The Alaskan Way Viaduct & Seawall Replacement Program

Central Waterfront

Alaskan Way Viaduct

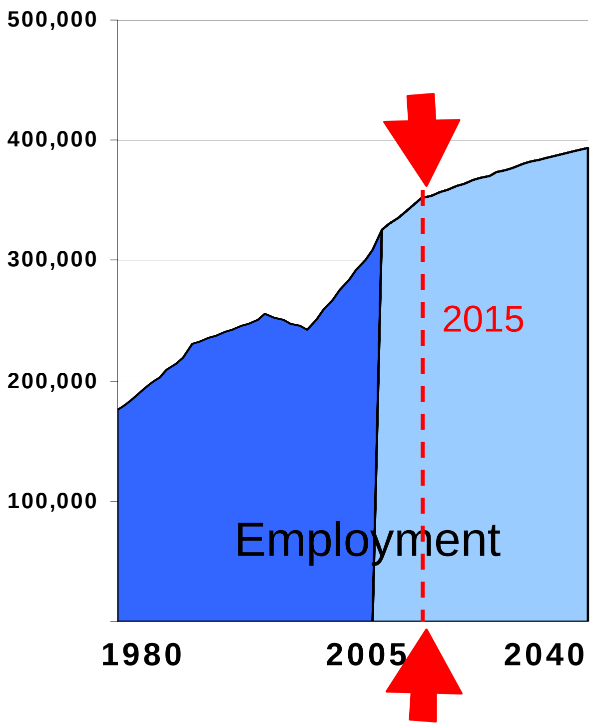
Stakeholder Advisory Committee

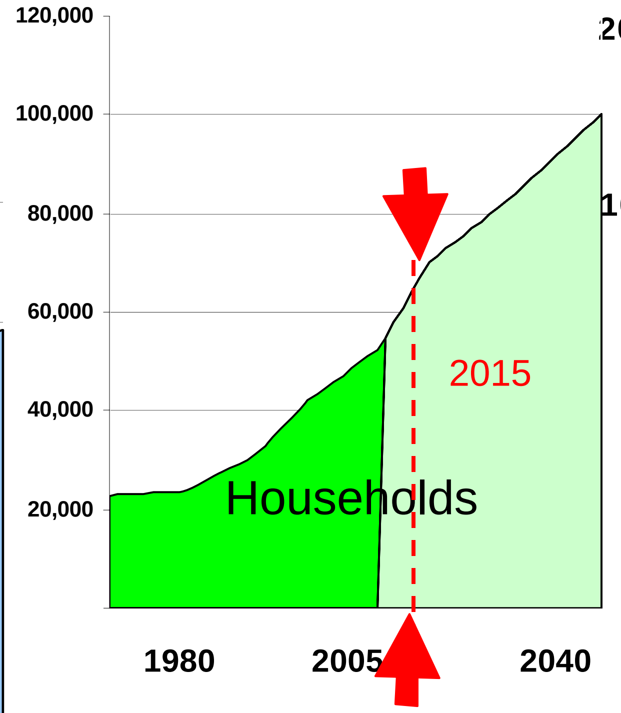
Guiding Principle 2: Travel Model Results

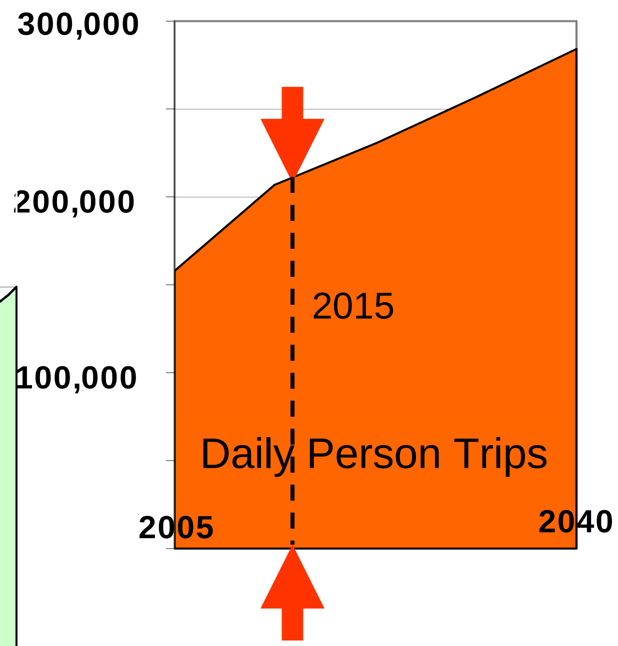
Nov. 13, 2008

U.S. Department of Transportation Federal Highway Administration | WSDOT | King County | City of Seattle

Population, Employment and Land Use







Central Waterfront

Study Area

- The study area is from 85th Street in the north to the southern city limits.

Handout Page 1

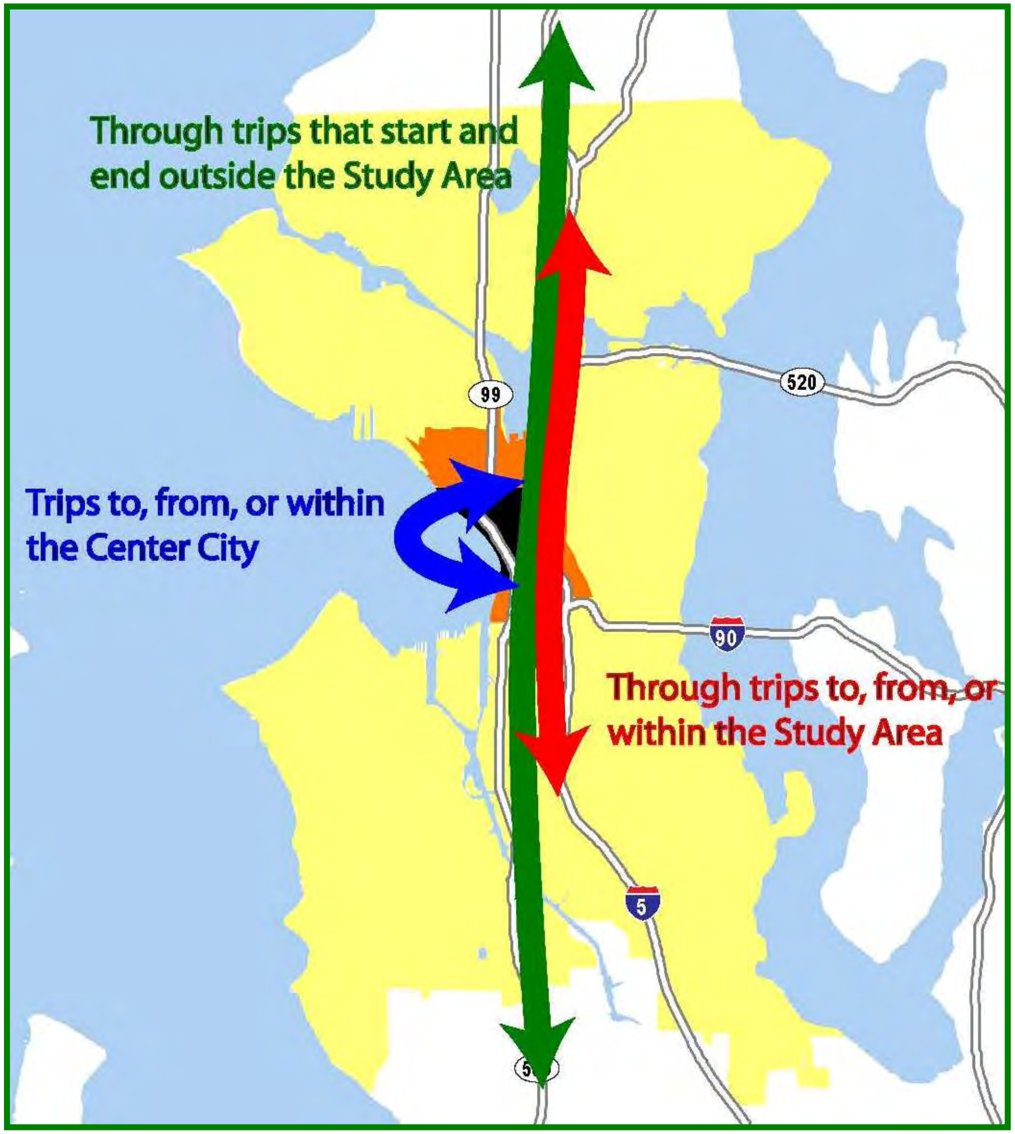
Center City

- Center City is defined as the area shown in orange. It includes:
  - Uptown
  - South Lake Union
  - Capitol Hill
  - Belltown
  - Denny Triangle
  - Pike/Pine
  - Commercial Core
  - First Hill
  - Pioneer Square
  - Chinatown/ International District

Baseline 2015

- For the purpose of modeling it is assumed that the baseline year is 2015.
- Assumes the viaduct is removed in 2012 and replaced with a four-lane surface street that connects to the Battery Street Tunnel and the new south end.
- Assumes that currently funded investments in transit are in operation; does not include light rail to Northgate or investments approved by voters in Proposition 1.
- Assumes growth in regional person trips from 1.7 million today to 2 million in 2015.

Types of Trips



Travel Behavior: Person Throughput and Mode Share

Guiding Principle 2, Measure 1:
Measure person throughput, to and through the Center City.

Guiding Principle 2, Measure 6:
Measure change in share of trips made by transit, carpool, bicycle or foot.

How many person trips are made within, to, from, and through the Center City each day?

Key findings:

- Roughly 10% of all person trips in the region begin, end or pass through the Center City.
- Approximately 85% of person trips on the Center City transportation system have an origin or destination within the study area.
- Through person trips in the study area decrease over time as a percentage of all travel due to land use changes and more congestion.
- Projected Center City population and employment growth will increase the total number of person trips to and within the Center City.

How many person trips are made within, to, from, and through the Center City each day?

What did we learn:

- Scenarios with a bypass provide an additional route for person trips through the Center City, serving up to 8% more through person trips compared to surface scenarios.
- The number of Center City person trips does not change significantly among the scenarios.
- Through person trips for any scenario are a small percentage of all trips on Center City facilities.

How many transit trips are made within, to, from, and through the Center City?

Key findings:

- Most transit trips in the study area are made to, from, or within the Center City. This is similar to today and in the 2015 baseline.
- Transit use grows significantly under all conditions by 2015.
- Transit also shows an increase in market share in 2015.
- A combination of transit service levels and travel demand management measures contributes to greater increases in ridership.

How many transit trips are made within, to, from, and through the Center City?

What did we learn:

- Generally, the pattern of travel growth follows transportation system supply changes.
- As transit service increases, ridership goes up, and as roadway capacity goes up, the share of transit does not grow as fast.
- Traffic demand management and tolling have a significant effect on transit ridership.

What is the distribution of mode share for travel within and to the Center City?

Key findings:

- There is a significant increase in walk and bike trips due to growth in population and employment in the Center City.
- The number of walk and bike trips does not vary between scenarios because land use is constant across the scenarios.
- The share of travel by private vehicle decreases under all scenarios, primarily as a result of increases in transit service, changes in land use, and additional policies and management measures.

What is the distribution of mode share for travel within and to the Center City?

What did we learn:

- The number of bike, walk and carpool trips is not impacted by the elements included in the scenarios, although both modes account for over one-third of AM peak period travel.
- Transit trips make up the greatest share of trips made to the Center City in the AM peak.

How many vehicle trips are made within, to, from, and through the Center City each day?

Key findings:

- Daily vehicle volumes grow by roughly 5 to 15% over existing levels depending on the scenario.
- Generally, vehicle travel grows most with additional roadway capacity and less with policies and management and transit service increases.

How many vehicle trips are made within, to, from, and through the Center City each day?

What did we learn:

- Generally the pattern of vehicle travel change follows transportation system supply changes. As roadway capacity is increased vehicle volumes grow.
- Policies and management, tolling and increased transit service slow the growth in vehicle volumes.
- Differences among the scenarios have a greater impact on vehicle travel to, from and within the Center City than on through trips.
- The volume of external through travel by private vehicle shows little change among the scenarios because these trips are difficult to shift to other modes.

How many vehicle trips use I-5 at Mercer Street during the 3-hour PM peak period?

Key findings:

- Total peak period volumes on I-5 at Mercer Street increase slightly across the scenarios that do not include I-5 improvements.
- While I-5 carries large volumes of traffic to and from the Center City, the majority of vehicle trips on I-5 are through trips.
- The mix of through trips and Center City trips on I-5 changes very little across the scenarios.

How many vehicle trips use I-5 at Mercer Street during the 3-hour PM peak period?

What did we learn:

- Changes to SR 99, improvements on other Center City roadways, increased transit service and demand management and tolling have little impact on the use of I-5 during peak periods. This is primarily because I-5 reached its capacity many years ago and travel demand exceeds the road's capacity.
- When capacity is added to I-5, vehicle volumes on I-5 increase slightly.

How many vehicle trips use SR 99 at Yesler Way during the 3-hour PM peak period?

Key findings:

- Currently 63% of traffic on SR 99 is through traffic.
- The volume of traffic in the SR 99 corridor is highly sensitive to the capacity of the roadway.
- Through traffic appears more sensitive to changes in roadway capacity than does Center City traffic.

How many vehicle trips use SR 99 at Yesler Way during the 3-hour PM peak period?

What did we learn:

- All scenarios assume new ramps at S. King Street, which results in some trips leaving the SR 99 corridor south of Yesler Way.
- The volume of Center City destined traffic on SR 99 is less sensitive to road capacity than the volume of through traffic.
- None of the scenarios results in the level of through traffic that now uses SR 99, although the bored tunnel comes close.
- The bypass scenarios all result in substantially higher volumes than the surface scenarios, with the exception of the lidded trench. The lidded trench has volumes similar to a surface scenario because it is constrained by intersections at both the north and south ends.

How many vehicle trips use city surface streets at University Street during the 3-hour PM peak period?

Key findings:

- Downtown surface street volumes all show future increases due primarily to changes in trips to, from and within the Center City.
- Today about 13% of surface street volume is through traffic.
- The percentage of through trips shows only a modest increase and is highest with the surface scenarios and bored tunnel. The bored tunnel through volumes are high since Alaskan Way and Western carry Elliott/Western volumes.

How many vehicle trips use city surface streets at University Street during the 3-hour PM peak period?

What did we learn:

- Policies and management, tolling and transit service enhancements influence surface street volumes.
- Surface street volumes are highest with a surface street scenario compared to bypass scenarios.
- Having a bypass, high levels of policies and management, or a combination of the two lowers surface street volumes the most.
- The bored tunnel shows the highest surface street volumes of the bypass scenarios because it includes the Alaskan Way/Western Avenue couplet and has fewer policies, management and transit enhancements.

Travel Times: General Purpose Traffic

Guiding Principle 2, Measure 2:
Measure travel times for general purpose traffic for representative trips to and through the Center City.

Travel Times: General Purpose Traffic

Greenwood to Airport on SR 99

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	SB	32	39	40	43	43	34	34	38	34	41
PM	NB	35	44	51	55	56	42	42	46	42	48
PM	SB	34	45	46	47	46	39	37	42	38	44

Travel Times: General Purpose Traffic

Northgate to Airport on I-5

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	NB	39	43	40	39	39	37	38	38	37	36
AM	SB	30	31	37	31	30	30	30	30	29	29
PM	NB	38	39	38	36	37	35	36	36	35	35
PM	SB	41	44	46	42	43	42	45	45	42	42

Travel Times: General Purpose Traffic

Ballard to SODO on SR 99 and Elliott / 15th Ave. W.

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	NB	18	25	20	24	26	20	19	23	24	23
AM	SB	14	24	23	26	27	14	15	20	16	23
PM	NB	20	34	35	31	31	20	20	26	24	29

Travel Times: General Purpose Traffic

West Seattle to CBD on SR 99

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	NB	13	30	20	22	25	24	25	23	25	23
PM	SB	13	32	24	27	27	22	20	22	22	26

Travel Times: Transit

Guiding Principle 2, Measure 5:
Evaluate transit speed, capacity and travel time.

Travel Times: Transit

Northgate to Airport via LINK

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	NB	60	51	48	48	48	48	48	48	48	48
AM	SB	55	52	48	48	48	48	48	48	48	48

Travel Times: Transit

Greenwood to Airport via Aurora RapidRide / LINK

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	SB	70	64	63	63	63	64	63	64	63	62

Travel Times: Transit

West Seattle to CBD via West Seattle RapidRide

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	NB	21	28	27	25	25	25	25	25	25	25

Freight Connections and Travel Times

Guiding Principle 2, Measure 8:
Measure directness, capacity, reliability, and quality of access to port facilities, rail yards and industrial centers.

Guiding Principle 2, Measure 3:
Measure travel times for freight for representative trips to and through the Center City, including to port facilities and industrial areas.

Travel Times: Freight

SR 99 First Ave. S. to Interbay via Alaskan Way Viaduct / Elliott Ave. W.

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	NB	17	29	24	26	28	20	21	27	21	26
AM	SB	16	24	23	25	26	16	17	22	18	23

Travel Times: Freight

I-5 / I-405 (Tukwila) to Terminal 46 via I-5

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	NB	19	25	22	23	23	22	22	23	22	21
AM	SB	12	15	15	15	15	15	15	15	15	15
PM	SB	14	22	20	21	21	21	22	23	21	21

Travel Times: Freight

I-90 / I-405 to Terminal 18 via West Seattle Viaduct

Time Period	Direction	Average Travel Time in Minutes									
		Current	2015 Base	Scenario							
				A	B	C	D	E	F	G	H
AM	NB	12	21	18	19	19	20	20	22	20	21
AM	SB	13	18	14	17	17	17	17	18	17	17
PM	NB	17	27	21	25	24	25	25	29	25	24

Parking

Guiding Principle 2, Measure 4:

Evaluate changes in parking and loading access to the central waterfront and other impacted business districts.

What are the effects on parking?

Key findings:

- On-street parking:
  - Decrease in supply is significant in all scenarios (between 8 and 13% in PM peak period, between 6 and 10% off-peak).
  - Most on-street parking eliminated is in the SR 99 corridor.
  - Surface street scenarios (A, B, C) have more reduction than bypass scenarios.
  - Belltown, Denny Triangle, International District, South Lake Union and the retail core see little change.
  - The waterfront loses 30 to 50% of PM peak supply.
  - Pioneer Square loses 30 to 40% of PM peak supply.
  - Uptown loses 23% of peak and off-peak supply.
  - Office core loses about 30% of PM peak supply in Scenarios A and B.

What are the effects on parking?

Key findings:

- Off-street parking:
  - Reductions are less than 1% of existing supply of 70,000 spaces in Center City.
  - All subareas have off-street parking to accommodate displaced demand from parking losses.

What did we learn:

- On- and off-street parking:
  - Mitigation of on- and off-street parking losses is possible through improved transit and the management of parking through the Center City Parking Program.

Connections: Neighborhood, Transit and Bicycle

Guiding Principle 2, Measure 7:

Measure quantity, capacity and quality of access to and connections among Center City neighborhoods.

How are Center City neighborhood connections being made?

Key findings:

- All scenarios enhance neighborhood connections.
- All scenarios improve pedestrian connectivity across I-5 between First Hill/Capitol Hill and Downtown/South Lake Union.
- New pedestrian connections are provided from Pike Place Market to the waterfront in surface scenarios, the cut and cover tunnel and the bored tunnel.

What did we learn:

- Surface street scenarios provide more opportunities for crossings at Aurora Avenue, connecting South Lake Union, Queen Anne/Uptown and Seattle Center.

How are transit connections being made?

Key findings:

- Where applied in scenarios, rapid trolley bus connections to and through Center City neighborhoods improved service from Queen Anne to Rainer Valley, Madrona via Downtown Seattle, and Queen Anne to Madison Park via Capitol Hill and South Lake Union.
- Signalized intersection crossings on SR 99 north of the Battery Street Tunnel add east-west connections for transit that do not exist today.
- For all scenarios, a new streetcar improves connectivity between First and Capitol Hills, the International District and Pioneer Square.
- Streetcar on First Avenue connects the Uptown area with Downtown Seattle, Pioneer Square, and International District (Scenarios B, C, E, and G)
- Waterfront streetcar connects Pioneer Square and the International District with the waterfront.

How are transit connections being made?

What did we learn:

- All scenarios improve north-south transit connections.
- The First Avenue streetcar would link high activity areas together, including Uptown, Seattle Center, Sculpture Park, Belltown, Pioneer Square and King Street Station.

How are bicycle connections being made?

Key findings:

- All scenarios provide improved bicycle facilities on the waterfront.
- New bicycle linkages are provided from the waterfront to Belltown in Scenarios A, B, C and F via new surface street.
- Bicycle lanes on Second and Fourth avenues are removed to provide additional transit or general purpose lanes and replaced with sharrows.
- Several scenarios provide new signalized crossings of Aurora Avenue connecting South Lake Union and Uptown:
  - Scenarios A, B, C, H: 4 to 5 new crossings at grade.
  - Scenario F: 2 new crossings at grade.
  - Scenarios B, F, G and H: provide bicycle/pedestrian trail on Mercer.
  - Scenarios D, E, G: provide new crossing of Aurora via Republican underpass.

How are bicycle connections being made?

Key findings:

- A six-lane Mercer Street underpass provides an additional bike path in Scenarios D, F, G and H.
- On Second and Fourth avenues there is a trade-off between general purpose traffic, dedicated transit lanes and existing bicycle lanes.