



Bellevue Pedestrian & Bicycle Implementation Initiative

Transportation Commission
January 28, 2016

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Transportation Department
City of Bellevue



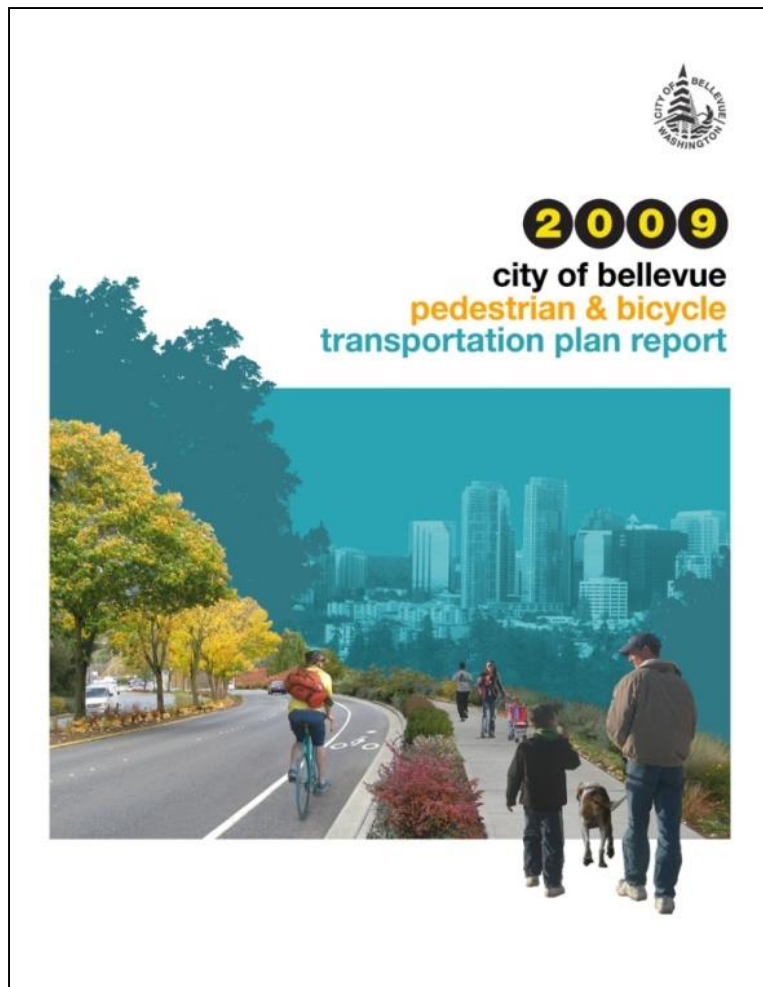
- 1) **12/10/15 TC Meeting Summary**
- 2) **Travel Lane Width Flexibility**
- 3) **RIP Conceptual Layouts**
- 4) **RIP Next Steps**





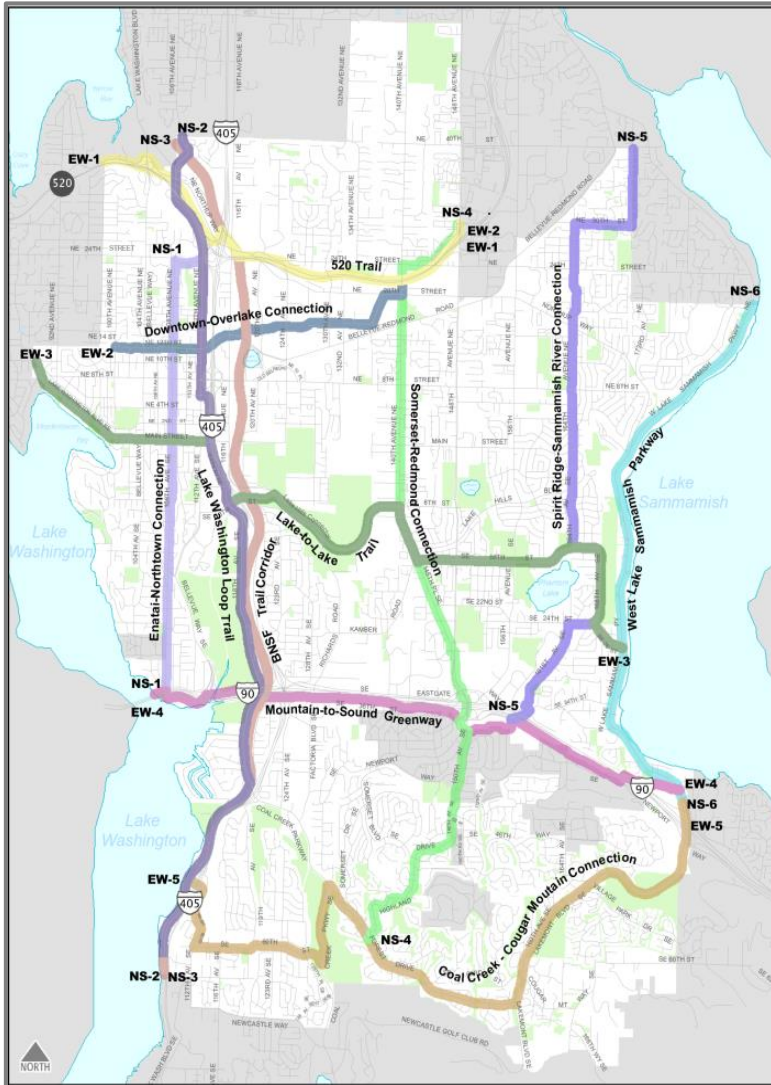
- 1) **2009 Pedestrian and Bicycle Plan**
- 2) **PBII Council Direction**
- 3) **Rapid Implementation Program**
- 4) **Connected + Protected + Rapid (CPR)**





Ordinance No. 5861 (2/17/2009)

- Formulated vision, goals, objectives.
- Assessed gaps in the non-motorized network.
- Established performance targets.



2014 Performance Target:

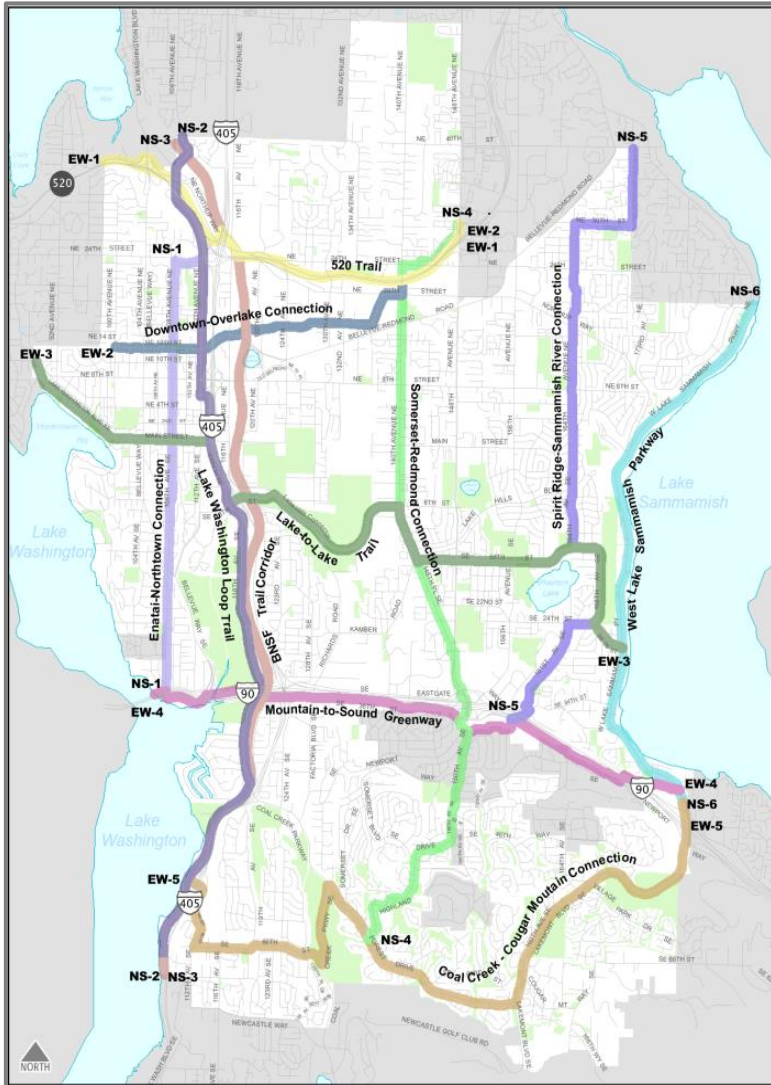
“Within 5 years, implement at least one completed and connected east-west and north-south bicycle route through Downtown Bellevue.”

- 2009 Pedestrian & Bicycle Transportation Plan



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Priority Bicycle Corridors



2019 Performance Target:

“Within 10 years, implement at least two completed, connected, and integrated north-south and at least two east-west bicycle routes that connects the boundaries of the city limits, and connects to the broader regional bicycle system.”

- 2009 Pedestrian & Bicycle Transportation Plan



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Priority Bicycle Corridors

Bellevue City Council

Claudia Balducci
Mayor

Kevin Wallace
Deputy Mayor

John Chelminiak
Councilmember

Conrad Lee
Councilmember

Jennifer Robertson
Councilmember

Lynne Robinson
Councilmember

John Stokes
Councilmember

PBII Program Principles

To guide the Transportation Commission in its oversight of the PBII, the Bellevue City Council approved the following set of **Program Principles**:

The City Council envisions an accessible, well-connected network of pedestrian and bicycle facilities for Bellevue that (i) enhances livability, (ii) supports economic vitality, and (iii) serves the mobility needs of people of all ages and abilities. The Council developed the following set of Program Principles to direct the Pedestrian & Bicycle Implementation Initiative, a complement of action-oriented efforts that advance non-motorized facility designs and programs identified by the 2009 Pedestrian and Bicycle Transportation Plan to meet or exceed the City's 2019 targets and position the City to realize its long-term vision for a walkable and bikeable Bellevue.

1. Continue to aspire to the vision established by the 2009 Pedestrian and Bicycle Transportation Plan, pursue its goals, which should not be diluted, and monitor its established measures of effectiveness.
2. Undertake an action-oriented initiative that advances projects and programs to help realize the City's vision.
3. Provide a safe pedestrian and bicycle environment, which is a prerequisite to making non-motorized travel a viable, attractive option in Bellevue.
4. Advance the implementation of Bellevue's planned Bicycle Priority Corridors to facilitate continuous bicycle travel along a connected grid of safe facilities throughout the city and the region.
5. Research pedestrian and bicycle count technologies to improve the City's data driven decision-making.
6. Determine where pedestrian and bicycle investments can improve the connectivity of the multi-modal transportation system.
7. Coordinate with other efforts underway in Bellevue related to pedestrian and bicycle issues.
8. Identify partnership opportunities to advance the implementation of non-motorized projects and programs.
9. Engage community stakeholders in setting the priorities for investment in non-motorized facilities.
10. Refine existing metrics to track plan progress and engage other departments as needed to foster a One City commitment to active transportation.

Continue to aspire to the vision established by the 2009 Pedestrian and Bicycle Transportation Plan, pursue its goals, which should not be diluted, and monitor its established measures of effectiveness.

- Approved by the Bellevue City Council (February 2015)



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Advance the implementation of Bellevue's planned Bicycle Priority Corridors to facilitate continuous bicycle travel along a connected grid of safe facilities throughout the city and the region.

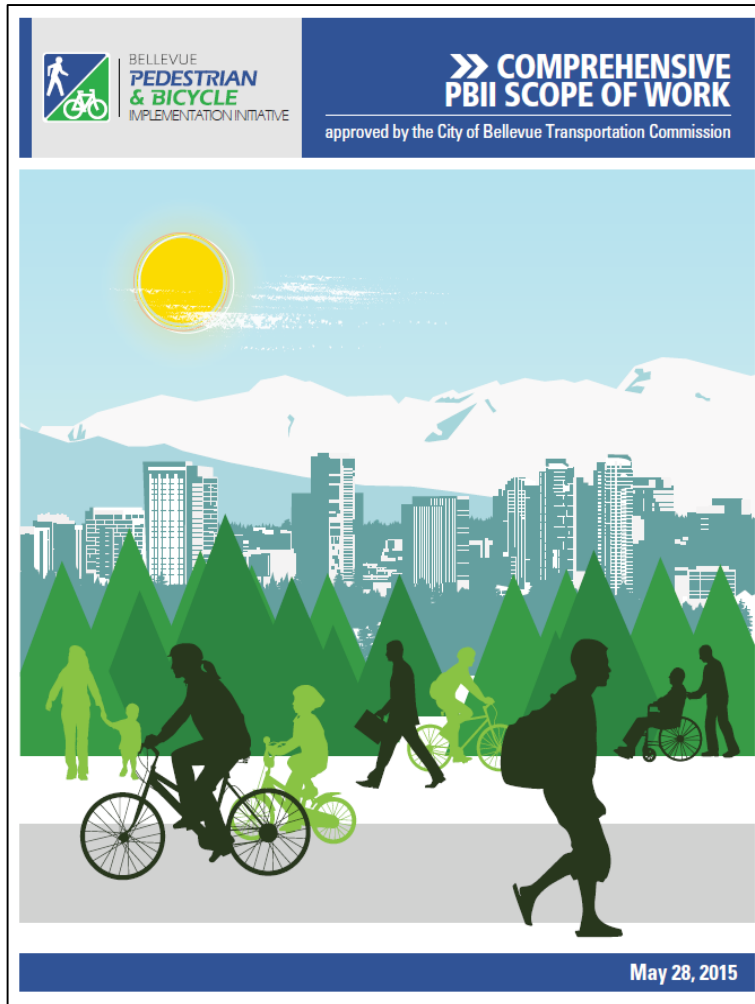
- Approved by the Bellevue City Council (February 2015)



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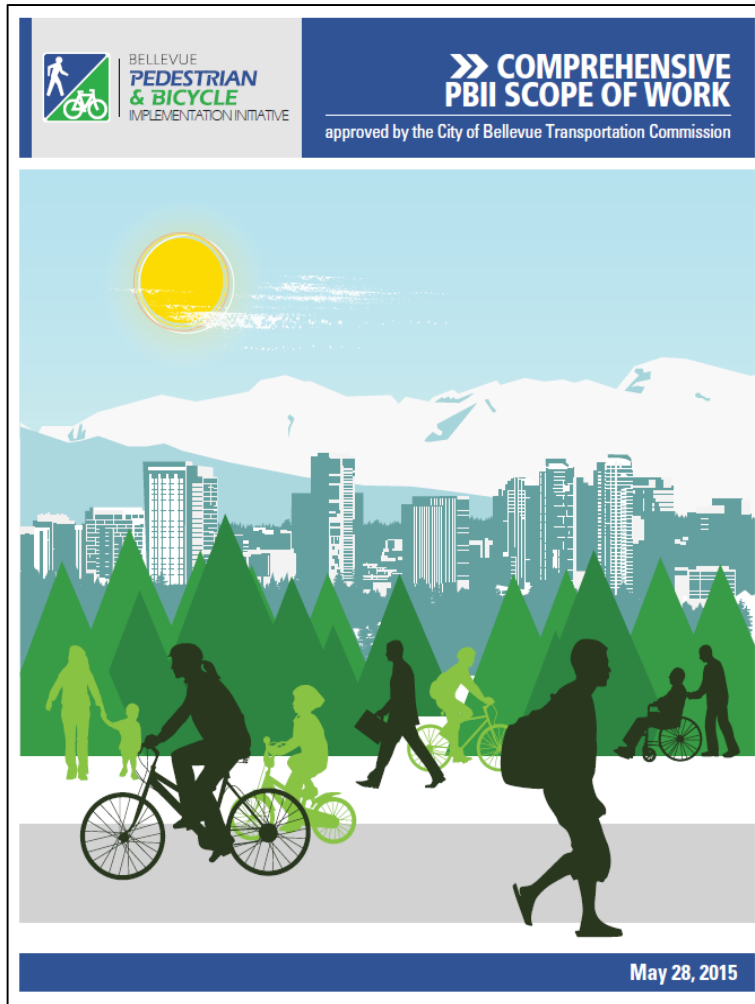
PBII Program Principles

Council support for a unified and recognizable strategy that:



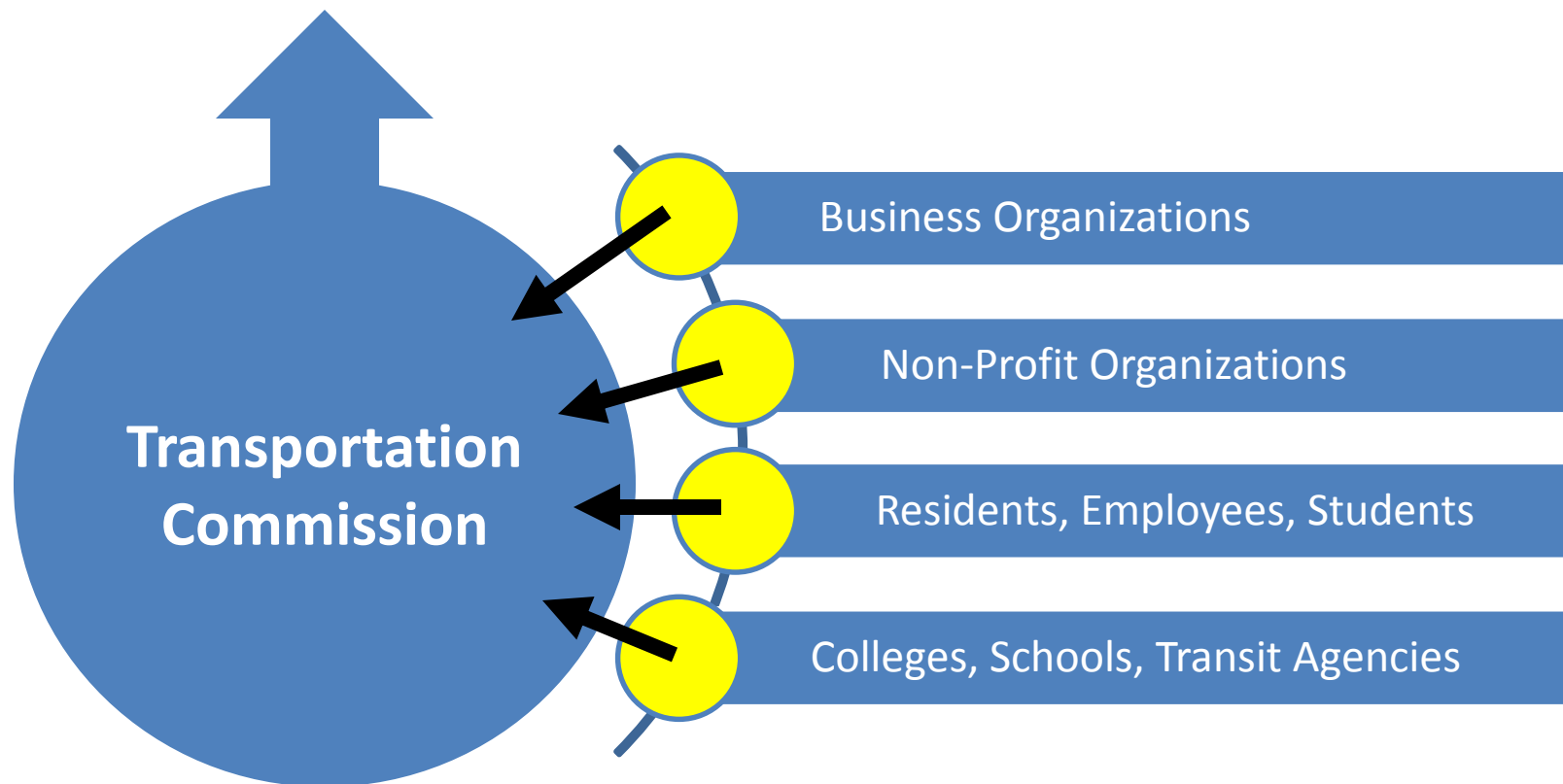
- Links planning with implementation
- Promotes coordinated solutions (5Es)
- Advances a “Complete Streets” philosophy
- Considers creative & affordable strategies
- Leverages best practices and innovative tools
- Investigates “Vision Zero” techniques
- Advances demonstration projects
- Identifies early-win opportunities
- Balances the needs of various roadway users
- Maximizes construction efficiencies
- Promotes physically separated facilities
- Prioritizes “filling the gaps”
- Engages stakeholders early

Council support for a unified and recognizable strategy that:



- Links planning with implementation
- Promotes coordinated solutions (5Es)
- Advances a “Complete Streets” philosophy
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- **Identifies early-win opportunities**
- Balances the needs of various roadway users
- Maximizes construction efficiencies
- **Promotes physically separated facilities**
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- Engages stakeholders early

Bellevue City Council



- 1. Ped-Bike Safety Assessment Report**
- 2. Bicycle Priority Corridor Design Report**
- 3. Transit Master Plan Integration Report**
- 4. Implementation/Funding Strategy Report**
- 5. Count Technology Report**
- 6. Bike-Share Implementation Report**
- 7. Performance Management Report**



1. Ped-Bike Safety Assessment Report
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6. Bike-Share Implementation Report
7. Performance Management Report



The Rapid Implementation Program (RIP) strives to fill gaps **[Connected]** along the Priority Bicycle Corridor (PBC) network, and planned bicycle network, with facilities that appeal to “interested but concerned” bicyclists **[Protected]**. The RIP approach emphasizes implementation of low cost/ short timeframe **[Rapid]** projects.



Effectiveness: 2009 Plan targets

- Connected-Protected-Rapid (CPR) Emphasis
- Bicycle Friendly Community “Silver Level”
- Practical Design: “Right Project, Right Time for the Right Cost, in the Right Way”



TFP Allocation: \$22M

- Engineering - “Paint/Post Ready” emphasis
- Education, Encouragement, Enforcement, Evaluation

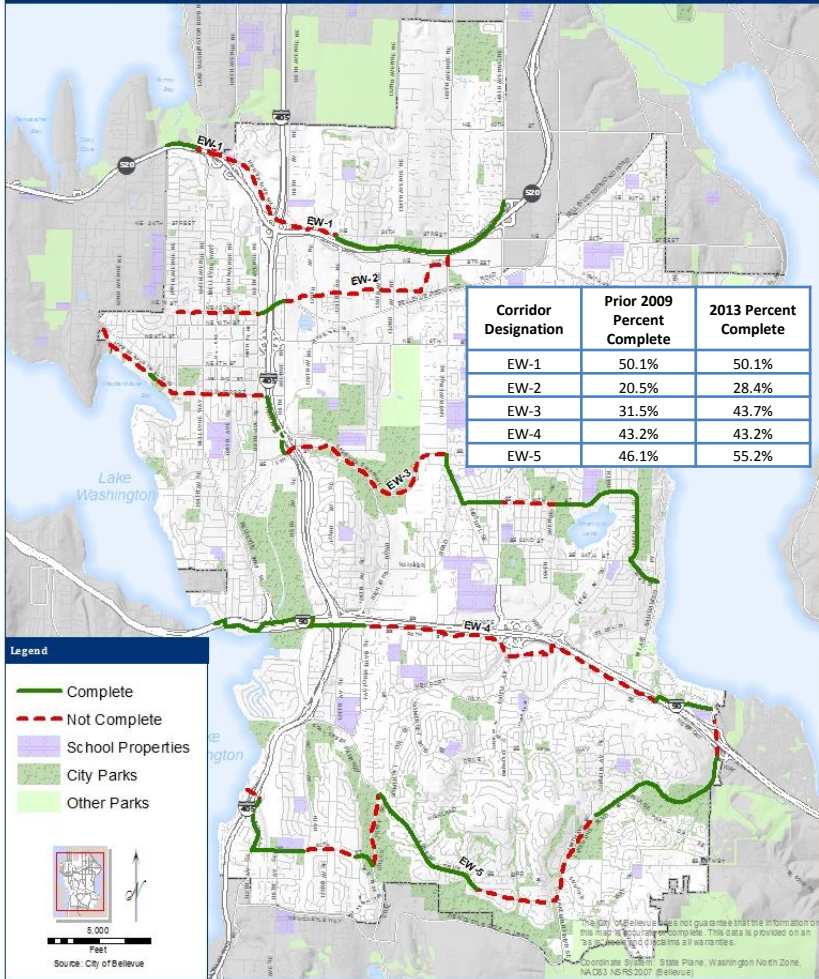


Timeframe: Years 1-3

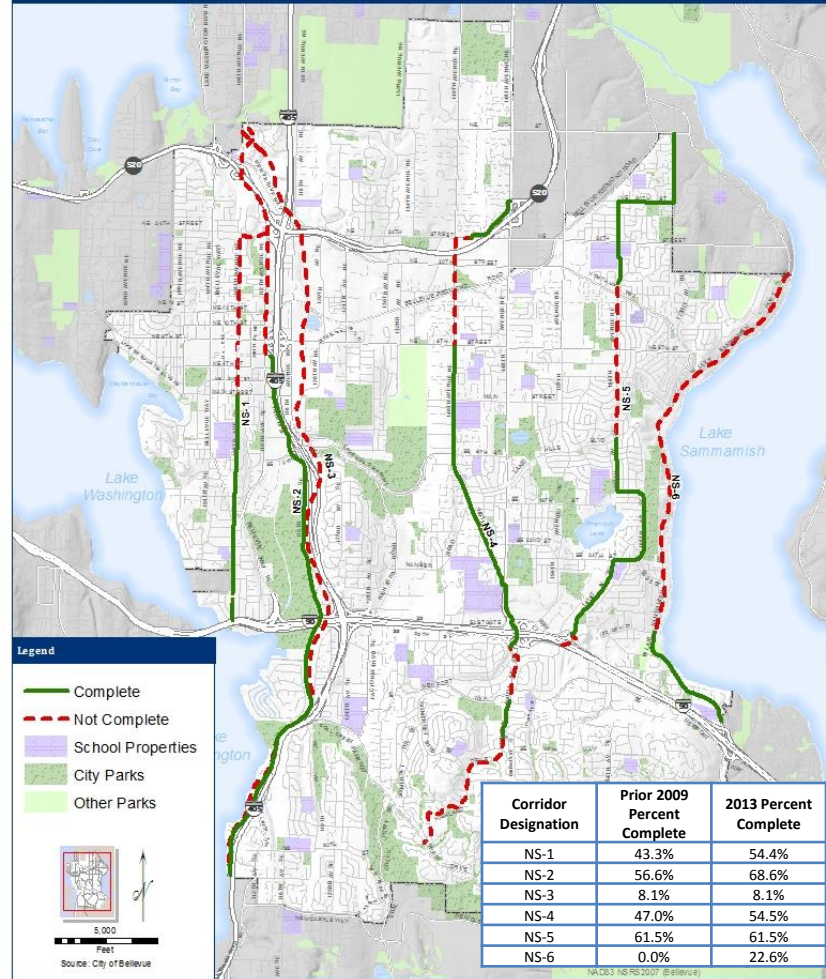
- Start with quickest and most inexpensive improvements (low cost + big wins)



E-W Priority Bicycle Corridors Completion Status 2013

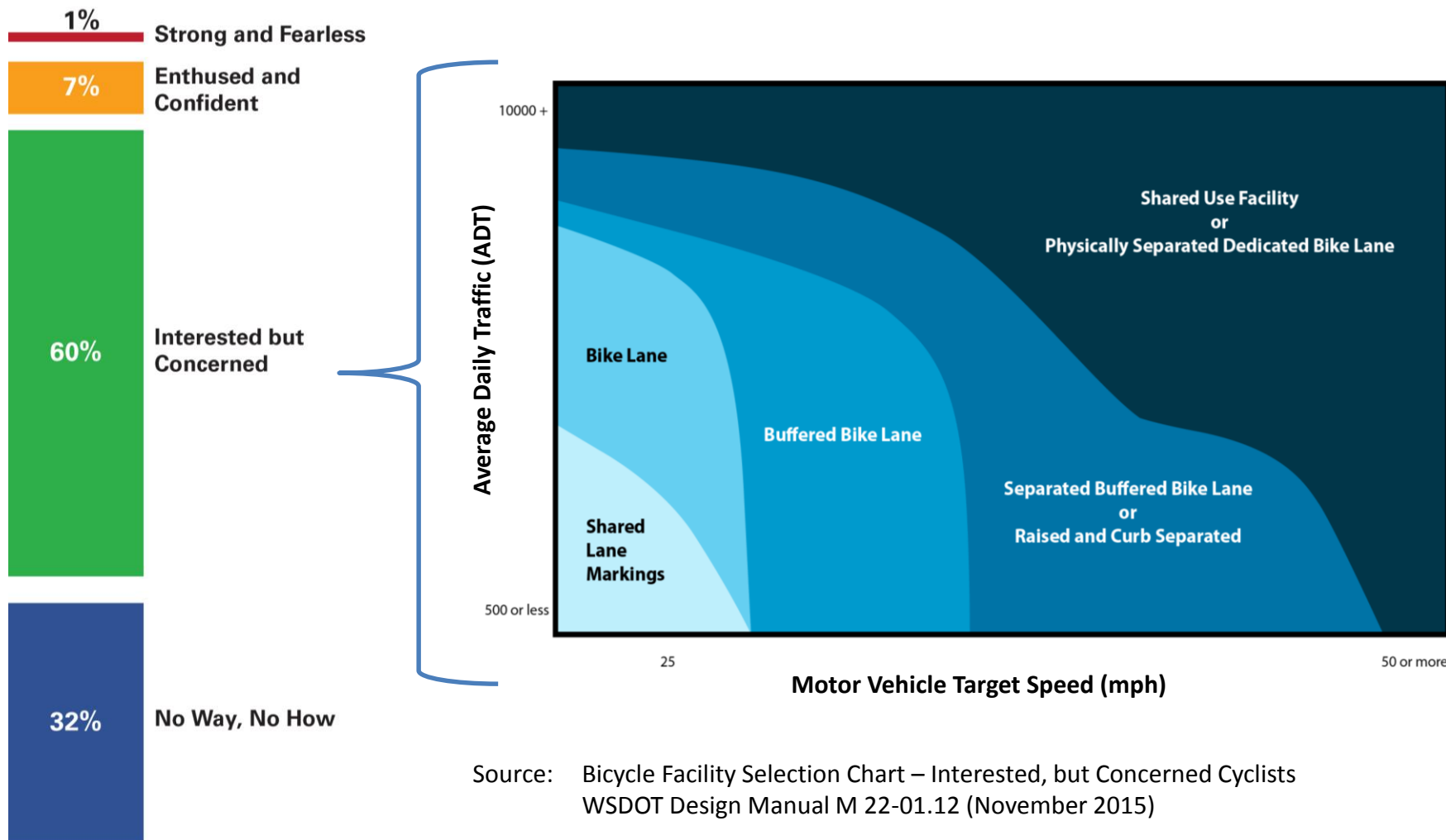


N-S Priority Bicycle Corridors Completion Status 2013



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Connected Solutions



Striped Buffer & Delineator Post



Paint & Delineator Posts



Turtle Bumps



Large Bumps



Oblong Low Bumps



Linear Barrier



Precast Barrier Curb



Parked Cars



Jersey Barriers



Planters



Rigid Bollards



Cast in Place Barrier Curb

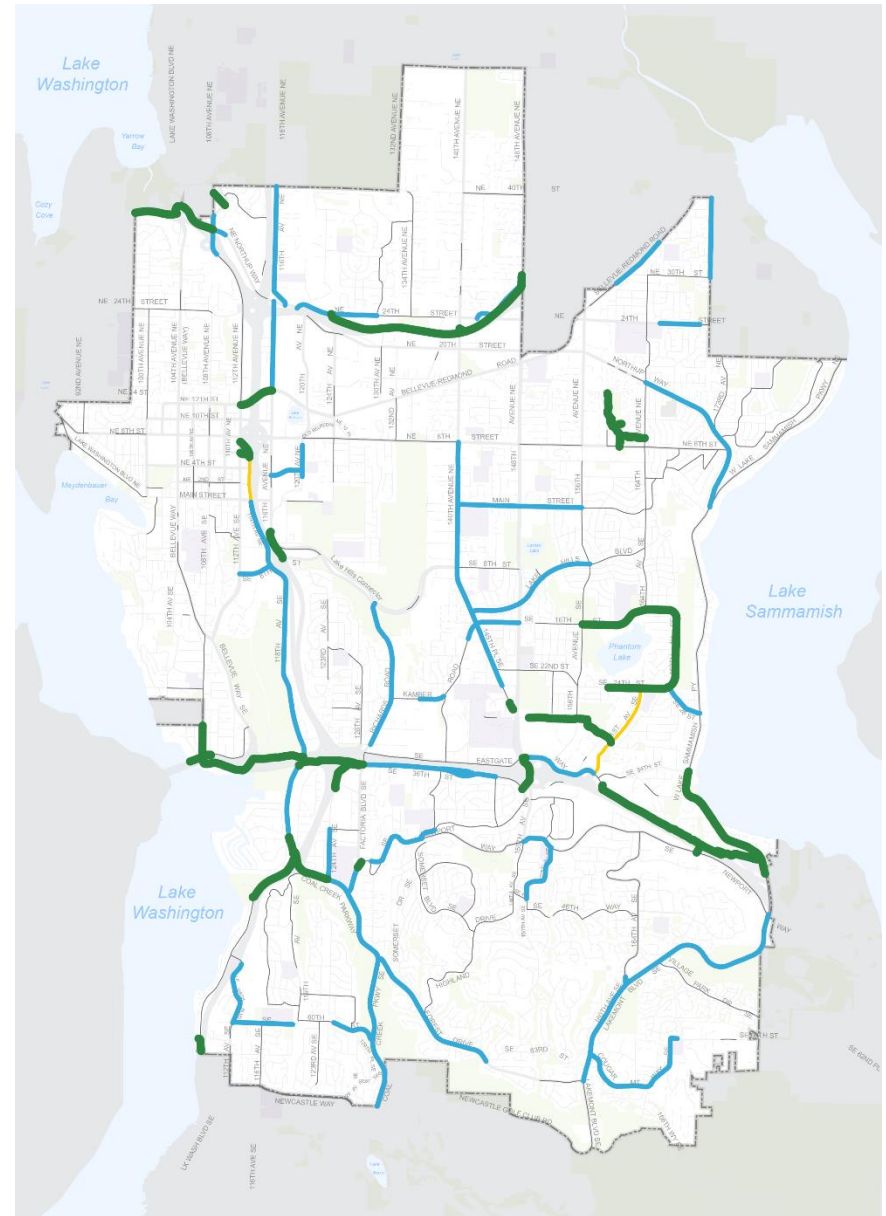


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Rapid Solutions

GENERALIZED FACILITY TYPES

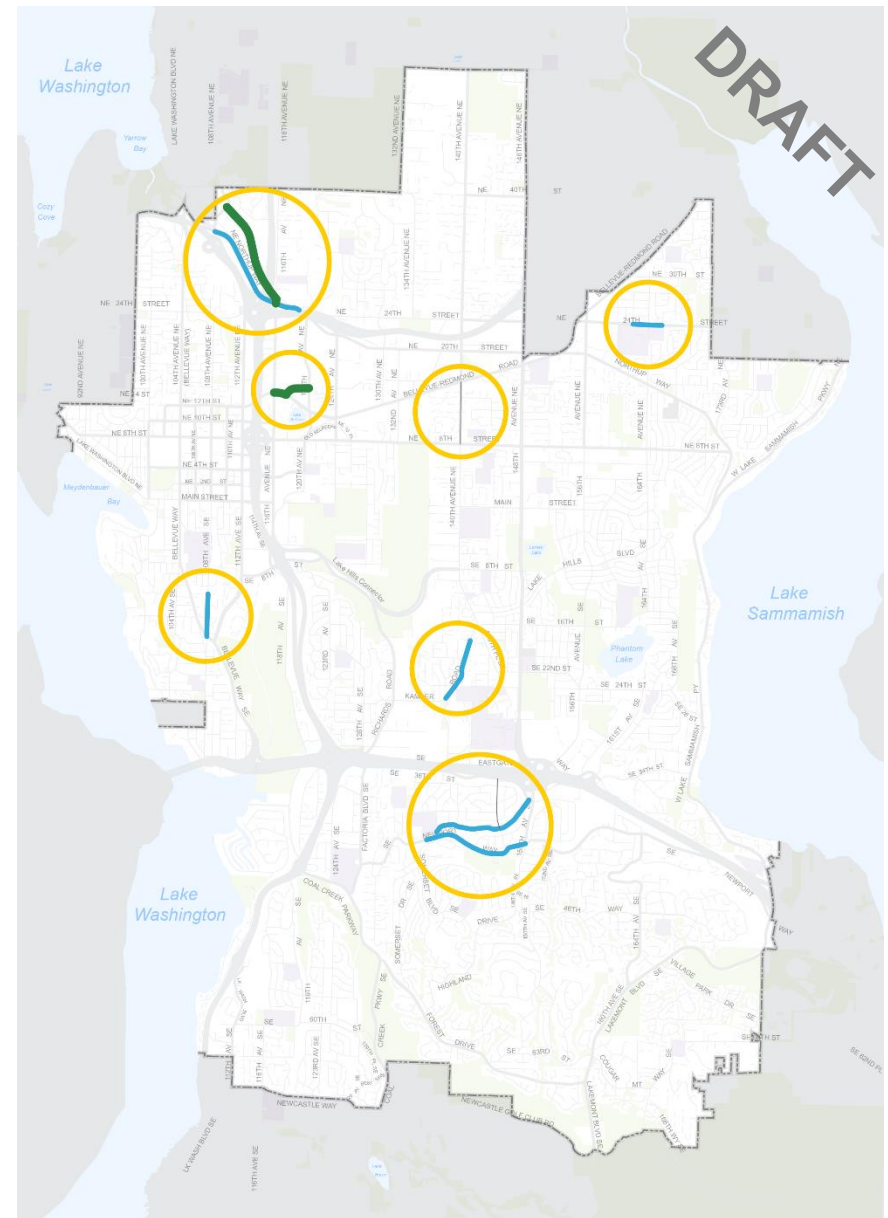
-  **Offstreet Paths**
-  **Separated Bike Lanes**
-  **Conventional Bike Lanes**
-  **Marked Bike Routes**
-  **Unmarked Shared Roadways**
-  **Other Roads**



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Separated Bike Lanes

Other Roads

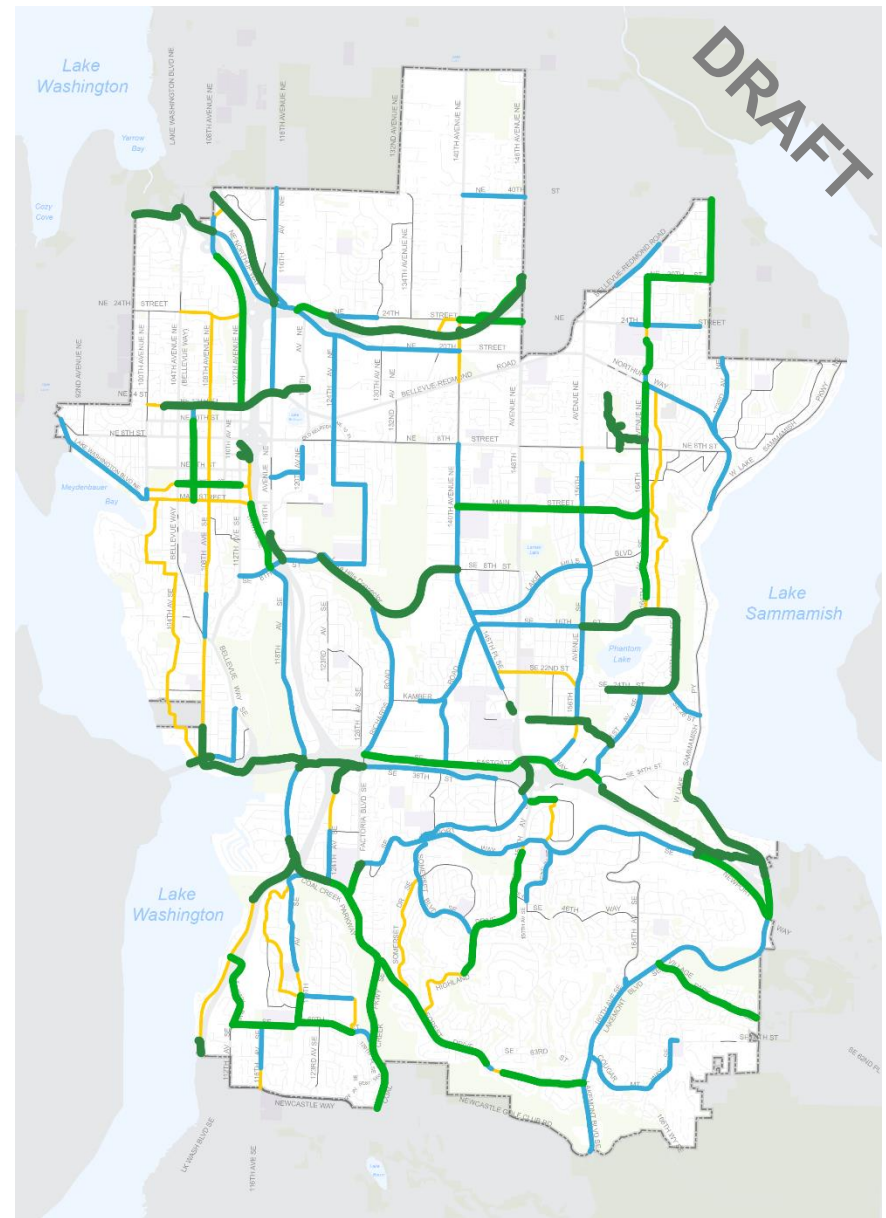


Other Roads



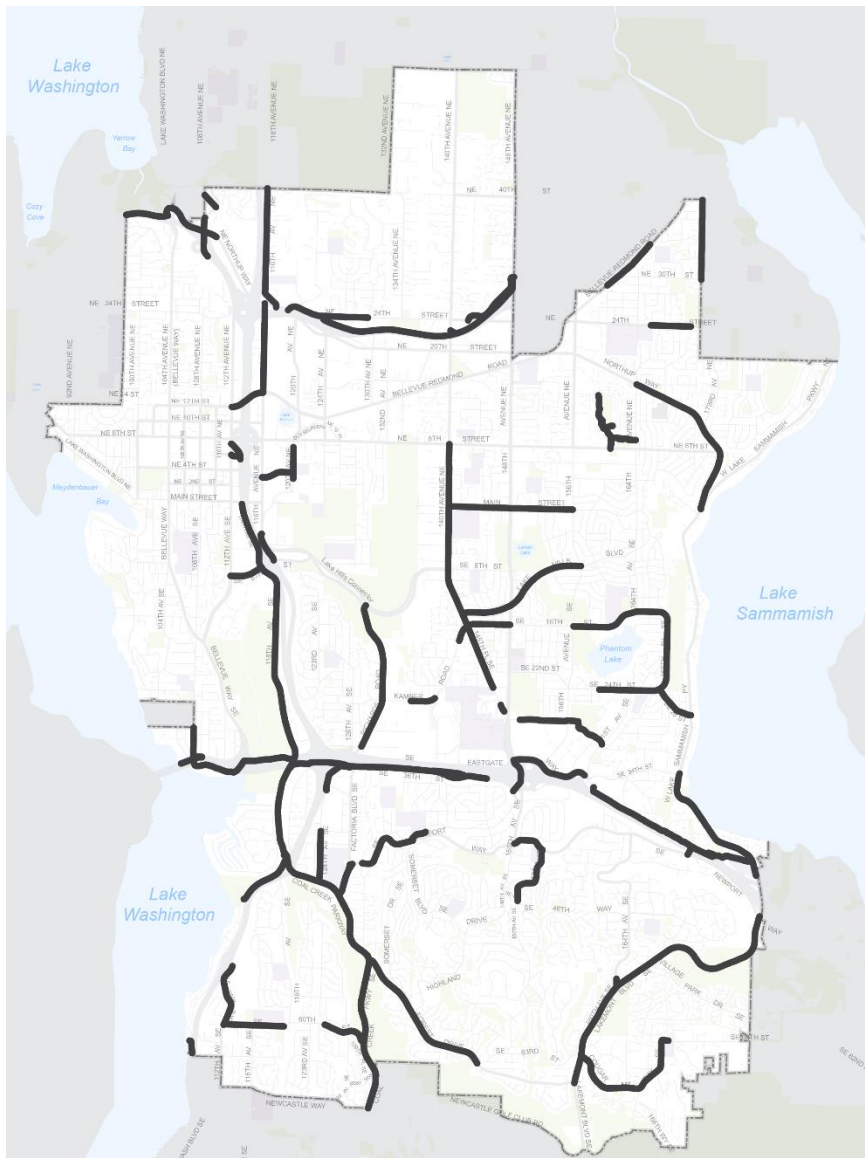
GENERALIZED FACILITY TYPES

-  **Offstreet Paths**
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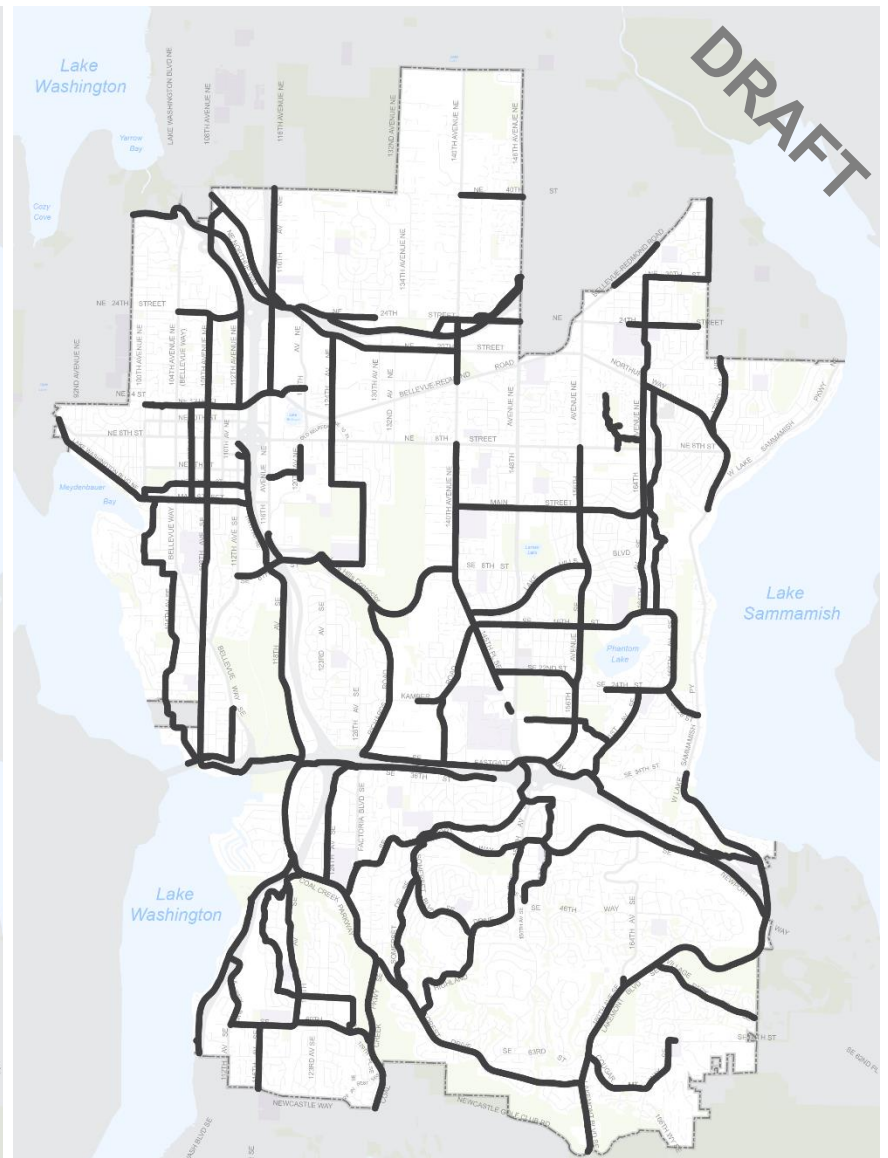


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Connected Network



Existing Bicycle Network



RIP Budget Proposal Network



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Connected Network

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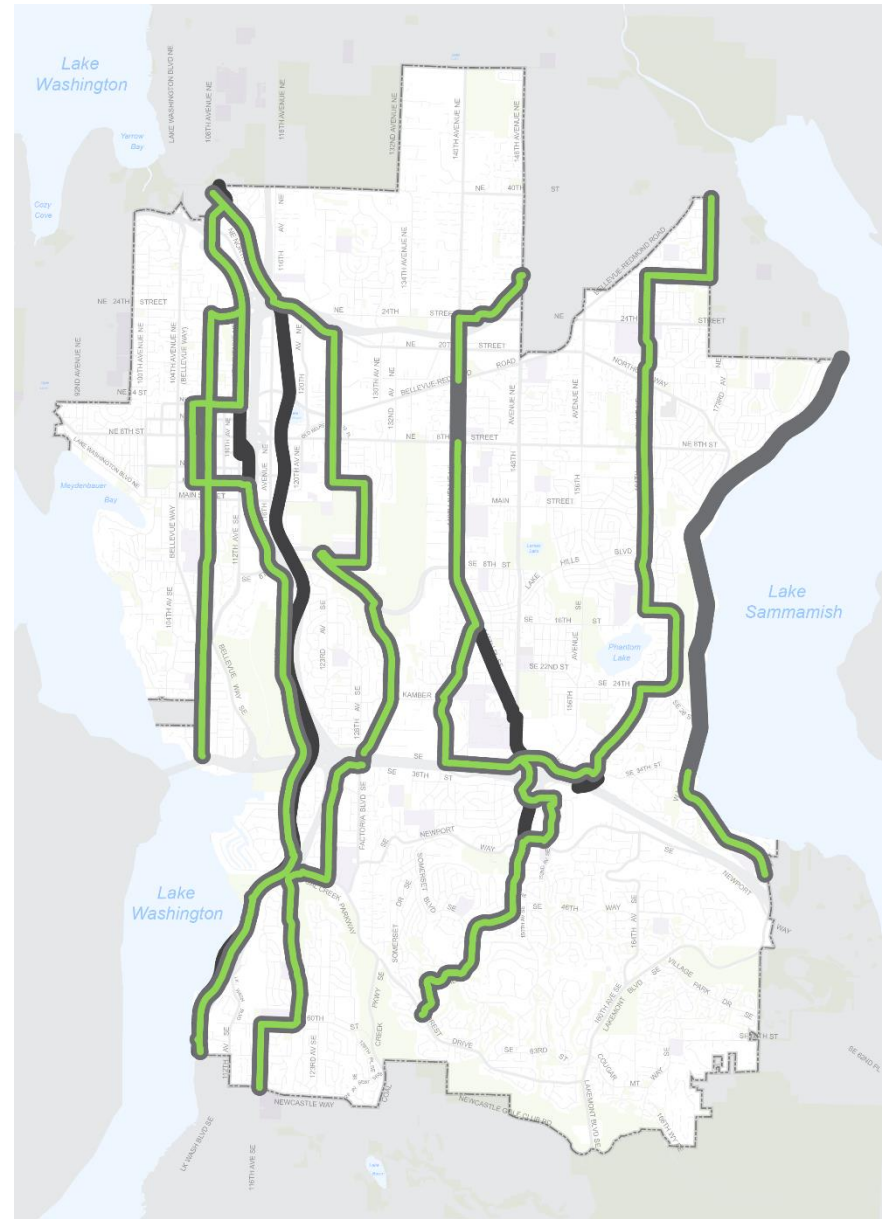
PBC + Pipeline Projects + RIP



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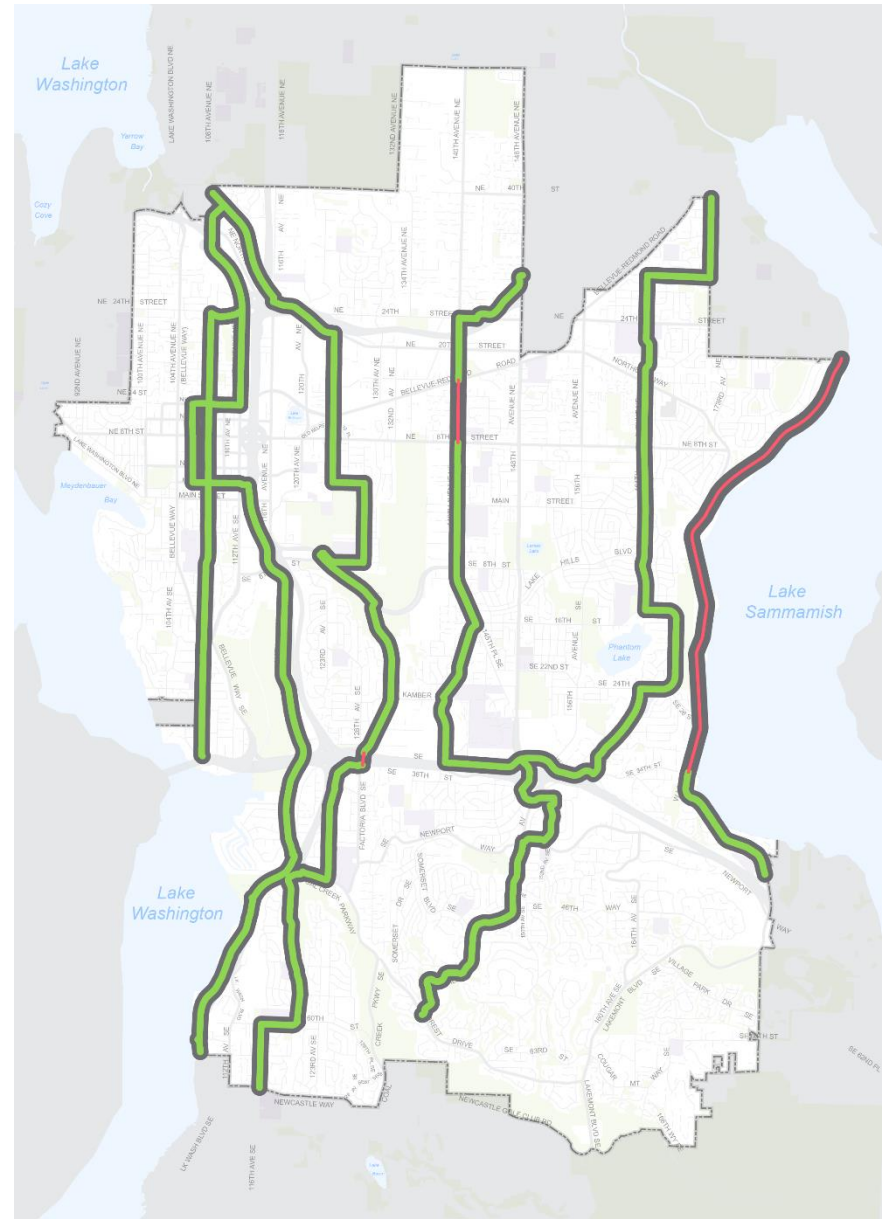


Completion status of 2019 cross-city bicycle connections and their relationship to PBCs. Shows that NS-1, NS-2, and NS-5 are all fully continuous end-to-end.



Map highlighting remaining gaps in the other cross-city connections.

- ***NS-3 is continuous except for a gap at Factoria Blvd underpass of I-90.***
- ***NS-4 is continuous except for a gap on 140th Ave NE between NE 8th St and Bel-Red Road.***
- ***NS-6 is complete except for remaining gap on West Lake Sammamish Parkway.***



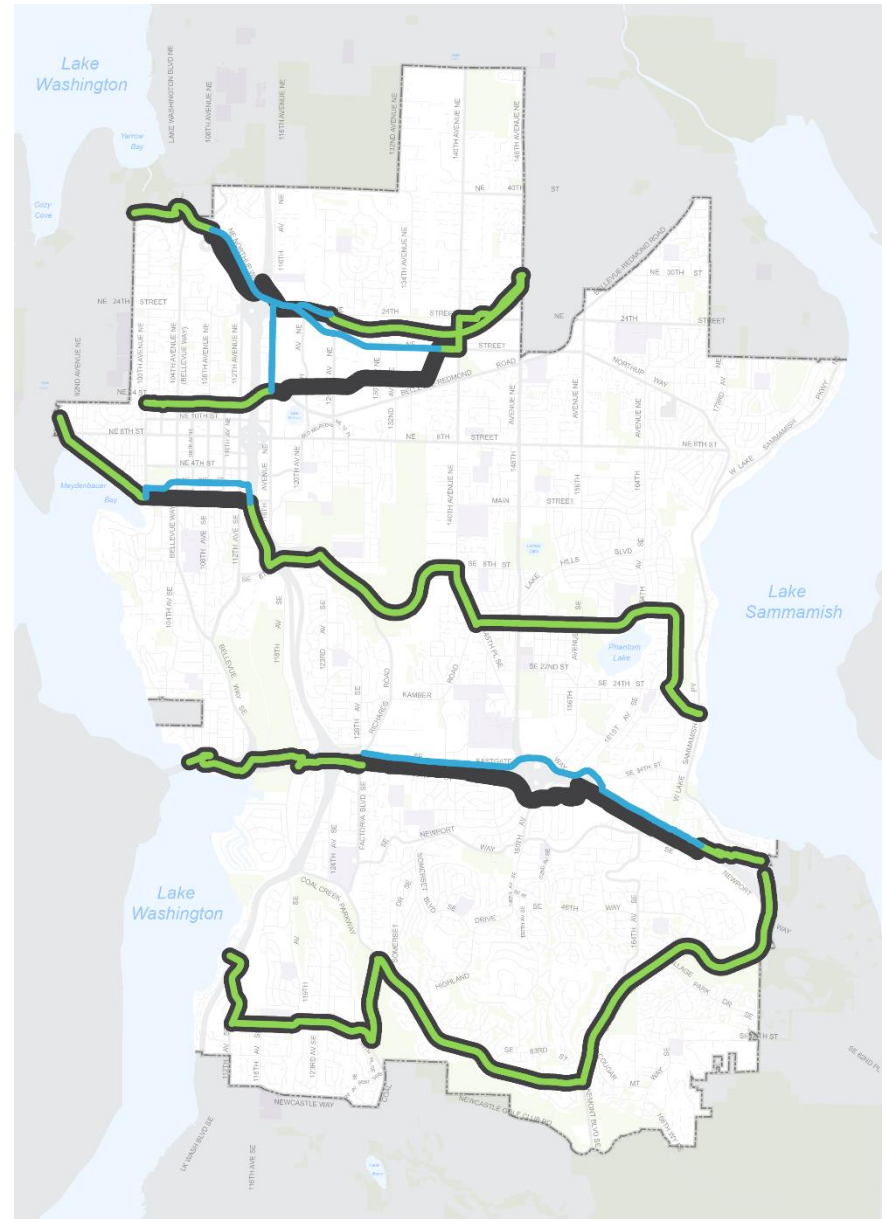
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PBC + Pipeline Projects + RIP



***Parallel corridors
where projects
that can help to
close gaps in the
PBCs where rapid
improvements
are not possible.***



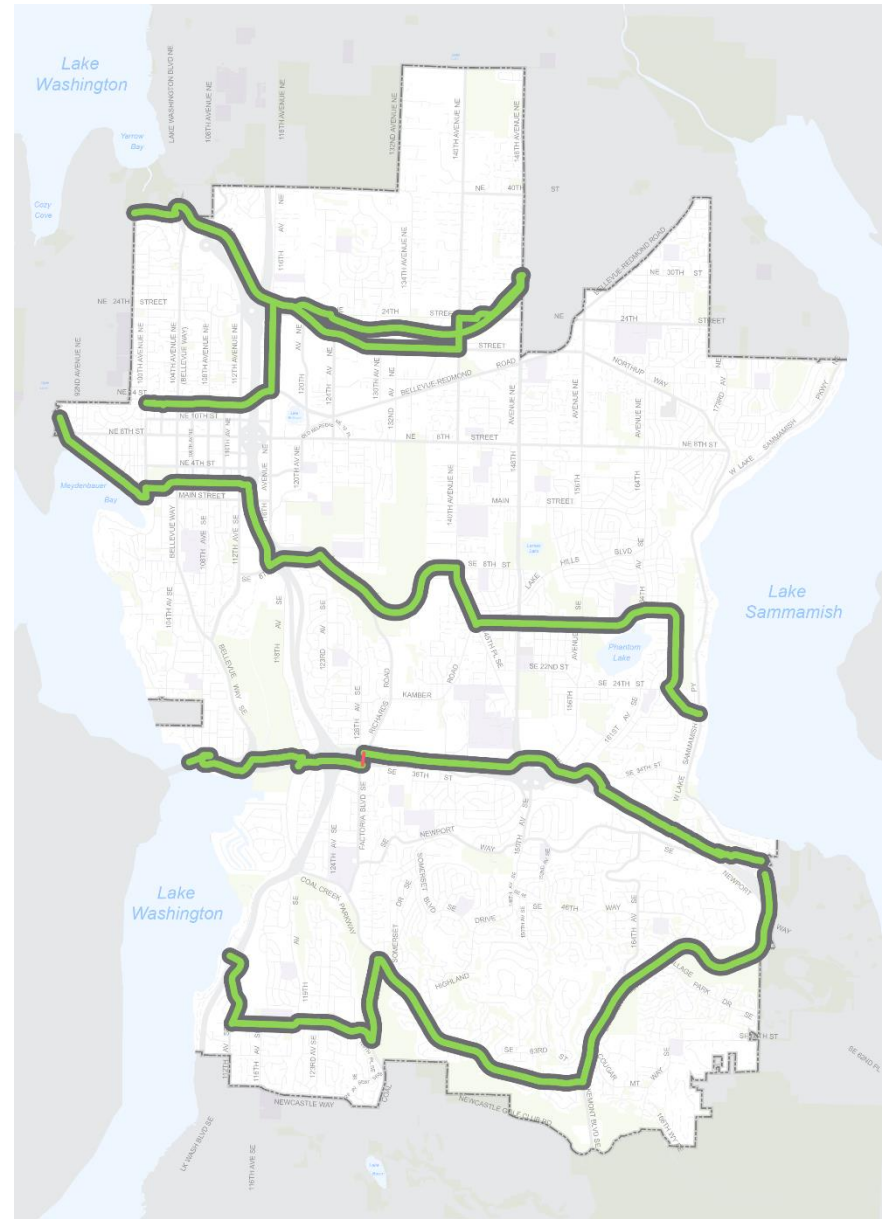
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Filling the Gaps

Connected Network

Map highlighting remaining gaps in the other cross-city connections.

- ***EW-4 is continuous except for a gap at Factoria Blvd underpass of I-90.***
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Questions/Comments?



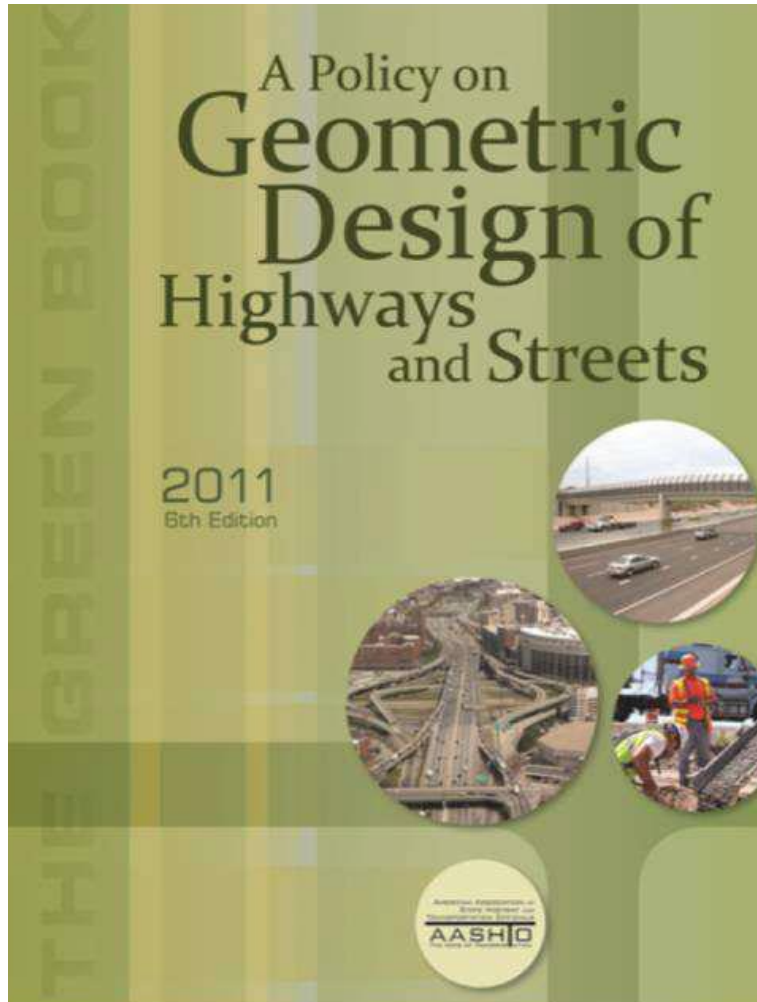
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Commission Discussion



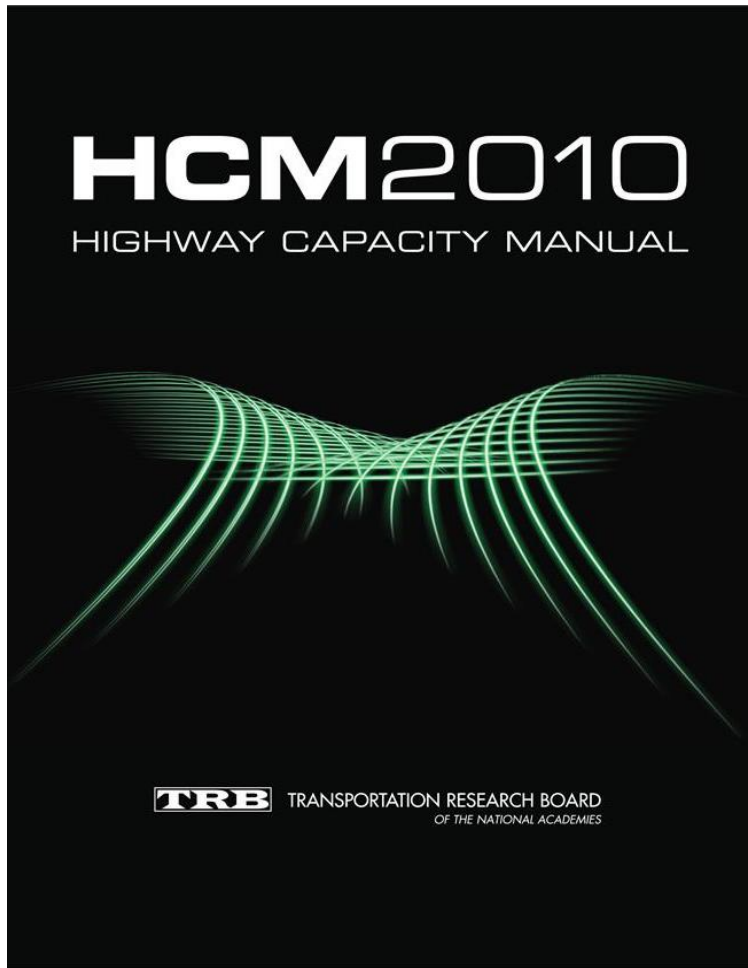
- 1) **The Green Book**
- 2) **Highway Capacity Manual**
- 3) **WA State Design Manual**
- 4) **NCHRP 17-26**
- 5) **Highway Safety Manual**





- Guidance for roadways in the United States.
- This is the basis for other standards for States and Local Governments.
- The Urban Arterials section of the manual states: “lane widths may vary from 10-feet to 12-feet.”
- Use of narrower lane widths would depend on the context of the road/intersection (traffic volumes, speeds, truck/bus traffic, others)
- Because of limited right of way and pavement widths, narrowing travel lanes to install bike lanes may be an appropriate solution instead of major construction.

Source: [A Policy on Geometric Design of Highways and Streets](#), 6th Edition. 2011



Adjustment Factor for Lane Width (f_{LW})

The values from *HCM* Exhibit 21-4 are used and directly based on the values of Data Item 54:

Lane Width	Reduction in <i>FFS</i> (mph; f_{LW})
12 ft.	0.0
11 ft.	1.9
≤ 10 ft.	6.6

Source: [Highway Capacity Manual](#) (HCM). Transportation Research Board. 2010.

Design Manual

M 22-01.12

November 2015

Division 1 – General Information
Division 2 – Hearings, Environmental, and Permits
Division 3 – Project Documentation
Division 4 – Surveying
Division 5 – Right of Way and Access Control
Division 6 – Soils and Paving
Division 7 – Structures
Division 8 – Hydraulics
Division 9 – Roadside Development
Division 10 – Traffic Safety Elements
Division 11 – Practical Design
Division 12 – Geometrics
Division 13 – Intersections and Interchanges
Division 14 – HOV and Transit
Division 15 – Pedestrian and Bicycle Facilities
Division 16 – Roadside Safety Elements
Division 17 – Roadside Facilities

Engineering and Regional Operations
Development Division, Design Office

- WSDOT revised the Practical Design Division of the Design Manual in Nov. 2015.
- A Practical Design approach means developing project alternatives that utilize the smallest dimensions that meet the need and desired performance.
- A prioritized bicycle mobility and safety performance target may result in reducing motor vehicle lane widths to provide a needed bike lane where appropriate.
- This approach does not introduce new or change City of Bellevue practices with respect to lane widths.

Source: WSDOT Design Manual. [Chapter 1106 – Design Element Dimensions](#). November 2015.

Potts, Harwood, and Richard

Relationship of Lane Width to Safety for Urban and Suburban Arterials

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Word Count: 5,894 + 9 tables = 8,144

TRB 2007 Annual Meeting CD-ROM

Paper revised from original submittal.

- Standard travel lane width 12 ft.
- Historically... Narrower lanes result in more crashes.
- Rural versus urban and suburban.
- Purpose: to investigate relationship between lane width and safety for streets and intersections.
- National Cooperative Highway Research Program (NCHRP) Project 17-26, Methodology to Predict the Safety Performance of Urban and Suburban Arterials

Source: Ingrid Potts, Douglas Harwood, and Karen Richard. "[Relationship of Lane Width to Safety on Urban and Suburban Arterials](#)." Transportation Research Board 86th Annual Meeting. 2007.

Relationship of Lane Width to Safety for Urban and Suburban Arterials

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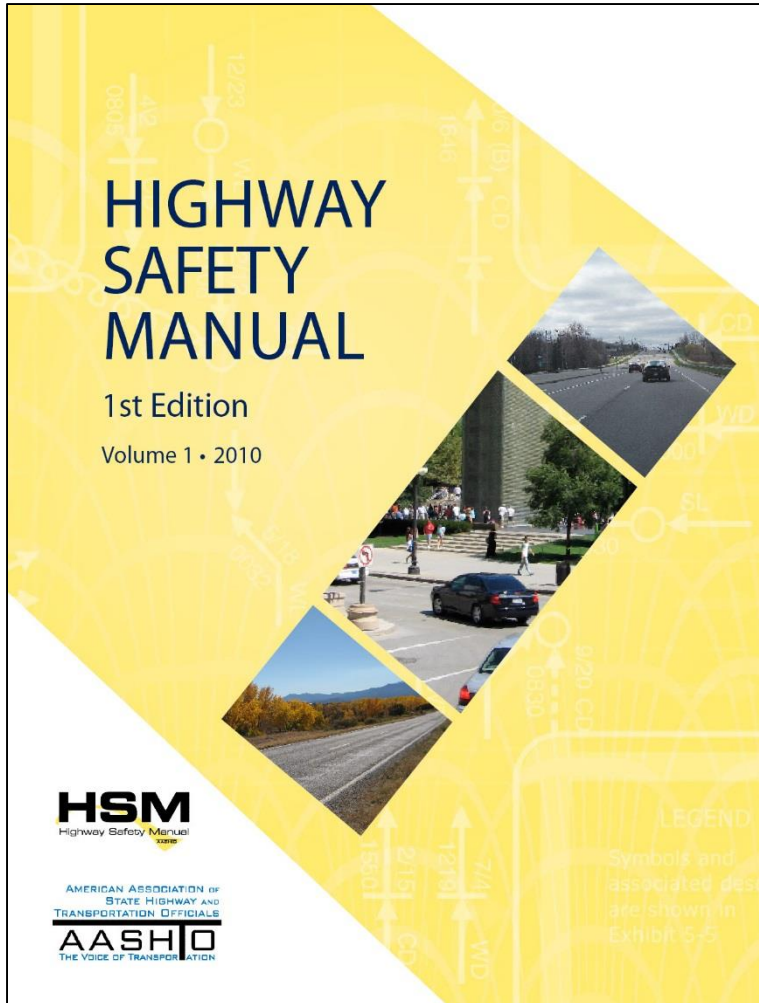
- (NCHRP) Project 17-26 Minnesota, Michigan and North Carolina.
- Study was conducted on both suburban and urban arterials.
- 408 miles, over 3000 roadway segments varied from 9ft to 13ft wide.
- Over 20,000 crashes within the 5 year study.
- 1342 intersection approaches.
- Over 10,000 crashes within the 5 year study.
- Research Published in 2007

Source: Ingrid Potts, Douglas Harwood, and Karen Richard. "[Relationship of Lane Width to Safety on Urban and Suburban Arterials](#)." Transportation Research Board 86th Annual Meeting. 2007.



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Effect on Traffic Safety



- (NCHRP) Project 17-26 was to develop prediction methodology for urban environment for the HSM.
- No consistent, statistically significant relationship between lane width and safety for urban roadway segments and intersection approaches.
- No indication that the use of narrower than 12 ft lanes increases crashes.
- Except in limited cases.

Source: [Highway Safety Manual](#). American Association of State Highway and Transportation Officials. 2010.



Questions/Comments?



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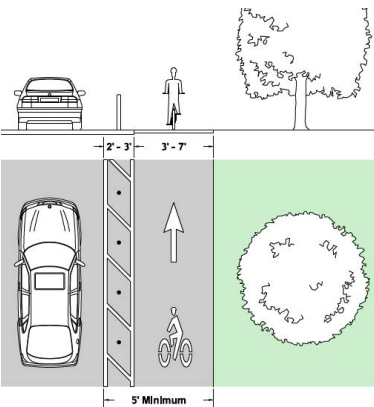
Commission Discussion



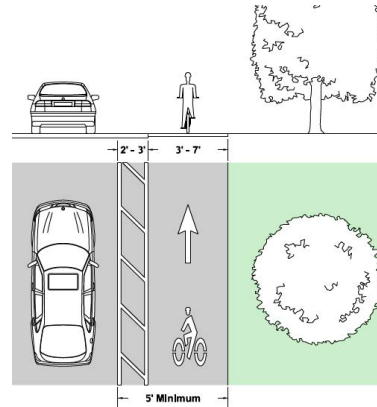
- 1) On-Street Bicycle Facilities
- 2) Summary Statistics
- 3) Corridor Assessments



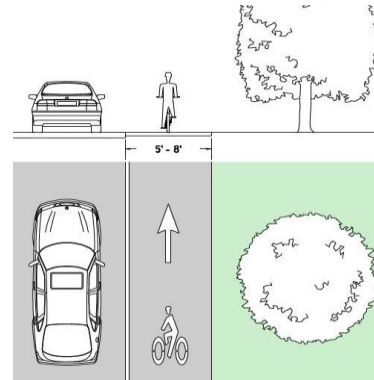
**Separated Buffered Bike Lane
(aka Protected Bike Lane)**



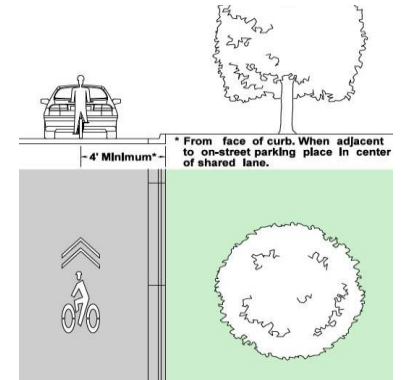
**On-Street Buffered
Bike Lane**



**Conventional On-Street
Bike Lane**



**Shared Lane Marking
(aka Sharrows)**



Source: WSDOT Design Manual. [Chapter 1520 – Roadway Bicycle Facilities](#). November 2015.



Bicycle Wayfinding



Curb Extension



Pavement Markings



School Zone Flashing Beacon



Traffic Diverter



Speed Hump



Questions/Comments?



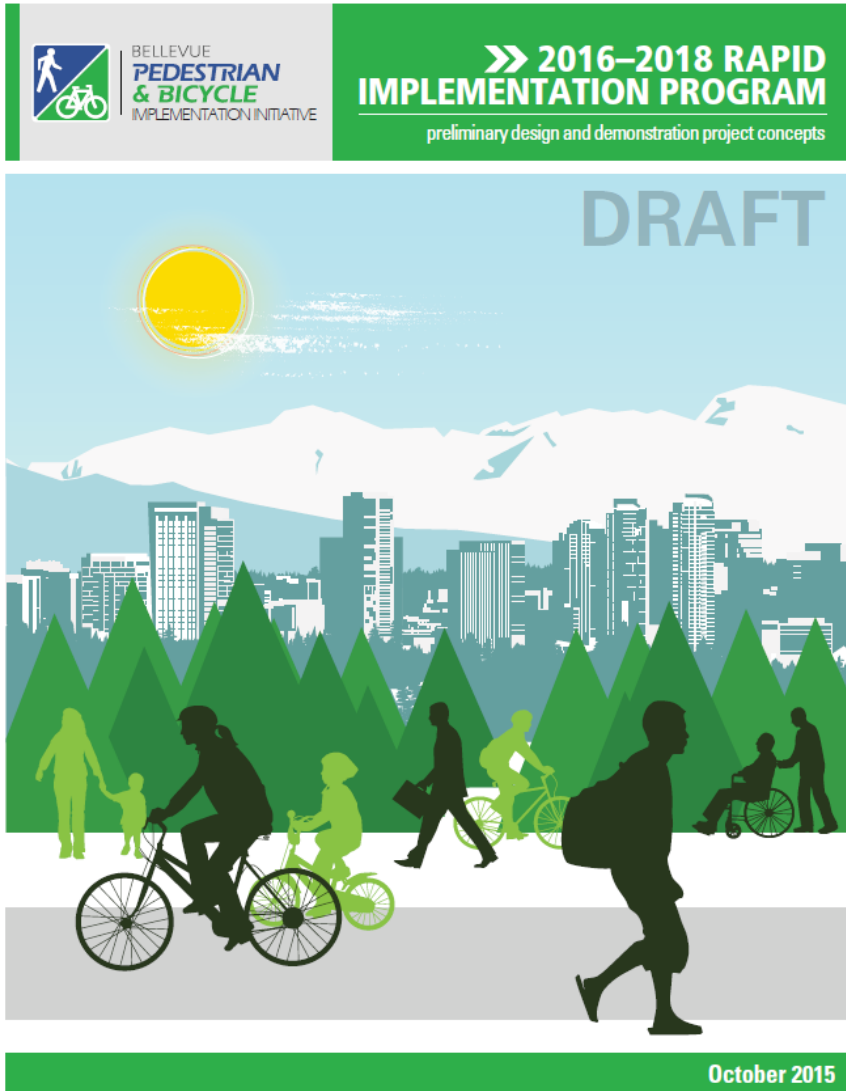
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Commission Discussion



- 1) Deliverable/Timeline**
- 2) Remaining Corridors**
- 3) Cost Estimates**
- 4) Summary Statistics**
- 5) Outreach Strategy**
- 6) Phasing Options**





- **December 10, 2015:** TC Meeting
- **January 12, 2016:** P&CS Board
- **January 28, 2016:** TC Workshop #1
- **February 25, 2016:** TC Workshop #2
 - RIP Open House
 - Remaining Corridors
 - Cost Estimates
 - Summary Statistics
 - Implementation Phasing Options
 - *Action: Agreement on Implementation Strategy*
- **March 24, 2016:** TC Workshop #3 [TBD]
 - PBII Budget Proposal: Engineering, Education, Encouragement, Enforcement, and Evaluation
- **March - April 2016:** RIP Outreach
 - Wikimap Interface for RIP Corridors
 - Door Hanger Affected RIP Corridors
- **April 29, 2016:** Budget Proposals to Budget Office
- **May/June 2016:** TC CIP Recommendation [CIP discussion begins on 2/11/16]

Implementation Strategy Options:

- 1) Improvements limited to gaps in Priority Bicycle Corridor Network or “Cross City Bicycle Corridors” (2 N-S and 2 E-W)**
- 2) Option 1 + upgrades to existing facilities along Priority Bicycle Corridor Network or “Cross City Bicycle Corridors” (i.e., from less protected to more protected)**
- 3) Option 2 + rapid implementation opportunities for feeder bicycle network improvements (e.g., school, park, major activity center)**

Implementation Strategy Options:

- 1) **Improvements limited to gaps in Priority Bicycle Corridor Network or “Cross City Bicycle Corridors” (2 N-S and 2 E-W)**
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- 3) Option 2 + rapid implementation opportunities for feeder bicycle network improvements (e.g., school, park, major activity center)

Existing Facilities

RIP Option #1

Wide Outside Lane

Wide Outside Lane

Wide Outside Lane

Bike Lane Improvement

Wide Outside Lane

Wide Outside Lane



Implementation Strategy Options:

- 1) Improvements limited to gaps in Priority Bicycle Corridor Network or “Cross City Bicycle Corridors” (2 N-S and 2 E-W)
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Existing Facilities

RIP Option #2

Wide Outside Lane

Bike Lane Improvement

Wide Outside Lane

Bike Lane Improvement

Wide Outside Lane

Bike Lane Improvement



Implementation Strategy Options:

- 1) Improvements limited to gaps in Priority Bicycle Corridor Network or “Cross City Bicycle Corridors” (2 N-S and 2 E-W)
- 2) Option 1 + upgrades to existing facilities along Priority Bicycle Corridor Network or “Cross City Bicycle Corridors” (i.e., from less protected to more protected)
- 3) **Option 2 + rapid implementation opportunities for feeder bicycle network improvements (e.g., school, park, major activity center)**

Existing Facilities

RIP Option #3

Wide Outside Lane

Bike Lane Improvement

Wide Outside Lane

Bike Lane Improvement

Wide Outside Lane

Bike Lane Improvement

School

Bike Lane Improvement



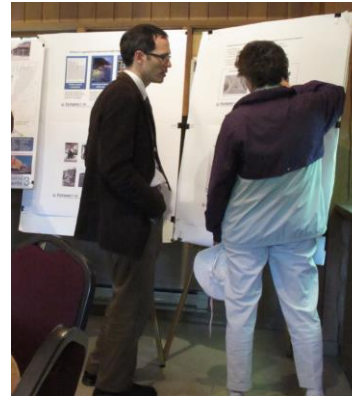
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IMPLEMENTATION INITIATIVE

February 25 Commission Workshop

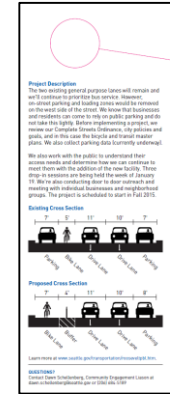
“Engage stakeholders at the earliest stages of scope development to ensure their input is included in project design.”

- City Council Direction

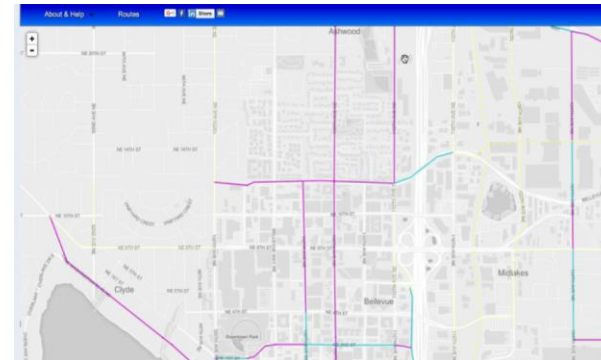
Transportation Commission RIP Open House (2/25/16)



Door Hanger to Affected Properties March – April 2016



Wikimap to Receive Public Feedback on Potential Projects March – April 2016



<https://www.dropbox.com/s/4b4b4drswjxuc08/bellevuedemo.mov?dl=0>



Questions/Comments?



BELLEVUE
**PEDESTRIAN
& BICYCLE**
IMPLEMENTATION INITIATIVE

Commission Discussion



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