



Level-of-Service in Bellevue

Toward a Multimodal Approach to Mobility

Transportation Commission MMLOS Refresher (Part 1) And Next Steps (Part 2) September 14, 2017

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BELLEVUE MMLOS TOPICS

- Bellevue Policy Evolution
- Vehicle Level of Service
- Pedestrian Level of Service
- Bicycle Level of Service
- Transit Level of Service
- Next Steps

WHAT IS MULTIMODAL MOBILITY?

A multimodal mobility strategy is designed to address more than one “mode” (or method) of transportation for people to get to/from and within Bellevue. The city’s multimodal mobility strategy incorporates policies for all mobility options, including walking, bicycling, riding transit, and driving.

Multimodal planning considers the modes of transportation and the context as inputs to design and investment decisions.



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MMLOS POLICY

- **Comprehensive Plan 1989**
 - Traveling on arterials should not be too inconvenient, time consuming, or unsafe
- **Comprehensive Plan 1993**
 - Establish (vehicle) LOS standards in each area of the city in light of growth management objectives
- **Comprehensive Plan 2015**
 - Establish MMLOS measures, standards and targets





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MMLOS SUMMARY

Transportation Commission Approved April 13, 2017

Mode	LOS Metric	LOS Standard	LOS Guideline
Vehicle	Intersections: Volume/Capacity or Average Delay	V/C 0.80-0.95. Varies by mobility optional and land use	Delay 20-80 sec. Varies by mobility options and land use
	Arterials: Typical Urban Travel Time/Speed		Percent of posted speed limit LOS varies by neighborhood context
Pedestrian	Sidewalk and Landscape Width	12-20 feet, Varies by land use context	
	Pedestrian Comfort, Access and Safety at Intersections		Design varies by land use context
Bicycle	Level of Traffic Stress (LTS) on Corridors		Design to achieve LTS varies by roadway traffic speed and volume
	Level of Traffic Stress (LTS) at Intersections		Maintain corridor LTS at intersections. Design components vary by context
Transit	Passenger Comfort, Access and Safety		Varies by transit stop/station typology
	Transit Travel Speed on Corridors		14 mph on Frequent Transit Network corridors between activity centers

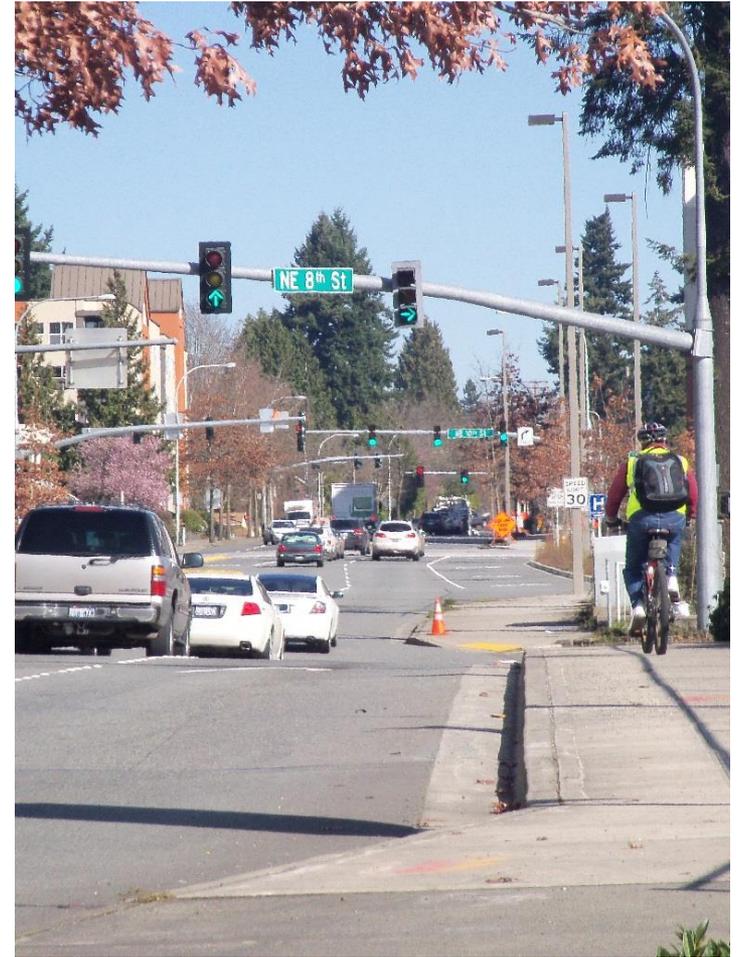


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VEHICLE LOS

- Intersections
- Corridors



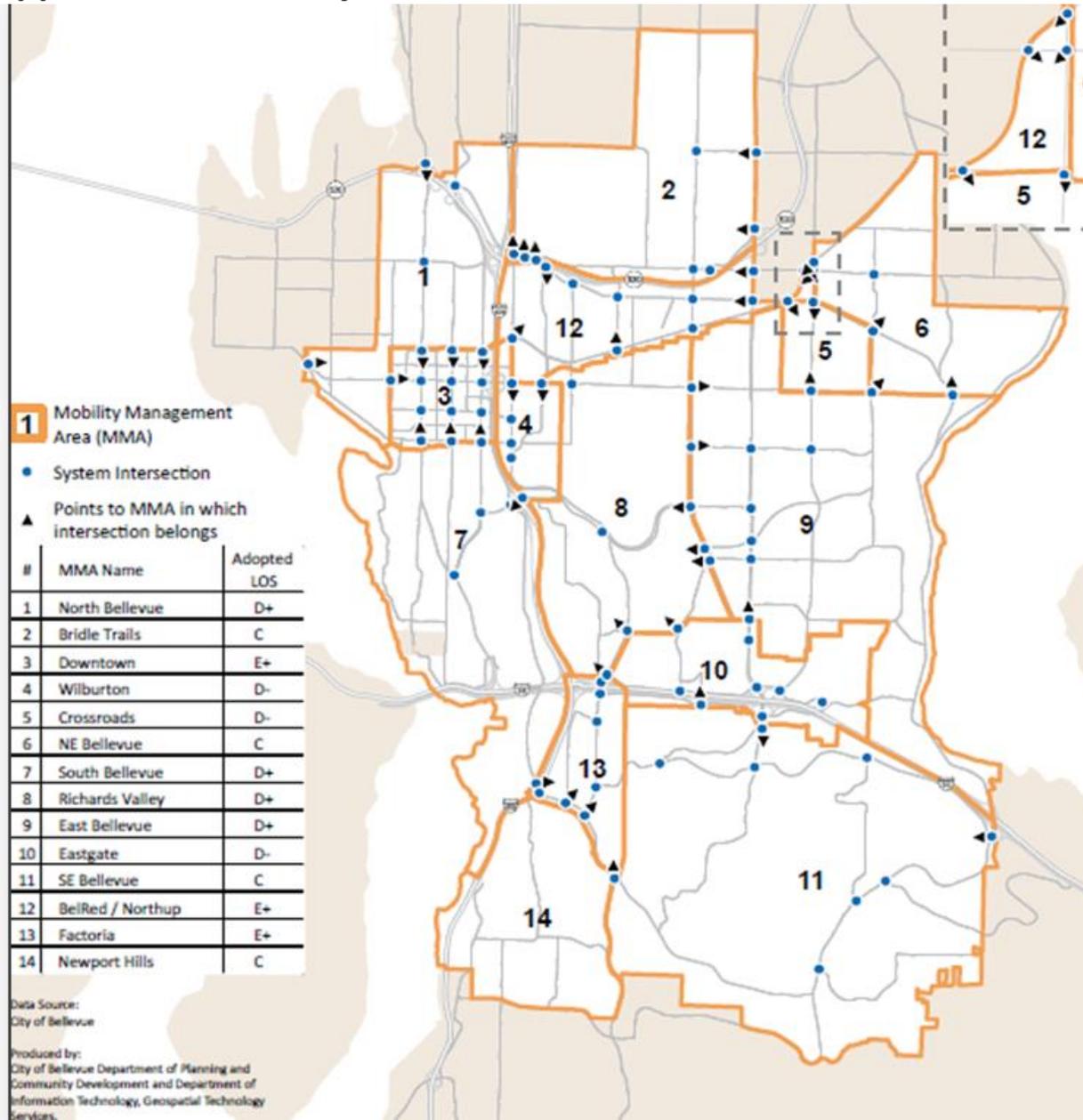


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VEHICLE LOS INTERSECTIONS

- Average V/C at System Intersections in Mobility Management Areas (MMAs)
- LOS PM Peak Hour Standards in Bellevue range from .70 to .95
- Varies by land use context and mobility options





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VEHICLE LOS - CORRIDORS

LOS	Typical Urban Travel Time/Travel Speed on Corridors Based on 40% of the Posted Speed Limit
Green	Less than 90% of Typical Urban Travel Time Faster than 1.1 times the Typical Urban Travel Speed
Light Green	90-110% of Typical Urban Travel Time Between 1.1 and .9 times the Typical Urban Travel Speed
Yellow	110-155% of Typical Urban Travel Time Between .9 and .75 times the Typical Urban Travel Speed
Orange	155-200% of Typical Urban Travel Time Between .75 and .5 times the Typical Urban Travel Speed
Red	More than 200% of Typical Urban Travel Time Slower than .5 times the Typical Urban Travel Speed



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VEHICLE LOS (HYPOTHETICAL) BELLEVUE WAY CORRIDOR

Posted speed: 30 mph

Typical Urban Travel Speed: 12 mph

Guideline: (.50 - .75) 6 – 9 mph 

NB: 10 mph  OK

SB: 5 mph  Not OK, 7 mph  OK

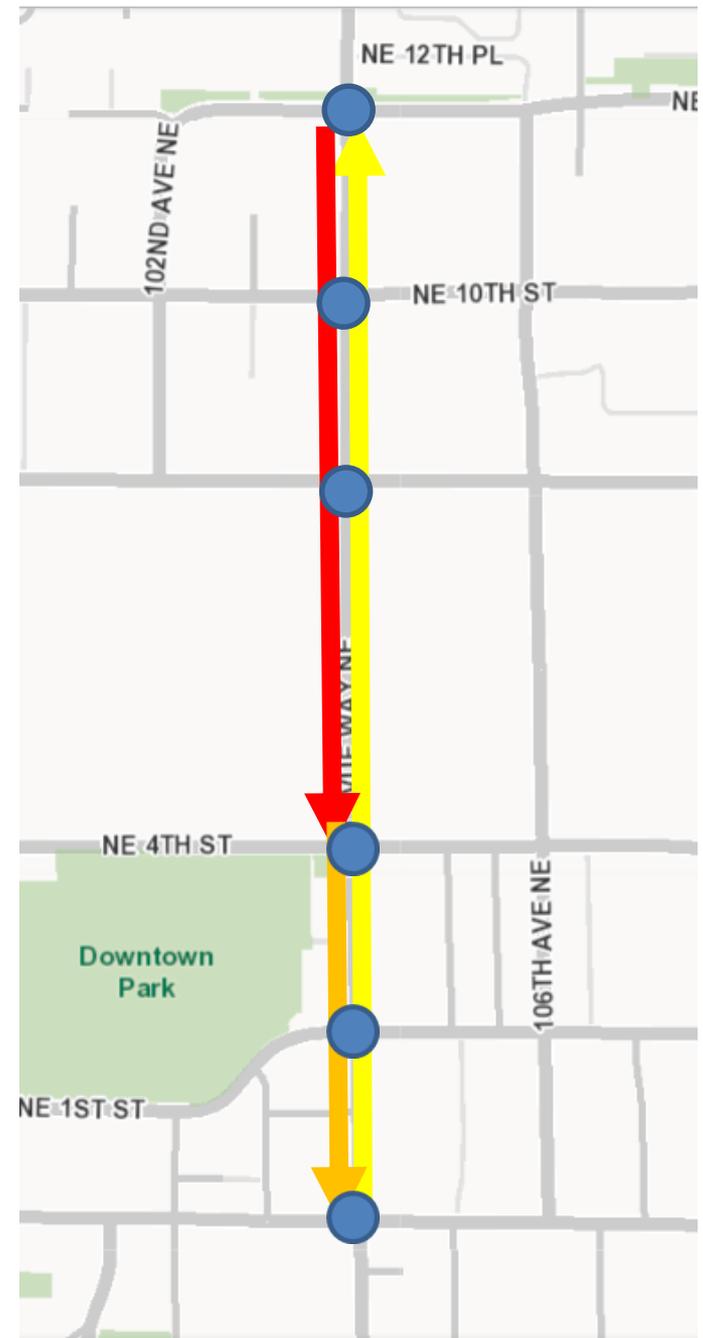
What to do with this information?

Take a look!

Potential remedies?

Compare to other locations

What are the MMLoS tradeoffs?





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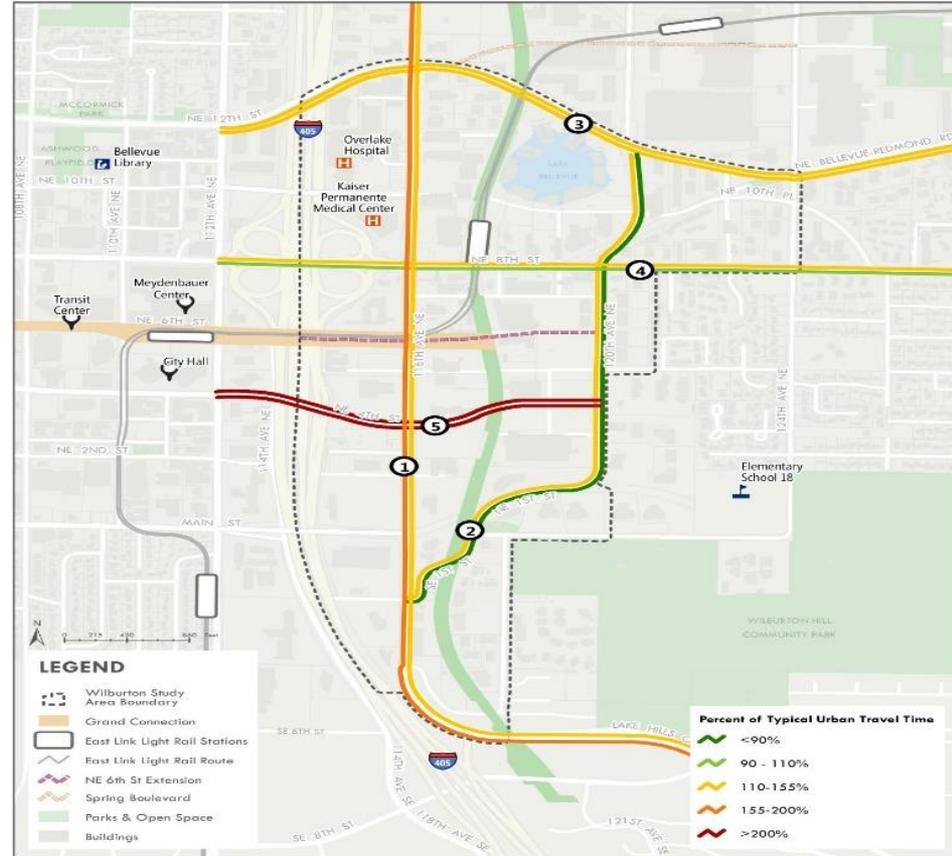
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Wilburton Commercial Area Study Comparing Alternatives

Alternative 2



Alternative 3



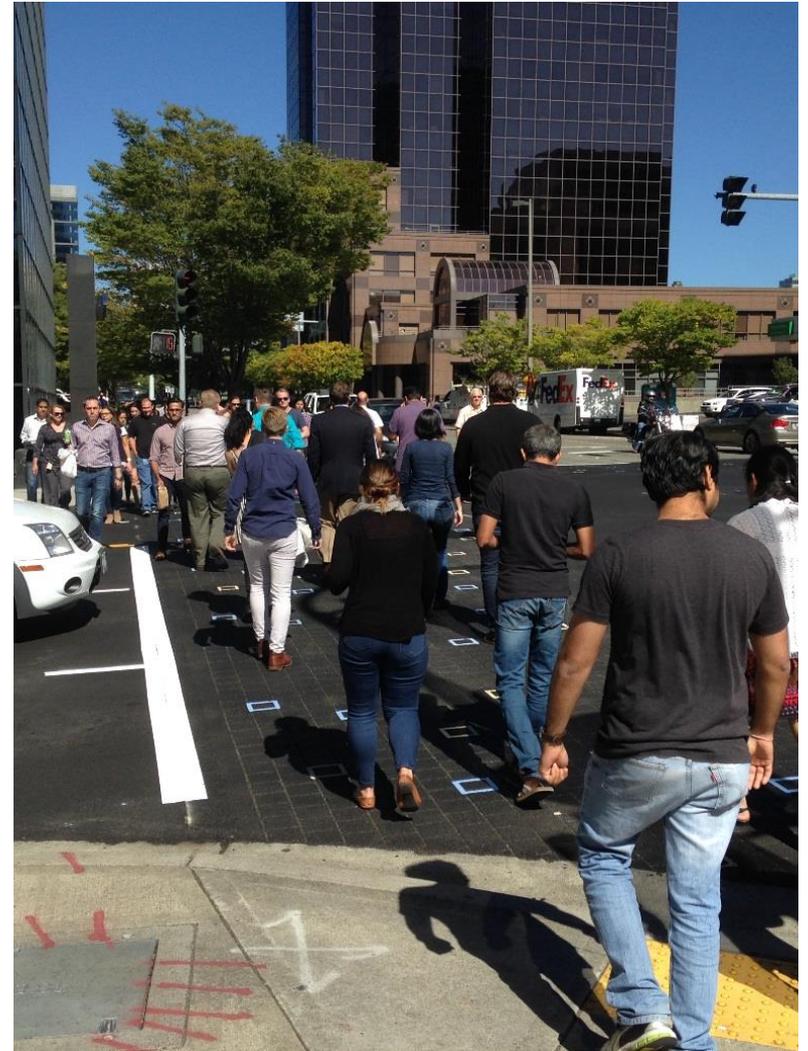


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PEDESTRIAN LOS

- Sidewalks
- Intersections





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PEDESTRIAN LOS

Context:	Downtown	Activity Center	Neighborhood Shopping Center	Pedestrian Destination	Elsewhere
Component					
Sidewalk Width Landscape Buffer	Downtown Land Use Code	16 feet	13 feet	13 feet	Transportation Design Manual
Signalized Intersection Design	Downtown Transportation Plan	Downtown Transportation Plan "Enhanced"	Transportation Design Manual	Transportation Design Manual	Transportation Design Manual
Arterial Crossing Frequency	Downtown Transportation Plan	600- 800 feet	600 feet	300-600	N/A

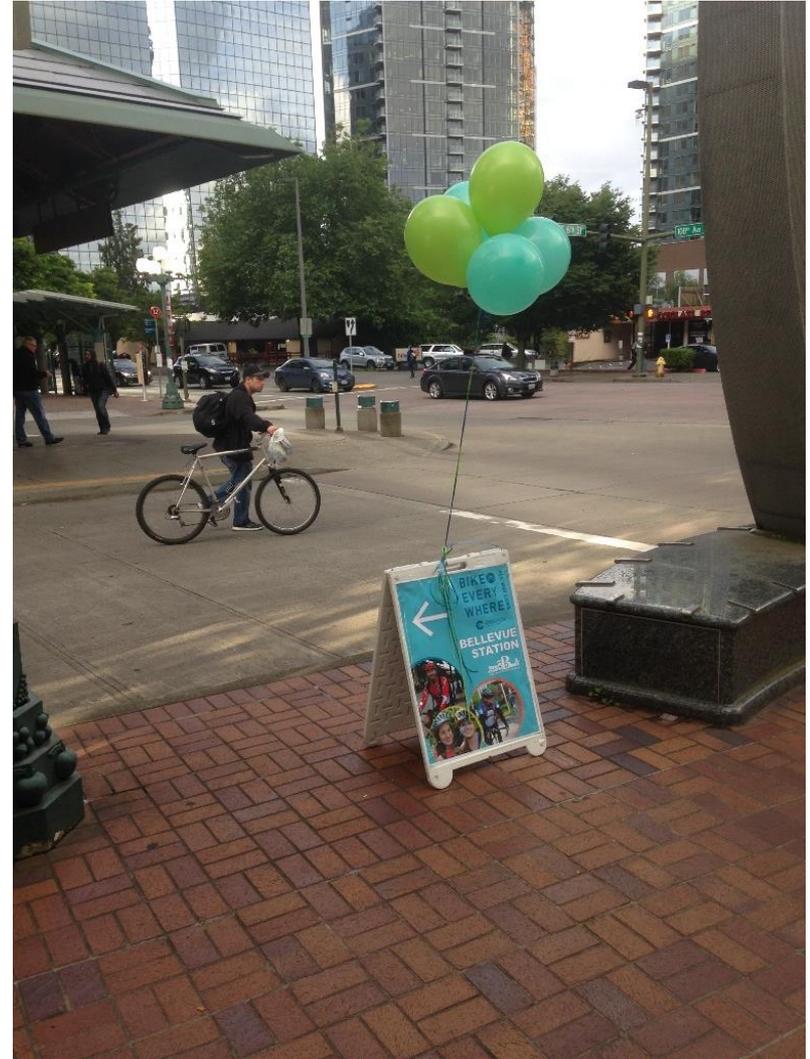


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BICYCLE LOS

- Corridors
- Intersections





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BICYCLE RIDER

LEVEL OF TRAFFIC STRESS (LTS)

LTS
1

INTERESTED BUT CONCERNED

LTS 1 is a level that most children & their parents would find comfortable and safe for riding.



LTS
2

INTERESTED BUT CONCERNED

LTS 2 bicycle riders are representative of a typical mainstream adult & can accept some degree of stress while riding along a roadway.



LTS
3

ENTHUSED AND CONFIDENT

LTS 3 bicycle riders can tolerate some stress even though they may prefer to ride with a lower level of traffic stress.



LTS
4

STRONG AND FEARLESS

LTS 4 is tolerated for any significant distance only by "strong and fearless" bicycle riders who are comfortable riding in a mixed-traffic environment.





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BICYCLE RIDER LTS/LOS

Roadway Characteristics

**Bicycle Facility Components:
Guideline to Achieve Intended Level of Service/Level of Traffic Stress**

Speed Limit (MPH)	Arterial Traffic Volume	No Marking	Sharrow Lane Marking	Striped Bike Lane	Buffered Bike Lane (Horizontal)	Protected Bike Lane (Vertical)	Physically Separated Bikeway
</= 25	<3k	1	1	1	1	1	1
	3-7k	3	2	2	2	1	1
	>/=7k	3	3	2	2	1	1
30	<15k	3	3	2	2	1	1
	15-25k	4	4	3	3	3	1
	>/=25k	4	4	3	3	3	1
35	<25k	4	4	3	3	3	1
	>/=25k	4	4	4	3	3	1
>35	Any	4	4	4	4	3	1



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BICYCLE LOS INTERSECTION COMPONENTS

Intersection Treatment	Bike Signal	Street Crossing	Approach to Intersection	Approach to Intersection with Right Turn Lane
Bike LOS				
1	Bike signal	Green solid or skip stripe	Green bike box	Curb ramp to wide sidewalk
2	Bike signal	Skip stripe	Bike box	Green bike lane to left
3	Green cycle length	Sharrows	Signal actuation	Bike lane to left
Trail or Mid-Block Crossing	Full signal or HAWK or RRFB	Green solid or skip stripe	N/A	N/A



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TRANSIT LOS

- Passenger Amenities
- Speed on Frequent Transit Network





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TRANSIT PASSENGER LOS COMPONENTS

Context			
<u>Component</u>	Local Stop	Primary Stop	Frequent Transit Network Stop
Weather Protection	Yes	Yes	Yes
Seating	Yes	Yes	Yes
Paved Bus Door Passenger Zone	15-30'	40'	60'
Wayfinding	Optional	Yes	Yes



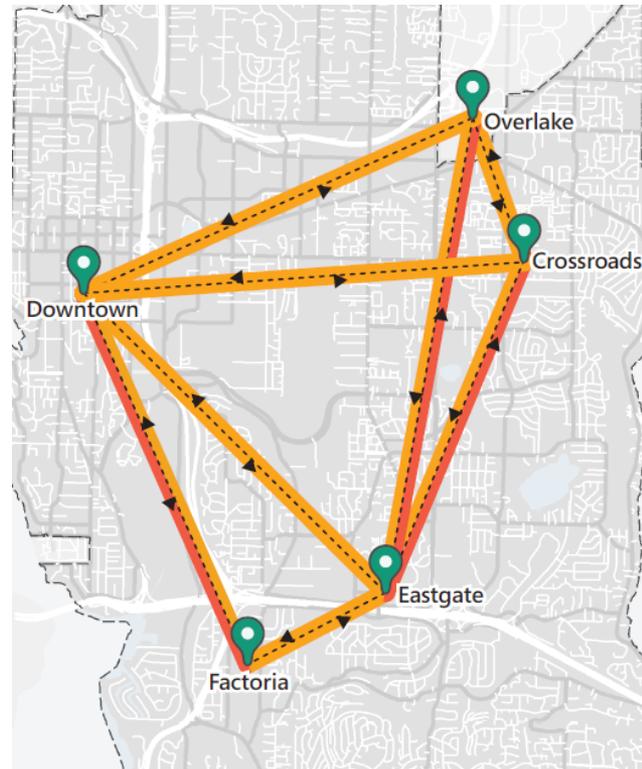
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TRANSIT LOS SPEED

- Frequent Transit Network (FTN) Corridors between Activity Centers
- Target FTN speed in Bellevue Transit Master Plan (14 mph)
- Transit LOS Guidance: 14 mph on FTN connections

LOS Rating	Transit Speed Target
	<10 mph
	10-14 mph
	>14 mph



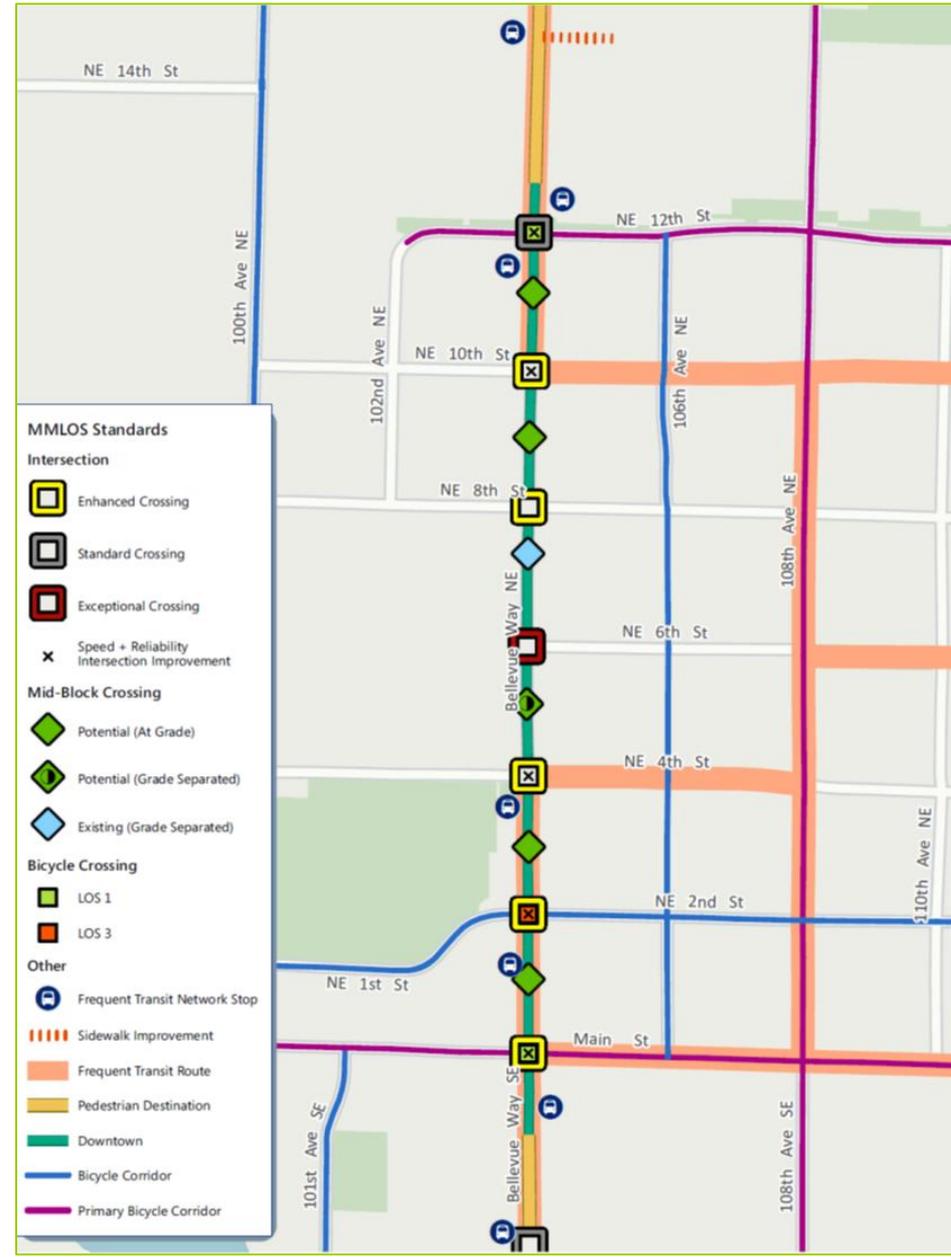


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MMLOS IMPLEMENTATION

Putting it all together on Bellevue Way in Downtown Bellevue





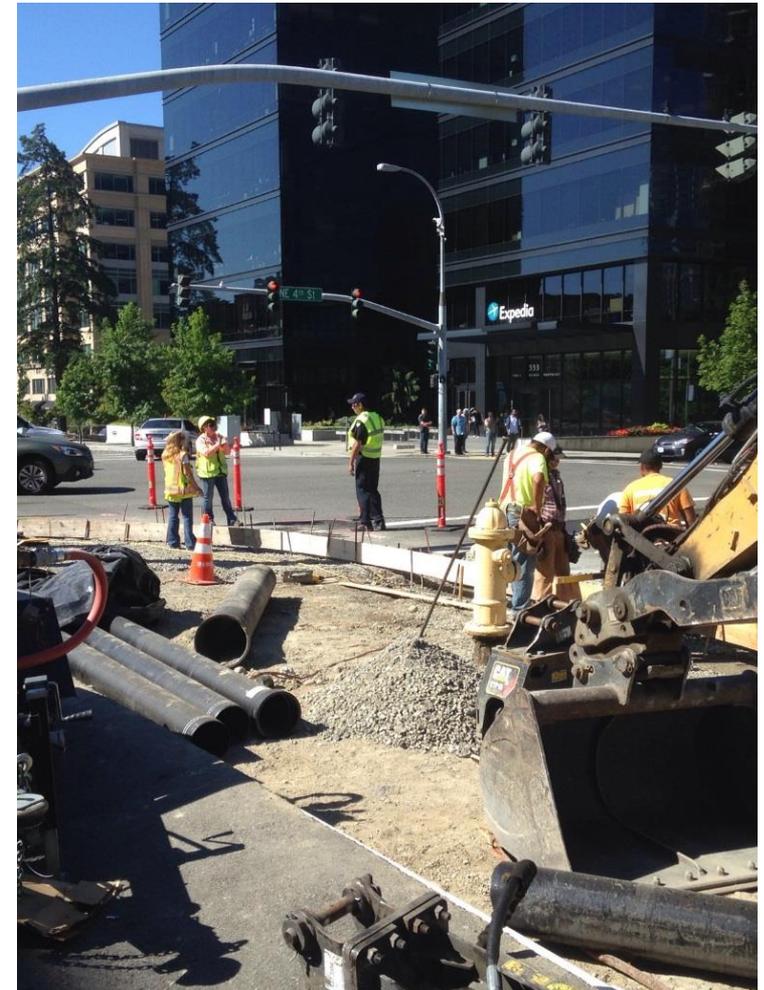
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NEXT STEPS: PART 2 MMLOS IMPLEMENTATION

Develop an approach to mobility in Bellevue that will deeply embed MMLOS into City decisions regarding:

- What Projects to Build
- Priority of Projects
- What Resources to Use





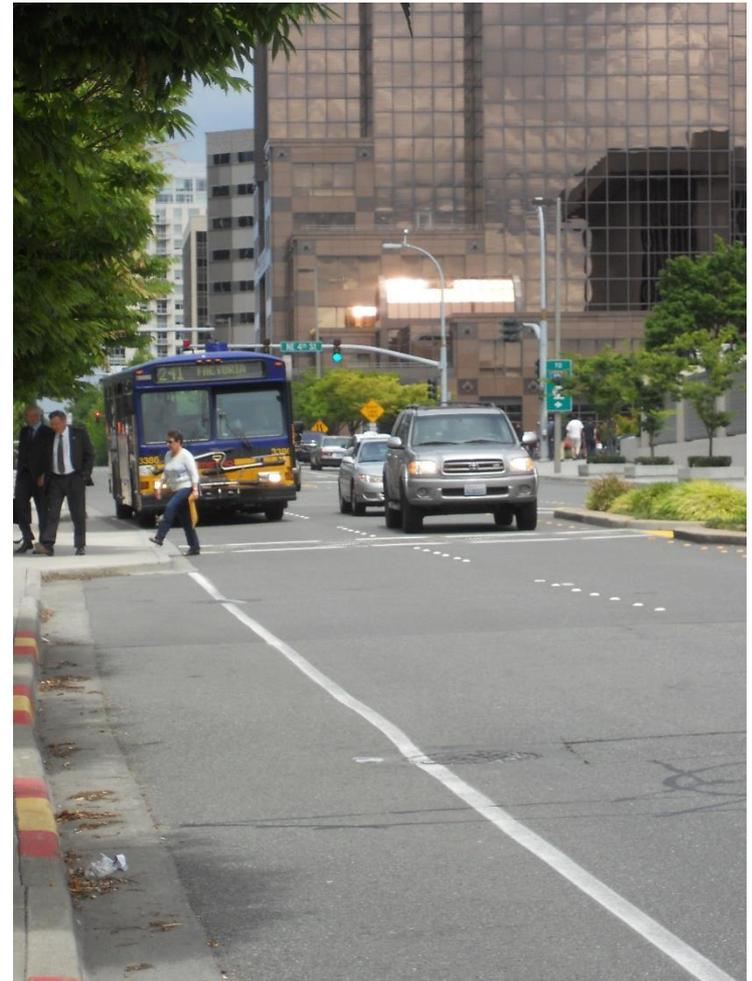
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NEXT STEPS - MMLOS IMPLEMENTATION

What Projects to Build – 3 steps

- Identify the expected LOS for each mode
- Consider the type of facility needed to achieve expected LOS
- Document how existing facility type compares to what is needed to meet expected LOS
 - If a gap is identified, then a project may be needed





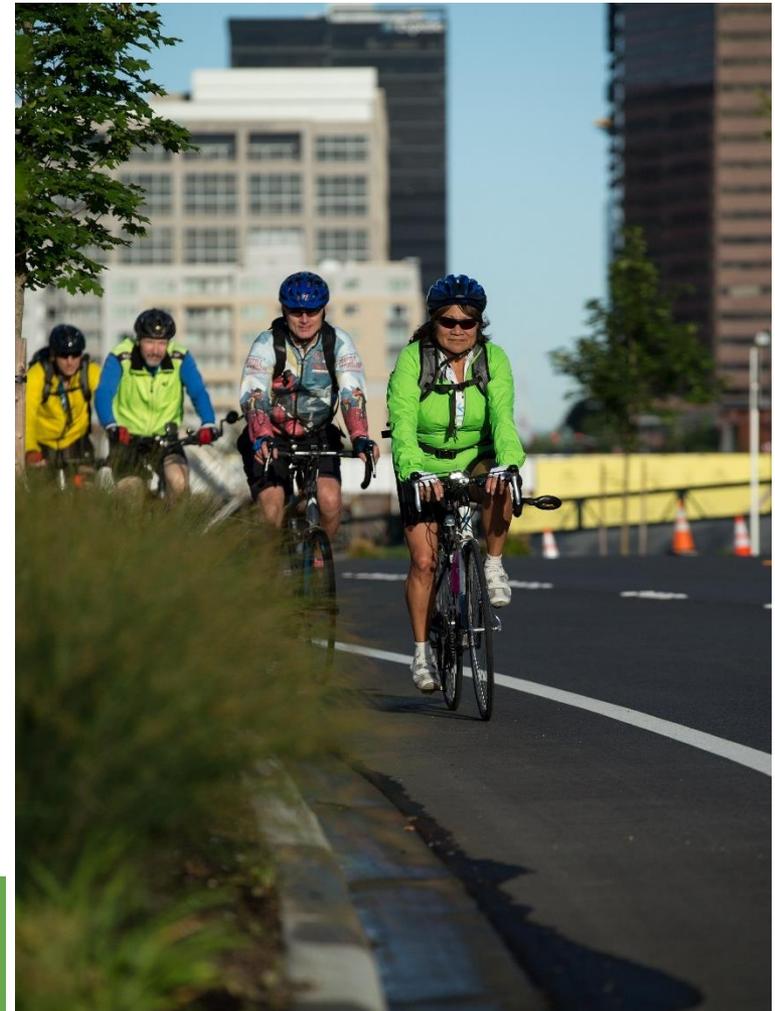
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NEXT STEPS - MMLOS IMPLEMENTATION

Project Prioritization

- MMLOS metrics, standards and guidelines will provide tools to identify priorities, for example:
 - Corridor travel speed
 - Bicycle level of traffic stress
 - Sidewalk and landscape width
 - Transit stop components



Bellevue, WA
SILVER LEVEL 2014-2019

www.walkfriendly.org



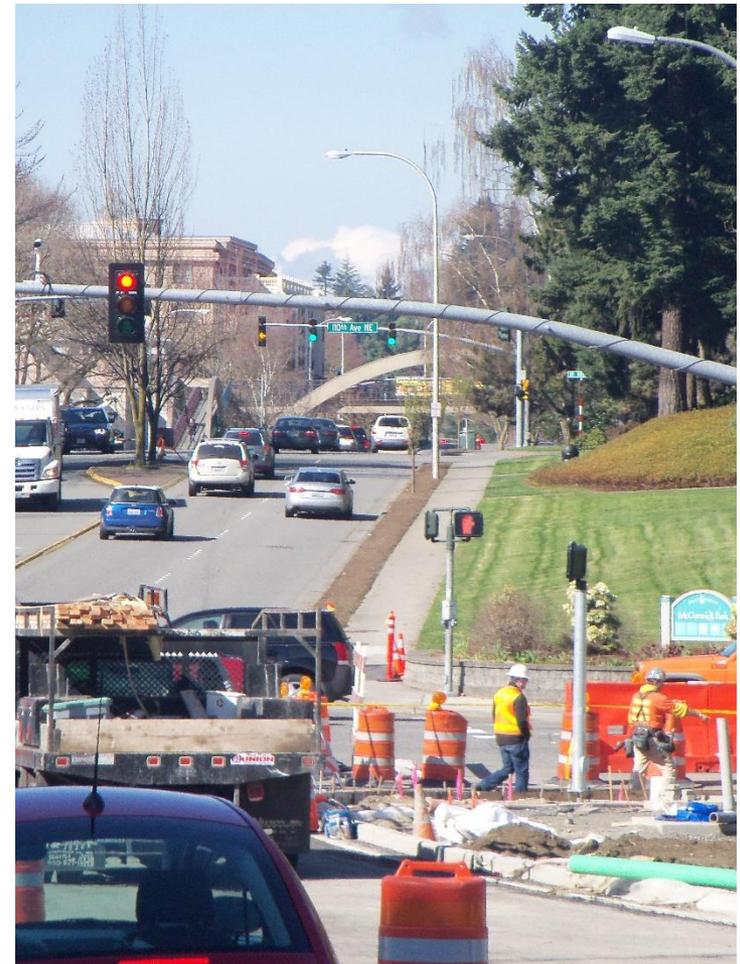
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NEXT STEPS - MMLOS IMPLEMENTATION

Project Implementation

- With what resources
 - Impact Fees
 - Trip generation calculated for vehicles in the PM Peak Period
 - What about new trips taken on foot, by bicycle or on transit?
 - Capital Investment Program
 - Funding for projects and programs
 - Achieve specific MMLOS outcomes
 - Development Review
 - Consider on-site improvements and off-site improvements





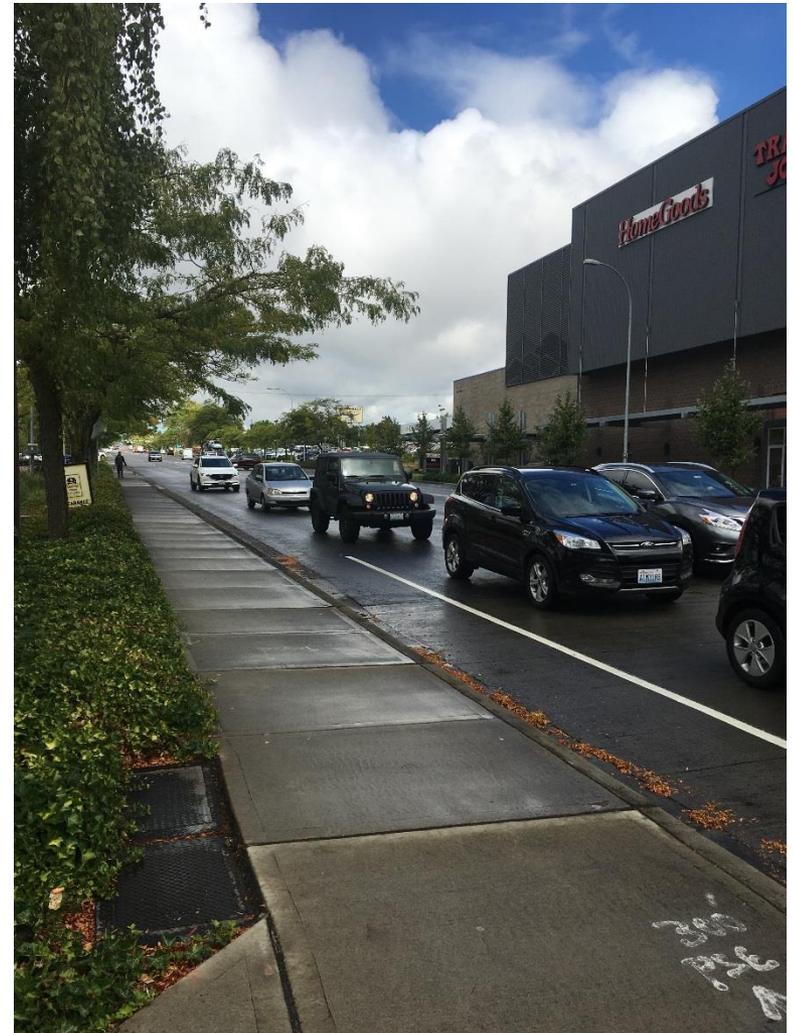
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MMLOS ENVIRONMENTAL OUTCOMES

"Green" Metrics

- Environmental outcomes of mobility choices
 - Mode Share
 - Vehicle Miles Traveled
 - Greenhouse Gas Emissions





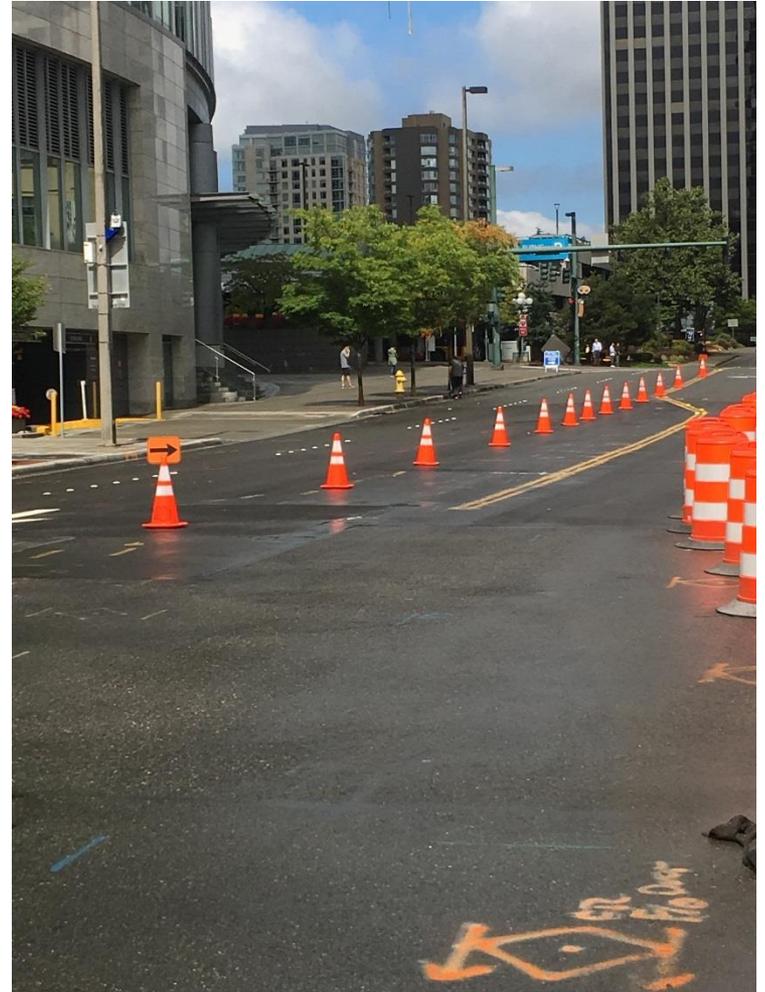
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NEXT STEPS - MMLOS IMPLEMENTATION

December 14, 2017

- Transportation Commission
 - Review scope of work
 - Fehr & Peers under contract
 - Use MMLOS to answer the question:
 - What Projects to Build





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