikes was a primary concern for truck interactions with vulnerable users and suggested that buffered or protected bicycle lanes would help to ensure that predictability.

The second keynote presentation was given by Cascade Bicycle Club Policy & Government Affairs Manager, Brock Howell. He discussed Seattle's Bicycle Master Plan and the need to comfortably accommodate all users on a connected bicycle network. Howell highlighted vehicle speed as a major issue for motorist perception and stopping distance as well as survivability for vulnerable users if a crash does occur. A speed of 20 mph or less was suggested as the preferred speed to ensure minimal chances for a vulnerable user fatality. Howell's presentation showed the two most prevalent dangers to bicycle riders in bike lanes or who share the road with large trucks – the right hook turn and the left cross. The right hook results when right turning trucks fail to see bicycle riders on their right side. The left cross occurs when a bicycle rider is hidden from the view of a left turning vehicle who assumes they are clear to make the turn. One of Howell's major takeaway messages was that safety is a function of proper roadway design. Lower speeds and protected space for vulnerable users are vital.

The third and final keynote presenter was President and CEO of Interstate Distributor Co., Marc Rogers. Rogers presented on behalf of the Washington State Trucking Association and provided the perspective of the safety and efficiency issues related to freight mobility in SoDo. He emphasized the industry's

commitment to safety by detailing some of the training practices and technology investments that his company has implemented. Rogers showed how his company employs speed governing technology in urban settings to ensure adequate reaction time and stopping distances for his drivers. He also outlined his company's zero tolerance policy for distracted driving. Rogers characterized the challenges facing people who drive trucks from inattentive automobile drivers and pedestrians. He indicated that bicycle riders need to understand the limitations that a truck driver faces by explaining that limited visibility is a primary concern for his drivers. Rogers reiterated the wisdom of mode separation discussed by the prior presenters. The use of protected bike lanes over simply making lanes wider is a much more effective strategy. He also added the need for well-maintained reflective paint and signage.

After the keynote speakers, the team introduced the assessment tool and gave participants the chance to do a ride along in a truck or bus. A third option for participants was to watch the video²² that was made of the assessment route.

The event day concluded with three exciting best practices presentations and an opportunity for an open forum and discussion. First to speak was Darryl Russell, the Transit Safety Superintendent of King County Metro Transit. He showed how new training programs and technologies such as the talking bus and strobe systems were reducing collisions with vulnerable road users.

The next presenter was George Donegan, Fleet Service Manager for the University of Washington. Donegan characterized collisions between non-motorized transportation users and large trucks and then discussed how side truck side guards that deflect bicyclists and pedestrians away from the truck rather than allowing them to fall into the path of the wheels are an effective preventative measure that he implemented throughout his fleet. This presentation demonstrated the local implementation of a national USDOT effort to promote side guard installation²³.

The final best practices presenter was Paula Reeves, the Community Design Manager for Washington DOT. She detailed research concluding that 10 percent of the roadways produced most of Washington State's fatal collisions. The collisions occur on urban highways, and the research indicates that vehicle speeds in those settings are too high to be safe for all users. Reeves explained that research has determined that conventional bike lanes are not appropriate for many urban arterials. She cautioned that workable solutions to reduce crashes are not always well received, but reduced crashes rather than popularity should be the metric. In closing, Reeves emphasized the need for protection and space when arterials are to be shared with vulnerable users.

The Toole Design Group, which is under contract with FHWA for bicycle/pedestrian safety studies wrapped up the event day with an open forum. This process elicited some candid discussion from the audience about the biggest takeaways from the day's events. A few highlights of this included a comment from Rick Krochalis, Regional Administrator for FTA Region 10, who brought up the fact that while the event had strong stakeholder representation, elected officials were not in attendance. This means it was up to the participants to tell their representatives what they had learned and what they wanted to see happen. Another commenter pointed to the specific context of 1st Avenue South section of the assessment route. The commenter explained that automobiles occupy seven lanes and felt the solution to multi-modal conflicts there was to simply require a small amount of protected space to cyclists. Another commenter, who drove vans for a living but otherwise used a bicycle for

²² <https://www.youtube.com/watch?v=eMxVcQeCzFI>

²³ <http://www.volpe.dot.gov/our-work/truck-side-guards-resource-page>

transportation, thought there were many commonalities between bicycling and driving a truck, and many of the issues stemmed from poor automobile driving behavior. Christine Wolf, Transportation Planner for the Port of Seattle, noted that just because someone has the right of way, that doesn't mean it is wise to be there, and that vigilant transportation is everyone's responsibility. Finally, a veteran Seattle truck driver with over fifty years of experience said he wanted people to ride bikes and wanted people to take transit, but he also needed a road to move freight.