Building Healthy Communities Through Seattle's Growth Policy

Dongho Chang
City of Seattle

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Building Healthy Communities
Our vision, mission, and core values

**Vision:** Seattle is a thriving equitable community powered by dependable transportation

**Mission:** to deliver a transportation system that provides safe and affordable access to places and opportunities

Committed to 6 core values:
- Equity
- Safety
- Mobility
- Sustainability
- Livability
- Excellence
Presentation Overview

- Background / Trends
- Growth Strategies/Policies
- Street Typologies
- Safety and Project Examples
Seattle Background

• **26% of Seattle land area** is in public street right-of-way

• **97.5% of Seattle’s population lives** within ¼ mile of a transit stop

• Ranks 6\textsuperscript{th} of the 50 largest cities for walkability

• **Typical arterial roadway width** is 60-66’
Seattle is growing

Seattle No. 1 for growth this decade
Since 2010, Seattle’s population has increased by 18.7 percent, the fastest growth rate among the 50 largest U.S. cities.

Seattle

Percent change since 2010 | Population increase since 2010
---|---
18.7% | 114,412

Sources: U.S. Census
MARK NOWLIN / THE SEATTLE TIMES

Washington D.C.
14.7% 88,932

Raleigh
14.4% 58,421

Atlanta
15.0% 63,441

Fort Worth
16.8% 125,599

Austin
17.9% 144,252

San Antonio
13.40% 178,533

Denver
16.8% 101,403

Charlotte
16.3% 120,535

Miami
15.6% 62,483

5th and Columbia – 48 story tower
528,000 SF Office Space
184 Room Hotel
~300 Parking Garage
Seattle is growing

4th and Columbia – 100 story tower
1,020 units
750 Parking Garage
Seattle’s land use permits this morning: 17,107
Seattle Background

• Population 23%
• Collisions -21%, ADT -5%
Seattle Background

- Transit Ridership 46%
Seattle Ridership Comparison

Change in bus ridership in U.S. urbanized areas since 2004

- Baltimore, MD
- Boston, MA-NH-RI
- Chicago, IL-IN
- Los Angeles-Long Beach-Anaheim,...
- Miami, FL
- New York-Newark, NY-NJ-CT
- Philadelphia, PA-NJ-DE-MD
- San Francisco-Oakland, CA
- Seattle, WA
- Washington, DC-VA-MD

Created by Yonah Freemark @ The Transport Politic | Source: FTA
Setting the Policy Foundation

“Because Seattle is a fully built city with a mature street system, the City uses a full range of non-single occupant vehicle transportation facilities to support the desired redevelopment pattern within Urban Villages”...

- 2004 Comprehensive Plan Update
Seattle’s Growth Strategy

- Focus growth to more efficiently serve it
  - Urban centers
  - Manufacturing & industrial centers
  - Urban villages

- 80% of city growth in centers/villages since 1994

- Future Comprehensive Plan growth targets 2016-2035
  - 70,000 additional housing units
  - 115,000 additional jobs
Comprehensive Plan Transportation Element key themes

- Safe, reliable, affordable, equitable, and high-quality travel options
- Ensure goods movement
- Use right-of-way for multiple purposes
Using Space efficiency

<table>
<thead>
<tr>
<th>Drive alone</th>
<th>Moving a trip from drive alone to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>Carpools, Bicyclists, Transit, Walking</td>
</tr>
<tr>
<td></td>
<td>frees up this much street capacity:</td>
</tr>
<tr>
<td></td>
<td>55%, 93%, 97%, 99.9%</td>
</tr>
</tbody>
</table>

Drive alone frees up 0% of street capacity, while moving a trip to carpools frees up 55%, to bicyclists frees up 93%, to transit frees up 97%, and to walking frees up 99.9%.
Measure the Right Thing: LOS vs Modeshare

200 people can fit in...

- 177 cars
- 3 buses
- 1 light rail train
- on their bikes

2nd Avenue in Seattle
Employment Density

How Commuters Got Downtown in 2017

- 48% TRANSIT
- 10% RIDE SHARE
- 8% WALK
- 3% BIKE
- 6% OTHER
- 25% DRIVE-ALONE

2018 PSRC Estimates

- 301,000 jobs in Downtown Seattle
- 235,000 jobs in Eastside (Redmond and Bellevue)
Jobs Up, Drive-Alone Rate Down 2010 to 2017

Graphic from: Commute Seattle

DOWNTOWN JOBS

DRIVE ALONE RATE

2010 2012 2014 2016 2017

202k 220k 228k 247k 262k

35.2% 34.2% 31.1% 29.7% 25.4%
Seattle’s Safety Trends

• One of safest cities in US

• We experience approx. 20 deaths each year

• 14 deaths in 2018

• People walking and riding bicycles/motorcycles are most at risk

• Urgency in improving conditions people
Safety Trends

- **89%** of total fatalities involve people walking, biking, and on a motorcycle.
- **90%** of all serious and fatal crashes occur on arterial streets.
- **60%** of pedestrian fatalities in the last 3 years were people age 55+.
Speed is a Factor in Fatalities and Serious Injuries

- **20 MPH**: 9 out of 10 survive
- **30 MPH**: 5 out of 10 survive
2,400 Miles of Residential Streets are 20 mph
• 1,500 Traffic Circles Reduce injury collision by 97%, all collisions by 90%
• 1,343 Volunteers just for our circles! (1 to 4 volunteers per circle)
• Curb/Planter strip gardening – raised structures requires no-fee permit (sand boxes!)
Seattle Speed Limit Background

Code of Washington (46.61.415)
• Allows local agencies to set speed limits based on an engineering study and MUTCD

Washington Neighborhood Safe Streets Bill
• Speed limits on non-arterials can be set to 20 mph without a speed study

Seattle Code 11.52.060 & 11.52.080
• Except where a different maximum speed is signed no person shall operate any vehicle in excess of twenty (20) miles per hour on any non-arterial street and twenty-five miles per hour on arterial streets.

Default speed limit signs were posted at city limits with SMC change in 2016
Evolving Methodology

Traditional
(no longer using this)

- Operating Speed
- Design Speed
- Posted Speed

Urban villages

- 50th percentile speeds (USLIMITS2)
- Top operating speed of priority modes

Urban villages approach:
- Pedestrians: ~3 MPH
- Bicycles: 10-15 MPH
- Public transportation: 10-25 MPH

Approach

- Target Speed
- Design Speed
- Posted Speed

Influences:
- Operating Speed
Pilot Implementation Data

CBD signal timing
- Lowered speed limits within CBD to 25 MPH
- Overall crash and severity reduced

Greenwood/Phinney urban village
- All crashes reduced by 47%
- Fatal, serious injury, and injury level crashes reduced by 37%

Green Lake/Roosevelt urban villages
- 26% reduction in top end speeders (+10 mph over speed limit)
Rainier Ave S

Re-designed one mile of Rainier from four to three lanes and reduced speed limit from 30mph to 25mph.

Before (2015)  
After (2016)
Results

• Collisions reduced by 15%
• Transit travel times improved by 1 minute in the southbound direction during the PM peak hour
# Results - Speeds

<table>
<thead>
<tr>
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<th>50th Percentile Speed</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
<td>2016</td>
<td>Change</td>
</tr>
<tr>
<td></td>
<td>(30 MPH speed limit)</td>
<td>(25 MPH speed limit)</td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>33.4 MPH</td>
<td>28.0 MPH</td>
<td>-16.2%</td>
</tr>
<tr>
<td>Southbound</td>
<td>33.5 MPH</td>
<td>30.0 MPH</td>
<td>-10.4%</td>
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</tbody>
</table>

## Speeders (percent speeding)

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<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Northbound</td>
<td>84.1%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Southbound</td>
<td>82.4%</td>
<td>59.3%</td>
</tr>
</tbody>
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## Top End Speeders (drivers exceeding 40 mph)

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</tr>
</thead>
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<tr>
<td>Northbound</td>
<td>4.1%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Southbound</td>
<td>6.2%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>
Street Types

- Supplements functional classification
- Provides street function for support land use and people
- Vision for street

*Except limited access/controlled access streets

25-35* mph

25-30 mph

15-20 mph
2nd Ave

- Principal Arterial
- Downtown Design Standards
- 25 mph
2nd Ave

• Two-way PBL
• Bus Only Lane
• Flex Curb Lane
2nd Ave

• Focus made at Intersection

• Signal separation of turning cars

• Reduced pedestrian left turn crashes by 80%

• Plant/Railing for people comfort
2\textsuperscript{nd} Ave Bike Ridership

- 300% after lanes separated
- 900% after lanes were extended
2nd Ave Vehicle Volumes

- 30% increase (year before/after)
- 15,200 in 2013
- 20,100 in 2015
- 21,400 in 2018
2nd Ave Safety

• 4 years before/after (Pike to Washington)
• 14% reduction in total # crashes
• 21% reduction in injury crashes
• 22% reduction in bike crashes
• 16% reduction in pedestrian crashes
Seattle’s Guidelines for Road Diets

Daily volume under 10,000 → Yes

Daily volume 10,000 – 16,000

< 700 vehicles per hour per direction → Yes

> 700 vehicles per hour per direction

Synchro model

LOS & Critical Approaches E or better → Yes

US Federal Highway Administration Proven Safety Measure to reduce all collisions by 29%

Seattle’s Guidelines for Road Diets

Daily volume 16,000 – 25,000

Synchro model

< 30% Increase in travel time
Corridor LOS D or better
LOS E or better at critical approaches
Yes

Daily volume more than 25,000

No

Every street is different, these are just guidelines
NE 75\textsuperscript{th} Street- 21,300 ADT

• Designed and implemented in 6 months

• 50% reduction in crashes

<table>
<thead>
<tr>
<th></th>
<th>Percent Change in 85\textsuperscript{th} Percentile Speed</th>
<th>Percent Change in Speeders going over the speed limit</th>
<th>Percent Change in Speeders going 10+ mph over the speed limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastbound</td>
<td>-9%</td>
<td>-64%</td>
<td>-75%</td>
</tr>
<tr>
<td>Westbound</td>
<td>-11%</td>
<td>-56%</td>
<td>-79%</td>
</tr>
</tbody>
</table>
Traffic calming

*Speed humps*

*Speed cushions*
## Speed humps

*Small investment with high safety yield*

<table>
<thead>
<tr>
<th></th>
<th>Graham Hill</th>
<th>Highland Park</th>
<th>Olympic Hills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in speeding over 25 mph</td>
<td>-79%</td>
<td>-73%</td>
<td>-88%</td>
</tr>
<tr>
<td>Change in speeding over 35 mph</td>
<td>-80%</td>
<td>-81%</td>
<td>-91%</td>
</tr>
</tbody>
</table>
## Speed humps/cushions/signs/cameras

<table>
<thead>
<tr>
<th>Location</th>
<th>Speed Humps Installed 2011</th>
<th>Speed Cushions Installed 2012</th>
<th>Olympic Hills Elementary NE 130th Street Speed Humps Installed 2014</th>
<th>Emerson Elementary 60th Ave S Speed Humps Installed 2014</th>
<th>Viewlands Elementary 3rd Ave NW and NW 104th Speed Cushions Installed 2014</th>
<th>Viewlands Elementary 3rd Ave NW and NW 105th Speed Cushions Installed 2014</th>
<th>Broadview Thomson K-8 3rd Ave NW and NW 105th Radar Speed Sign Installed 2014</th>
<th>Rainier View Elementary Beacon Ave S NW/0 57th Ave S Automated Enforcement 2015</th>
<th>Rainier View Elementary Beacon Ave S NW/0 57th Ave S Speed Cushions 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>85th Percentile Speed Before (MPH)</td>
<td>28.3</td>
<td>29.7</td>
<td>28.7</td>
<td>33.9</td>
<td>32.4</td>
<td>34.3</td>
<td>35.2</td>
<td>36.6</td>
<td>36.0</td>
</tr>
<tr>
<td>85th Percentile Speed After (MPH)</td>
<td>23.2</td>
<td>24.2</td>
<td>22.7</td>
<td>21.3</td>
<td>27.3</td>
<td>28.5</td>
<td>35.4</td>
<td>35.1</td>
<td>36.0</td>
</tr>
<tr>
<td>Percent exceeding 25 mph Before</td>
<td>36%</td>
<td>43%</td>
<td>45%</td>
<td>79%</td>
<td>69%</td>
<td>79%</td>
<td>85%</td>
<td>89%</td>
<td>88.5%</td>
</tr>
<tr>
<td>Percent exceeding 25 mph After</td>
<td>8%</td>
<td>12%</td>
<td>5%</td>
<td>2.2%</td>
<td>28.2%</td>
<td>35.8%</td>
<td>94.1%</td>
<td>94.6%</td>
<td>79.9%</td>
</tr>
<tr>
<td>Percent exceeding 35 mph Before</td>
<td>1.6%</td>
<td>3.2%</td>
<td>1.1%</td>
<td>10.0%</td>
<td>4.5%</td>
<td>10.5%</td>
<td>16.7%</td>
<td>18.9%</td>
<td>24.3%</td>
</tr>
<tr>
<td>Percent exceeding 35 mph After</td>
<td>0.2%</td>
<td>0.6%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>1.1%</td>
<td>1.6%</td>
<td>12.2%</td>
<td>15.4%</td>
<td>20.8%</td>
</tr>
</tbody>
</table>

Seattle Department of Transportation
Leading Pedestrian Interval

• Also referred to as LPI’s

• Activate pedestrian signal 3-7 seconds prior to vehicular green light

• Pedestrians establish themselves in the crosswalk before vehicle movements

• 60% Reduction in pedestrian/vehicle crashes
Leading Pedestrian Interval

- 9 locations installed between 2009-2018
- 40-60% reduction in pedestrian collisions
- Average cost $10,000 per intersection
- Funded 144 new installations in next 3 years 2019-2021

<table>
<thead>
<tr>
<th>All Ped Crashes 2011-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Movement</td>
</tr>
<tr>
<td>Left</td>
</tr>
<tr>
<td>Right</td>
</tr>
<tr>
<td>Serious/Fatal Ped Crashes 2011-2017</td>
</tr>
<tr>
<td>Vehicle Movement</td>
</tr>
<tr>
<td>Left</td>
</tr>
<tr>
<td>Right</td>
</tr>
</tbody>
</table>
Leading Pedestrian Interval

• Evaluate at all signalized intersections

• Prioritized based on:
  • BPSA
  • Urban villages/centers
  • Near schools, parks, community centers
  • Where serious injury pedestrian collision occurred w/in 3 years
Automated Red Light Enforcement

- 24 camera locations. 20 with 3 year before/after data
- Angle collisions reduced by 46%
- **Pedestrian collisions reduced by 32%**
- Rearend collisions reduced by 15%, all collisions reduced by 23%
School Speed Zone Safety Cameras

83% K-12 students live inside a walk zone

SINCE START OF SCHOOL SPEED ZONE SAFETY CAMERA PROGRAM

- **↓64%**
  The average number of traffic violations per camera per day has decreased by 64%

- **↓4%**
  Average speeds have decreased by 4%

- **90%**
  90% of people who receive a speeding citation and pay it, do not pay for another citation

COLLISIONS ARE DOWN

- **↓50%**
  50% drop in total collisions, pedestrian, and bicycle collisions, all times of the day

- **↓71%**
  71% drop in total collisions during the camera activation hours

- ❌
  No pedestrian/bicycle collisions in the after period during camera activation times

*School Zone Cameras effectively reduce speeding and enhance safety for Seattle students.*
Great Places for People- Westlake Avenue

- Main North-South Transit Arterial in South Lake Union
  - New Transit Lanes
  - Upgraded Transit Stop Facilities
  - Signal Improvements
  - Widened Sidewalks
  - RapidRide C Line Extension
Speed, reliability, and bus stops

Combining innovative signals and transit lanes

- Northbound Westlake Avenue transit lane plan includes:
  - Bus stop extensions to accommodate two-three articulated bus at all stops
  - Curb lane queue jump into center-running transit lane
  - Center lane straight-through signal
  - Center lane queue jump into curb lane
  - Several turn restrictions for GP traffic
Great Places for People- Westlake Avenue

PROJECT FEATURES

**More bus service** means there is room for hundreds of more people.

**Benefits:** Increased mobility, affordable transportation options

**Dedicated transit lanes** allow streetcars and buses to bypass traffic, reducing delay and making for a smoother, more predictable ride.

**Benefits:** Faster, more reliable service

**Wider sidewalks and longer bus stops** allow buses to board passengers without having to pull out and back into traffic. They also provide space for more buses and streetcars, shelters and real-time information kiosks.

**Benefits:** Faster, more reliable service, rider comfort, sidewalk space

BY THE NUMBERS

**Service**
- 40 buses and streetcars can move up to 2,800 people between 5 and 6 PM on Westlake alone

**Reliability**
- Doubling the number of people using transit along Westlake Ave N between 5 and 6 PM is the equivalent of adding another travel lane

**Growth**
- 65,000 people live in Center City Seattle and 25 new jobs a day are being added
Westlake Avenue

Two lanes closed on Westlake Avenue ... and nobody noticed

Originally published April 1, 2016 at 9:05 pm | Updated April 2, 2016 at 12:33 pm

Lots of people figured the city’s plan to kick cars out of two lanes of Westlake Avenue downtown would obviously cause more traffic gridlock. Then two weeks ago the city went ahead and did it.

What would happen if you kicked cars off half the lanes of a big downtown arterial?

Probably gridlock. Right?

That was pretty much the feeling a year ago when the city proposed dropping two car lanes from more than a mile of busy Westlake Avenue North downtown to make way for transit. The Seattle Times story on this in March 2015 was greeted by 488 online comments, most of them lampooning it as a traffic disaster in the making.
Westlake Avenue

Says city traffic engineer Dongho Chang: “We haven’t heard of any operational issues with Westlake so far.” That’s engineer-speak for: “It’s working!”

South Lake Union transit lanes

The city closed two lanes of Westlake Avenue North to cars on March 21, making them transit only.

I drove Westlake four days this week, morning and evening, curious to see what it’s like when a big downtown road is put on a diet.

It’s early, but the cars are flowing about as freely in one lane as they did in two. How is that possible?
Westlake Avenue
Westlake Avenue
Better Transit Stop Environment, Q Jump
Better Transit Stop Environment, Q Jump
Westlake Avenue

• C Line ridership is up 27%, about 2,300 new daily rides
• D Line ridership is up 23%, over 2,600 new daily rides
• Rt 40 ridership is up 23%, over 2,000 new daily rides
Westlake Avenue

- C Line on-time performance increased from 80.7% to 84.9%.
- D Line on-time performance increased from 81.4% to 86.7%.
Westlake Avenue

- Average morning travel times between Westlake Ave N & 8th Ave N and 3rd Ave & Virginia St dropped by 1.23 minutes (1 minute, 14 seconds); a 10% decrease in travel times.
- Average afternoon travel times between Westlake Ave N & 8th Ave N and 3rd Ave & Virginia St dropped by 0.83 minutes (50 seconds); a 5% decrease in travel times.
Vibrant Complete Streets
School and Greenway Crossing Pilot

• Build appropriate crossing treatment necessary for users.
• Count/evaluate afterward for effectiveness. Revise as needed.
Aurora Avenue (SR 99) and N 92\textsuperscript{nd} St

- 92\textsuperscript{nd} 6 crashes (3yrs prior to project). No crashes (16 month after)
- 88\textsuperscript{th}-94\textsuperscript{th} (26% drop in all crashes, 47% drop in injury crashes)
Lake City Way (SR 522) and NE 82\textsuperscript{nd} St

PROPOSED NEIGHBORHOOD GREENWAY CONNECTIONS

- Northgate Link Light Rail (2021)
- Olympic View Elementary
- Sacajawea Elementary
- Seattle Waldorf School
- Our Lady of the Lake School
- Maple Leaf Recreation Park
- Wedgwood Elementary
- North Seattle College

Future Lake City Neighborhood Greenway - Funded for 2021 Construction

Proposed Crossing Improvement Lake City Way NE and NE 62nd St

Curb barrier
New crosswalk
New bike crossing
Expanded island
New curb bulb
New crossing signal
New no parking zone
New curb ramp
New one way out
Intersection Control Context

Counts Noon to 1 pm
Wednesday - 7/20/2011
3,639 Pedestrian Crossings
571 Vehicle Crossings
Collision = 10 year period

Western Avenue at Virginia Intersection Operations

Signal Phasing Diagram

| Pike and 1st Ave 1-2 pm, Thursday 4/24/03 | 1187 pedestrians (scramble) 1107 Vehicle Crossing 2 Phase signal |

Pedestrian Service
Pedestrians have the highest service priority. No delay when crossing. All vehicles come to a complete stop ensuring safest crossing.

Traffic Speeds
Traffic speeds are low due to the all-way stop and the pedestrian crossing activity. Lower speeds encourages bicyclist usage to the Market, Pike Place Market and Vicentia Steichen Park.

Impact to Street
Little impact.

Flexibility
Operates as all-way stop, even when there is little pedestrian traffic during off-peak times.

Traffic Signal
Pedestrians have an all-way walk phase. Pedestrians crossing diagonally. Pedestrians must wait for signal, creating crowding at the crosswalk landings. Will need to increase the waiting area.

Vehicle speeds will increase as traffic will be able to flow through the intersection on green light. Higher traffic speeds on Western Avenue makes Pike Place Market and Vicentia Steichen Park more integrated for pedestrians.

Table:

<table>
<thead>
<tr>
<th>All Way Stop</th>
<th>Traffic Signal</th>
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Questions?

Dongho.chang@seattle.gov | (206) 684-5106

www.seattle.gov/transportation