



# **Bellevue Pedestrian & Bicycle Implementation Initiative**

**Transportation Commission** January 28, 2016

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City of Bellevue

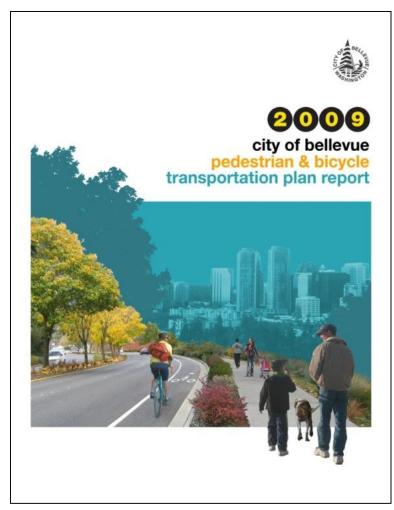


- 1) 12/10/15 TC Meeting Summary
- 2) Travel Lane Width Flexibility
- 3) RIP Conceptual Layouts
- 4) RIP Next Steps



- 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.



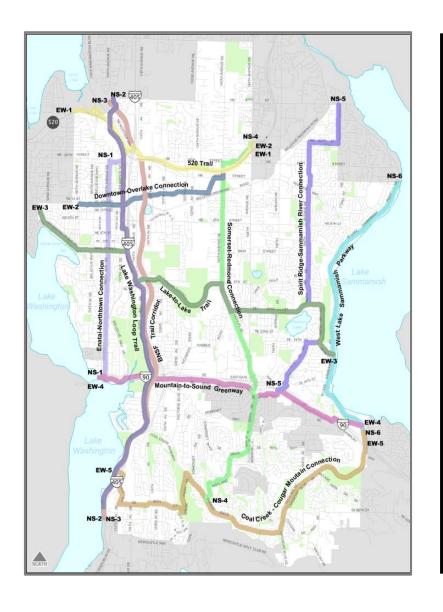


## **2014 Performance Target:**

"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





### **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 & BicycleTransportation Plan



#### 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.

- 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.
- Undertake an action-oriented initiative that advances projects and programs to help realize the City's vision.
- Provide a safe pedestrian and bicycle environment, which is a prerequisite to making non-motorized travel a viable, attractive option in Bellevue.
- 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.
- Research pedestrian and bicycle count technologies to improve the City's data driven decision-making.
- Determine where pedestrian and bicycle investments can improve the connectivity of the multi-modal transportation system.
- Coordinate with other efforts underway in Bellevue related to pedestrian and bicycle issues.
- Identify partnership opportunities to advance the implementation of nonmotorized projects and programs.
- Engage community stakeholders in setting the priorities for investment in non-motorized facilities.
- 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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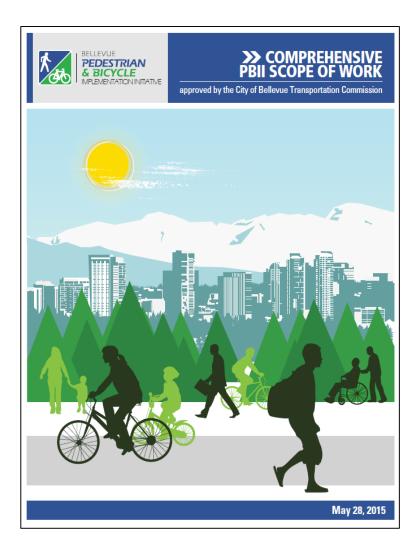
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Advance the implementation of Bellevue's planned **Bicycle Priority Corridors to facilitate** continuous bicycle travel along a connected grid of safe facilities throughout the city and the region.

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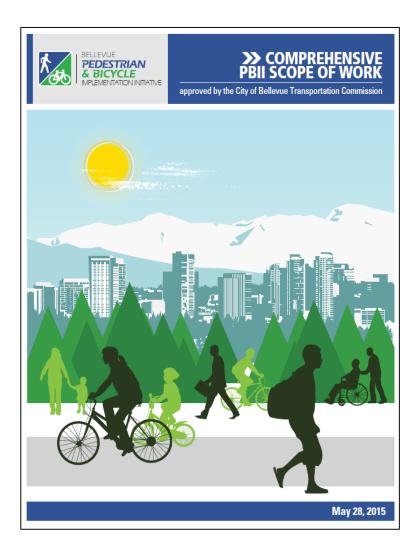
# Council support for a unified and recognizable strategy that:



- 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



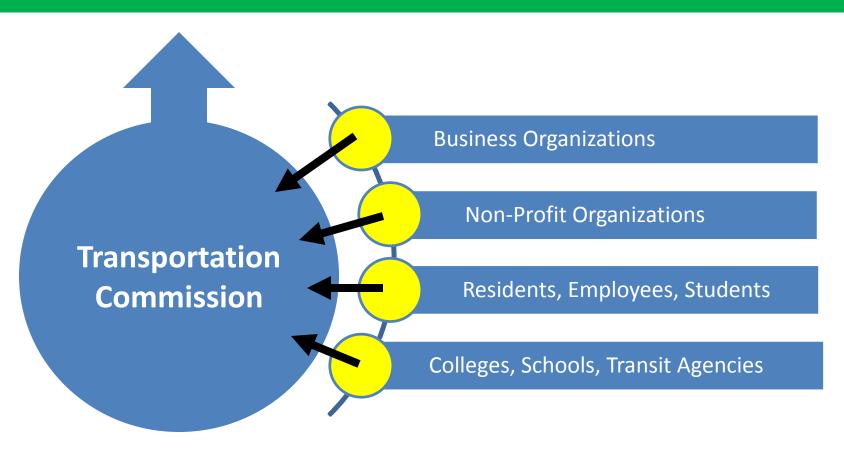
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# **Bellevue City Council**





- 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



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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**

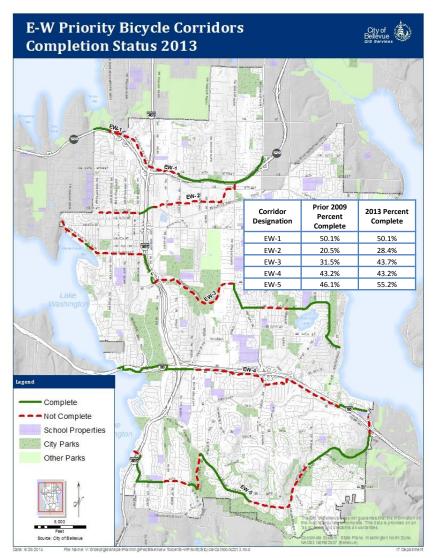
- Engineering "Paint/Post Ready" emphasis
- Education, Encouragement, Enforcement, Evaluation



#### Timeframe: Years 1-3

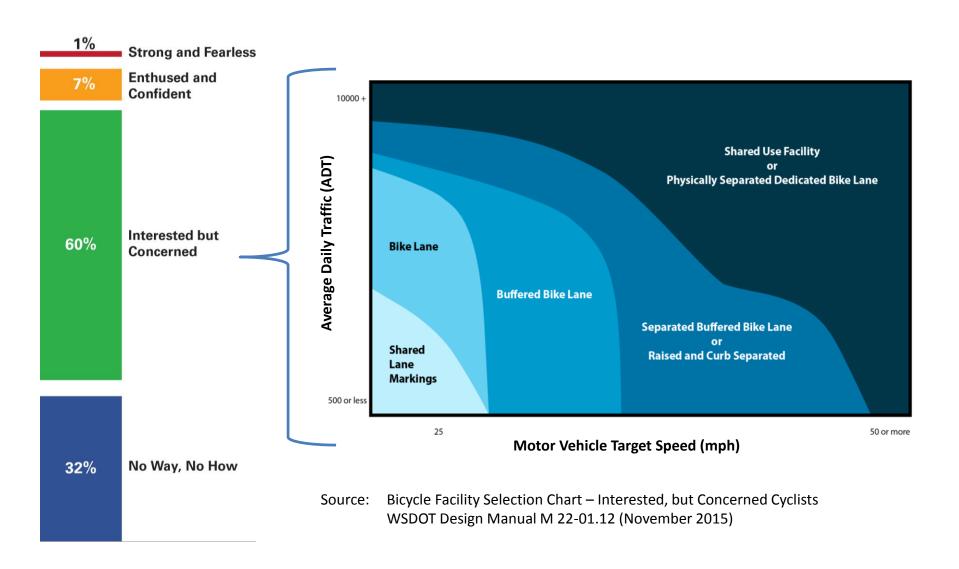
■ Start with quickest and most inexpensive improvements (low cost + big wins)













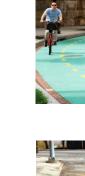
## **Protected Solutions**

**Striped Buffer & Delineator Post** 



**Oblong Low Bumps** 

**Jersey Barriers** 



**Linear Barrier** 

**Paint & Delineator Posts** 





**Turtle Bumps** 



**Precast Barrier Curb** 



**Rigid Bollards** 



**Large Bumps** 



**Parked Cars** 



**Cast in Place Barrier Curb** 





Offstreet Paths

Separated Bike Lanes

**Conventional Bike Lanes** 

**Marked Bike Routes** 

**Unmarked Shared Roadways** 

**Other Roads** 





**Existing Bicycle Facilities** 

Offstreet Paths

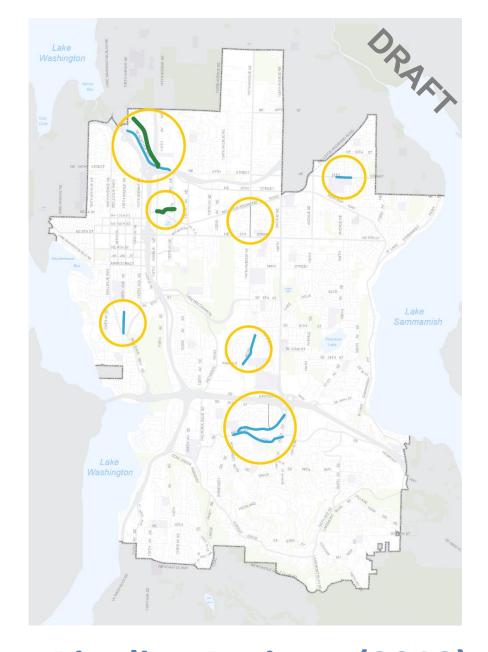
Separated Bike Lanes

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**Other Roads** 





Pipeline Projects (2019)

Offstreet Paths

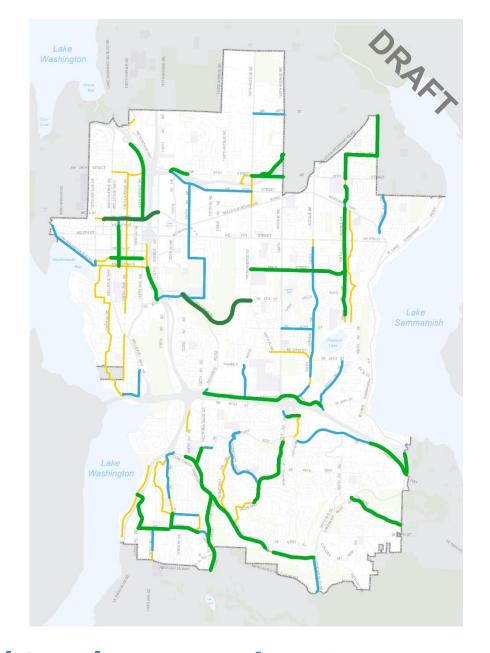
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Offstreet Paths

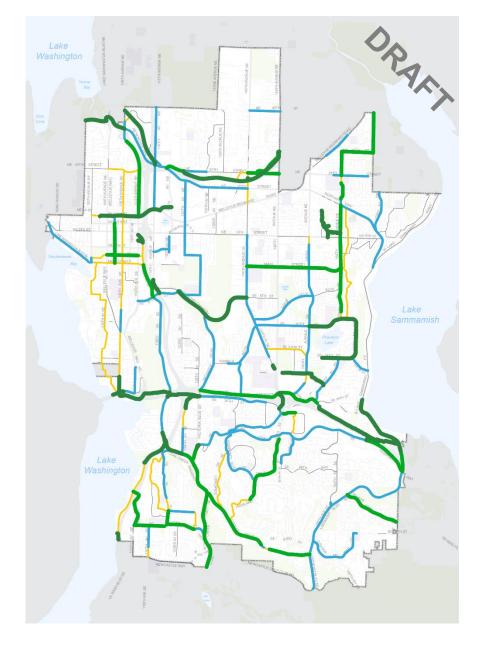
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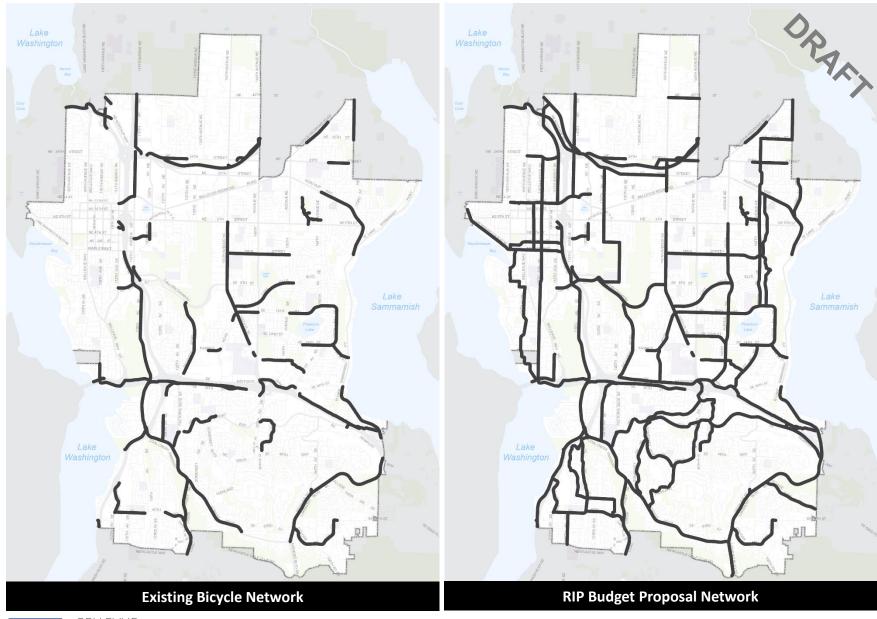
**Unmarked Shared Roadways** 

**Other Roads** 





**Connected Network** 





# **Connected Network**

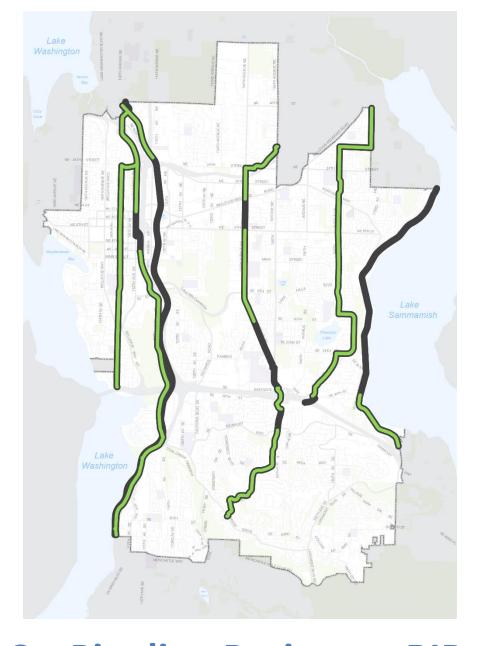
North-South
Priority Bicycle
Corridors (PBC) as
defined in the
2009 Plan.





**PBC (N-S Corridors)** 

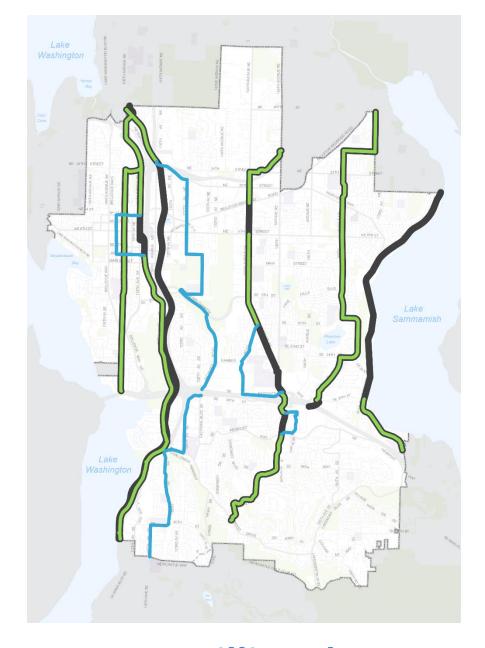
2019 completion status of Priority **Bicycle Corridors** (PBC) with pipeline projects and Rapid *Implementation* Program (RIP).





**PBC + Pipeline Projects + RIP** 

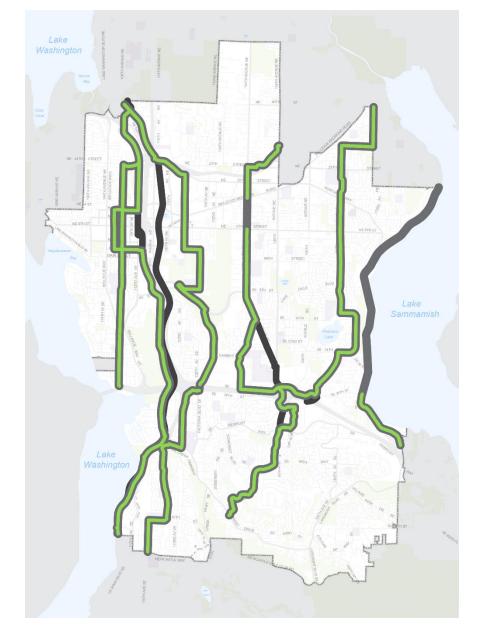
Parallel corridors where projects that can help to close gaps in the PBCs where rapid improvements are not possible.





Filling the Gaps

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.

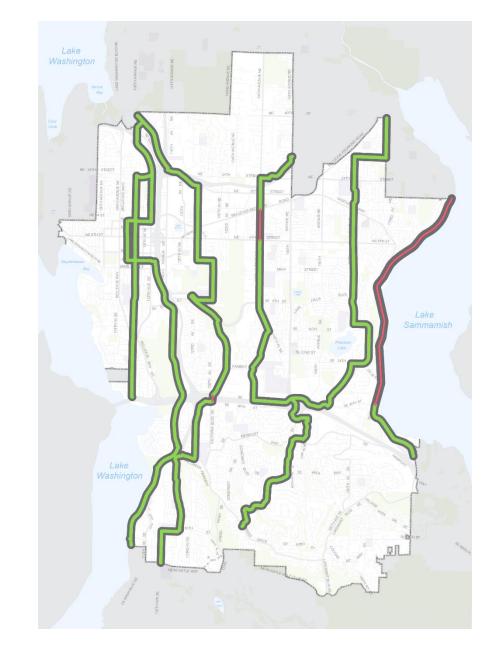




**Connected Network** 

# 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 140<sup>th</sup> Ave NE between NE 8<sup>th</sup> St and Bel-Red Road.
- NS-6 is complete except for remaining gap on West Lake Sammamish Parkway.





**Connected Network** 

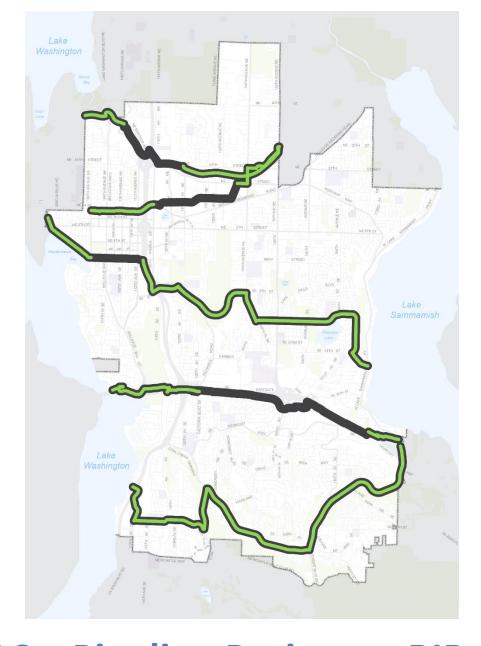
East-West Priority
Bicycle Corridors
(PBC) as defined
in the 2009 Plan.





**PBC (E-W Corridors)** 

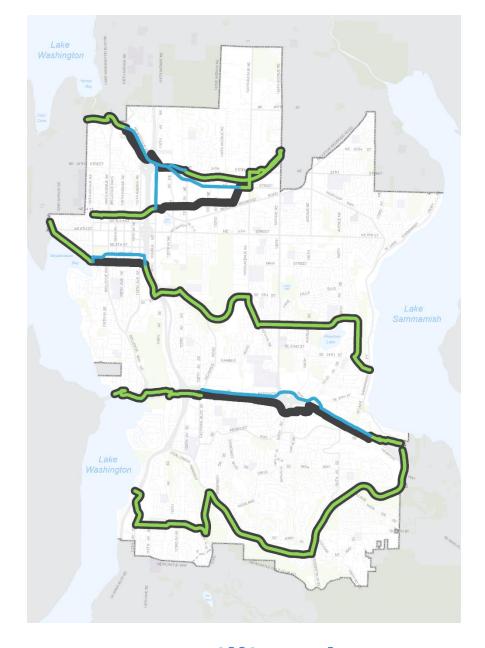
2019 completion status of Priority **Bicycle Corridors** (PBC) with pipeline projects and Rapid *Implementation* Program (RIP).





**PBC + Pipeline Projects + RIP** 

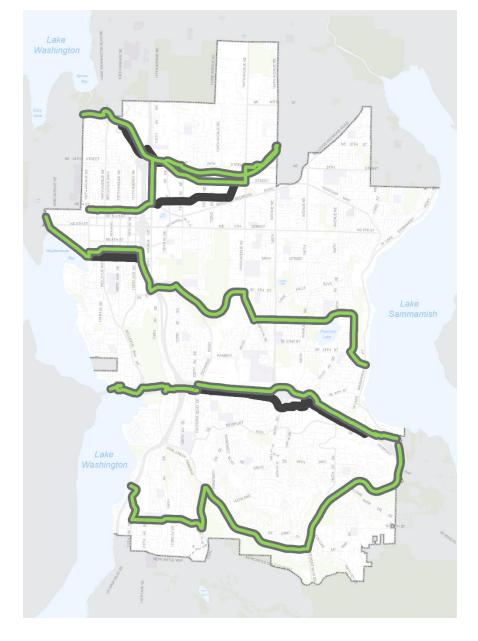
Parallel corridors where projects that can help to close gaps in the PBCs where rapid improvements are not possible.





Filling the Gaps

Completion status of 2019 cross-city bicycle connections and their relationship to PBCs. Shows all E-W corridors with continuous end-to-end.

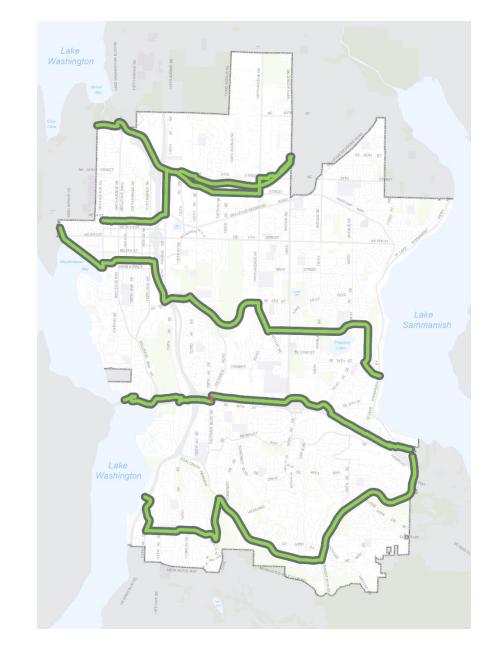




**Connected Network** 

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**Connected Network** 



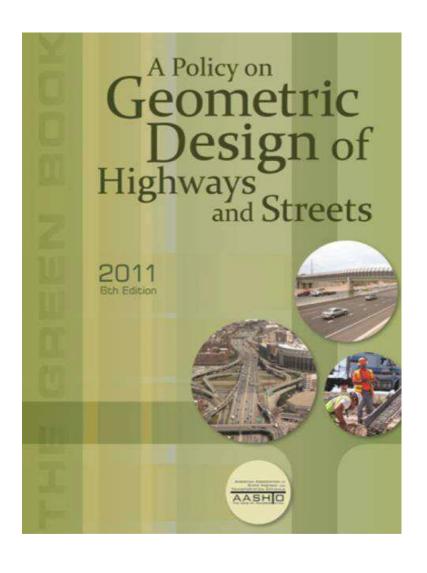
# **Questions/Comments?**





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

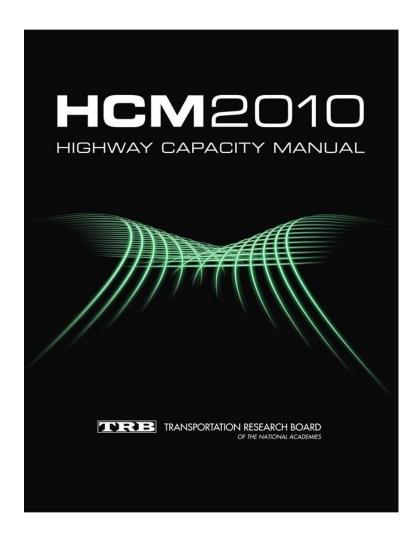




- Guidance for roadways in the United States.
- This is the basis for other standards for States and Local Governments.
- The Urban Arterials section of the manual states: "lane widths may vary from 10-feet to 12-feet."
- Use of narrower lane widths would depend on the context of the road/intersection (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





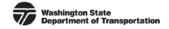
#### Adjustment Factor for Lane Width $(f_{IW})$

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

Lane Width	Reduction in <i>FF</i> S (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. <u>Chapter 1106 – Design Element Dimensions</u>. November 2015.



Potts, Harwood, and Richard

#### Relationship of Lane Width to Safety for Urban and Suburban Arterials

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#### Douglas W. Harwood

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> Karen R. Richard Staff Analyst Midwest Research Institute 425 Volker Boulevard Kansas City, MO 64110-2299 Tel: (816) 360-5286 Fax: (816) 561-6557 krichard@mriresearch.org

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.



Potts, Harwood, and Richard

#### Relationship of Lane Width to Safety for Urban and Suburban Arterials

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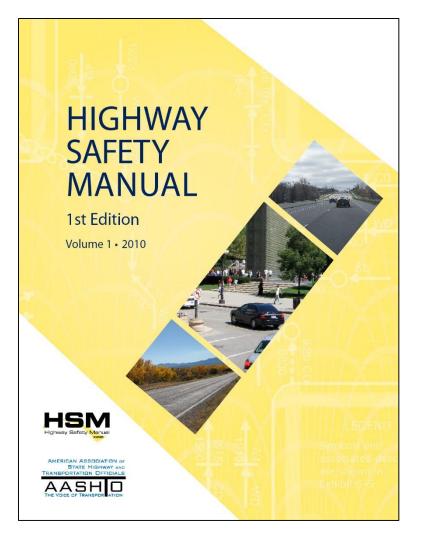
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- (NCHRP) Project 17-26 Minnesota,
   Michigan and North Carolina.
- Study was conducted on both suburban and urban arterials.
- 408 miles, over 3000 roadway segments varied from 9ft to 13ft wide.
- Over 20,000 crashes within the 5 year study.
- 1342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





- (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?**





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



Most Separation Least Separation

Separated Buffered Bike Lane (aka Protected Bike Lane)



On-Street Buffered Bike Lane

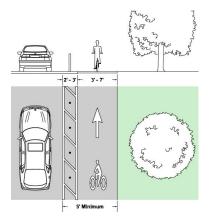


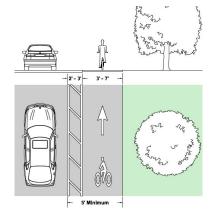
Conventional On-Street Bike Lane

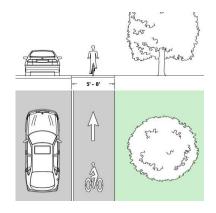


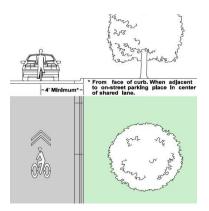
Shared Lane Marking (aka Sharrows)











Source: WSDOT Design Manual. <a href="Chapter1520">Chapter 1520 — Roadway Bicycle Facilities</a>. November 2015.



# **On-Street Bicycle Facilities**



**Bicycle Wayfinding** 



**Curb Extension** 



**Pavement Markings** 



**School Zone Flashing Beacon** 



**Traffic Diverter** 



**Speed Hump** 





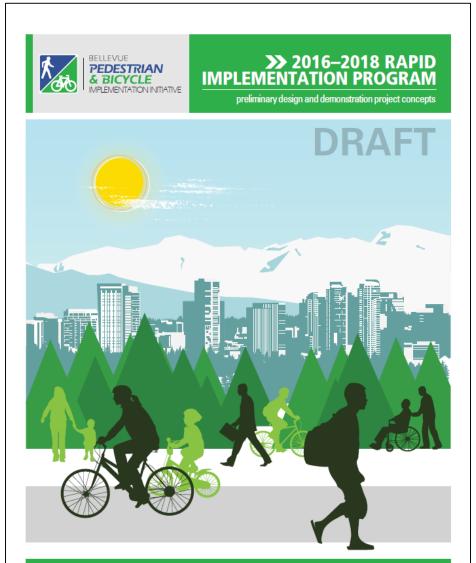
# **Questions/Comments?**





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





October 2015



- 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]

# **Deliverables/Timeline**

- 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 #1
- 1) Improvements limited to gaps in Priority Bicycle Corridor Network or "Cross City Bicycle Corridors" (2 N-S and 2 E-W)
- Wide Outside Lane Wide Outside Lane

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)

Wide Outside Lane Bike Lane Improvement

3) Option 2 + rapid implementation opportunities for feeder bicycle network improvements (e.g., school, park, major activity center)

Wide Outside Lane Wide Outside Lane



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### **Existing Facilities** RIP Option #2

**Wide Outside Lane** 

**Bike Lane Improvement** 

**Wide Outside Lane** 

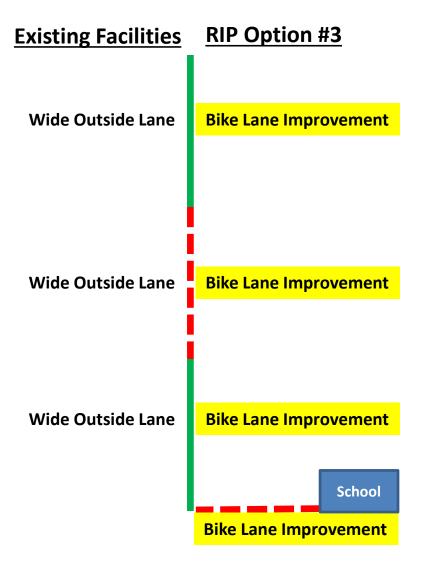
**Bike Lane Improvement** 

**Wide Outside Lane** 

**Bike Lane Improvement** 



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- Option 2 + rapid implementation opportunities for feeder bicycle network improvements (e.g., school, park, major activity center)





"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)

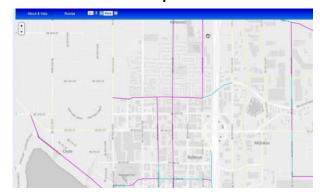


### Door Hanger to Affected Properties March – April 2016





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



https://www.dropbox.com/s/4b4b4drswjxuco8/bellevuedemo.mov?dl=0



### **Outreach Strategies**



# **Questions/Comments?**





### Franz Loewenherz

**Transportation Department** 

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425-452-4077

